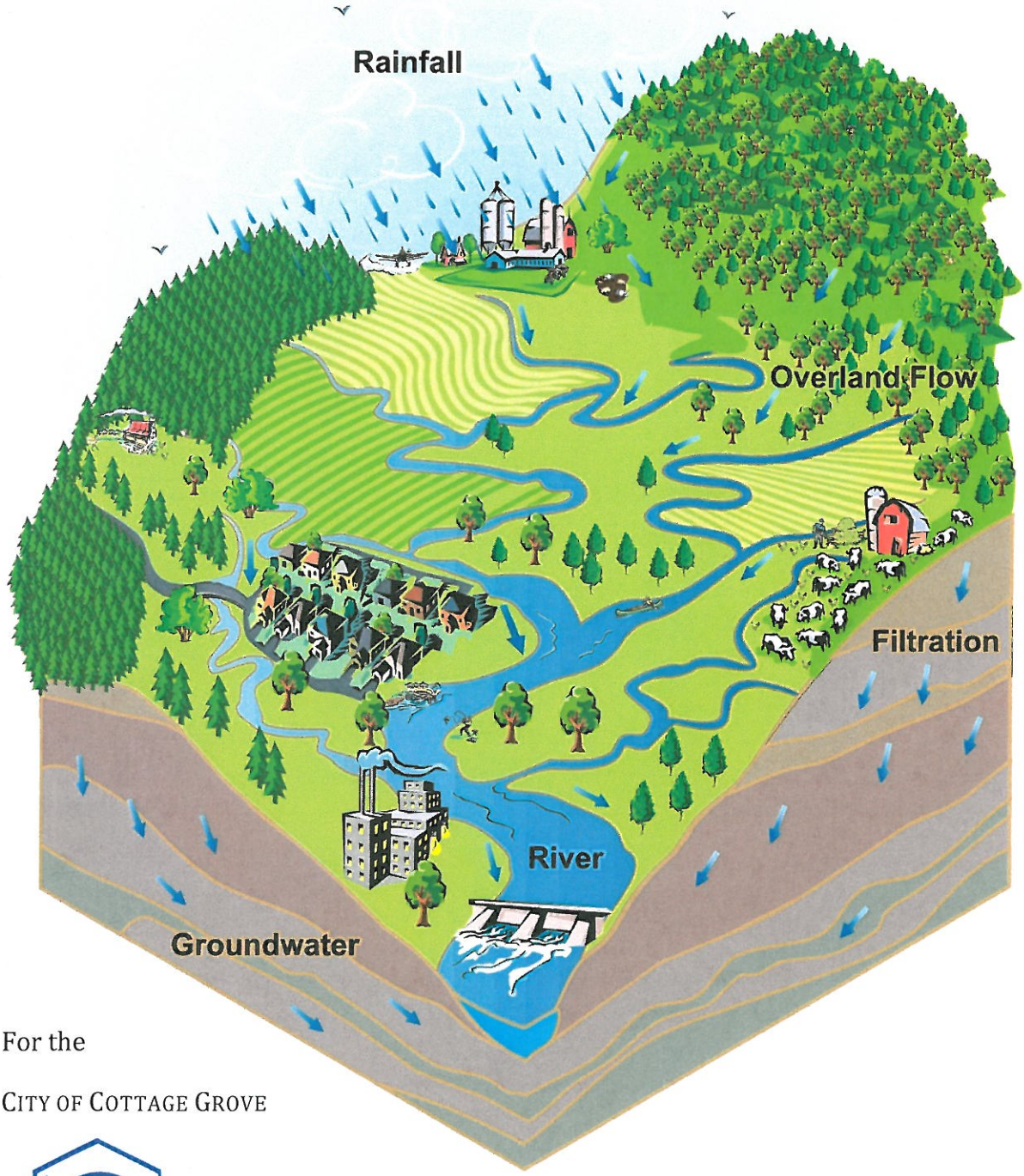
STORMWATER MANAGEMENT PLAN 2011



For the

CITY OF COTTAGE GROVE

CITY OF COTTAGE GROVE OREGON

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ABBREVIATIONS

BMP	Best Management Practices
CDD	Community Development Department
CFR	Code of Federal Regulations
CFWWC	Coast Fork Willamette Watershed Council
CWA	Clean Water Act of 1977
DEQ	Oregon Department of Environmental Quality
DMA	Designated Management Agency
DO	Dissolved Oxygen
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973
F	Fahrenheit
FEMA	Federal Emergency Management Agency
GI	Green Infrastructure
IUCN	International Union for the Conservation of Nature
LCC	Lane Community College
LID	Low Impact Development
mg/L	Milligrams per liter
MRCI	Municipal, residential, commercial, and industrial
MS4	Municipal Separate Storm Sewer System
N	Nitrogen
NPDES	National Pollutant Discharge Elimination System
OAR	Oregon Administrative Rule
ODOT	Oregon Department of Transportation
ORS	Oregon Revised Statutes
PW	Public Works
SDC	System Development Charge
STREAM	Students Train in River Enhancement, Assessment, and Monitoring
SWMP	Stormwater Management Plan
SWDMM	Stormwater Design and Maintenance Manual
TMDL	Total Maximum Daily Load
TP	Total Phosphorous

Abbreviations

TSS	Total Suspended Solids
UGB	Urban Growth Boundary
USACE	U.S. Army Corps of Engineers
WQMP	Water Quality Management Plan

EXECUTIVE SUMMARY

Unchecked and untreated stormwater runoff results in accelerated stream flows, destruction of aquatic habitat, modified natural hydrologic patterns, and elevated pollutant concentrations in the receiving waters. These results negatively impact the local community and the environment. *The City of Cottage Grove's Stormwater Management Plan* (SWMP) promotes innovative land use practices and municipal programs that produce water quality improvements over time. The use of biological treatment and detainment facilities, in addition to traditional conveyance systems, adds aesthetic benefits to the City in the form of street trees, vegetated planters, wetlands, and open space. These benefits translate into economic revenues for the community as a result of factors such as more efficient and cost-effective operating practices, increased property values, and increased revenues from recreation and tourism.

There are six main federal and Oregon State regulations that govern various aspects of local stormwater management activities. These include the Total Maximum Daily Load (TMDL), the Endangered Species Act (ESA), the Federal Emergency Management Agency (FEMA) – Floodplain Management, the Clean Water Act (CWA) Section 404 – Wetland Management, the Safe Drinking Water Act (SDWA) – Underground Injection Control, and the Statewide Planning Goals 5 and 6. Each regulation addresses a different aspect of stormwater management and must be incorporated into a comprehensive management plan. Until the City reaches a population of 10,000 and is designated as needing to apply for a Municipal Separate Storm Sewer System (MS4) permit by DEQ, the City will not be required to comply with the National Pollution Discharge Elimination System (NPDES) Phase II requirements. However, the City has taken a proactive approach toward meeting these requirements in order to save money in the long run, benefit the local environment, and improve the City's infrastructure for the benefit of its residents. More information on the NPDES Phase II requirements is available on the DEQ website.

In addition to meeting federal and state requirements, the City's existing stormwater planning documents were in need of review and an update. These documents provide the necessary foundation for policy decisions related to the stormwater system and future land use and development.

This SWMP outlines the planning, management, engineering, and regulation of the City's stormwater utility for all areas within the city limits. The recommendations for biologically-based structural BMPs as stormwater treatment facilities are aimed at incorporating environmental restoration and protection of the City's open spaces into existing stormwater management regulations and practices. The SWMP integrates the broader watershed and its functional elements and processes into stormwater planning

and implementation. Streams that were once viewed solely as water conveyance systems are seen as an integral part of the community's ecological health. Stormwater management at a watershed scale is intended to provide a unified strategy that will address water quality, water quantity, and stream-system management.

Document Organization

Chapter 1 Introduction—describes the objectives of the SWMP, how the document is organized, and how it fits into the City's Comprehensive Plan.

Chapter 2 Related Stormwater Regulations—describes the main federal and State regulations that are the legal framework for local stormwater management activities.

Chapter 3 Study Area Characteristics—describes the City's physical and temporal characteristics, and summarizes known water quality studies, water quality concerns, and flood prone areas within the city.

Chapter 4 Implementation Strategies—describes the goal and strategies of each of the six minimum stormwater control measures and the program management measures.

Chapter 5 Glossary—provides definitions for key terms.

Appendix A Implementation Work Plan—is the work plan with the programs, tasks, and benchmarks the City will use to meet the six minimum stormwater control measures and the program management measures.

Appendix B TMDL Annual Reports— archive for TMDL annual reports submitted to DEQ.

Appendix C *Stormwater Design and Maintenance Manual* (SWDMM)—is the technical document that outlines the requirements that apply to all development and redevelopment projects within the City on private and public property.

Chapter 1 INTRODUCTION

Protecting water quality in local lakes, streams, rivers, and wetlands is an essential part of any stormwater management plan. The primary purpose of the City of Cottage Grove's (the City's) *Stormwater Management Plan* (SWMP) is to increase local stream and river water quality. This is achieved using the following three strategies: (1) providing the City of Cottage Grove with the policy framework necessary to meet the stormwater management plan requirements of the Total Maximum Daily Load (TMDL) implementation plan as stipulated by the Oregon Department of Environmental Quality (DEQ), (2) preparing for a stormwater program review by DEQ once the population exceeds 10,000 to determine if the City will need to meet the National Pollutant Discharge Elimination System (NPDES) Phase II Municipal Separate Storm Sewer System (MS4) permit requirements, and (3) addressing the following seven topics:

1. Public education and outreach
2. Public involvement
3. Illicit discharges control
4. Construction erosion and sediment control
5. Post-construction runoff controls
6. Pollution prevention and good housekeeping
7. Program management

The strategies, programs, and tasks described in this SWMP address all TMDL pollutants listed in the Willamette Basin TMDL 2006 for the Coast Fork Willamette: mercury, bacteria, and temperature. While stormwater is not the cause of stream temperature increases, stormwater management strategies, such as a riparian ordinance, low impact development, and riparian landowner education, do address the causes of temperature increases. The annual reports from this SWMP that identify all of the tasks completed and the future tasks to be performed are intended to supersede and fulfill the requirement of the TMDL Implementation Plan Annual Report.

In addition, this SWMP meets some, but not all of the NPDES Phase II MS4 permit requirements.[1] A Phase II MS4 permit review by DEQ is triggered once a city reaches a population of at least 10,000 and has a US Census Bureau designated population density of at least 1,000 people per square mile. A city can also be designated as a regulated MS4 if DEQ determines that its discharges cause, or have the potential to cause, an adverse impact on water quality.[2] As of the 2010 US Census, the City's population was 9,686 with a

[1] For more information on MS4 permit requirements visit: http://www.deq.state.or.us/wq/stormwater/municipalph2.htm

[2] Who's Covered? Designations and Waivers of Regulated Small MS4s (Fact Sheet 2.1), http://cfpub.epa.gov/npdes/stormwater/swfinal.cfm

population density of 2,723 people per square mile[3]. In anticipation of passing the 10,000 population threshold and through a desire to protect local water quality and natural habitat, the City has adopted this SWMP.

Overview of Stormwater Management Plan

The City's SWMP outlines strategies, programs, and tasks to improve water quality, address existing and future conflicts between natural floodplain function and development, and preserve and enhance valuable natural resources, including stream and floodplain systems. The prioritization of the tasks will directly affect the City's capital improvement and operating programs. In addition, some programs require new ordinances and development standards that will affect the way future development is conducted within the area. Implementation of the SWMP will require the active involvement and cooperation of all property owners in the city limits, City departments, and State and federal agencies.

Supporting Documents

The City of Cottage Grove Public Facility Plan 2011 builds upon the framework provided by the Public Facilities Element of the Cottage Grove Comprehensive Plan. It describes water, sewer, and stormwater facilities that were designed to support the land uses designated in Cottage Grove's Comprehensive Plan Map for the next 20 years, through 2031.

The City of Cottage Grove 2007 Storm Drainage Master Plan Draft (SDMP) identifies and addresses stormwater related problems throughout the City. These problems include frequent flooding, localized ponding, and stream bank erosion. They are largely due to under-capacity or nonexistent storm drainage systems or due to the inability to effectively maintain the existing system. Backwater and surcharging of storm sewers are also commonly observed due to low outfall elevations into Silk Creek and the Coast Fork of the Willamette River. The SDMP also identifies opportunities for optimizing existing resources through improved prioritization, mission integration, and a renewed commitment to the use of environmentally responsible, cost-effective and sustainable solutions. The mission of the SDMP is to reduce the impact of flooding and water pollution in the community in order to protect lives, property, and the environment. Programmatic recommendations provided by the document are as follows:

- Conduct a Low Impact Development Pilot to improve flood hazard reduction program in the watershed.
- Adopt updated stormwater quality standards to improve water quality in the watershed.

[3] Based on the City's total area of 3.557 square miles in July 2011.

- Increase inspections for compliance with stormwater requirements and NPDES permit (if applicable) to improve water quality in the watershed.
- Develop and implement a land acquisition program for riparian habitat protection and improvement.
- Develop and implement a program to enhance degraded riparian habitat and water quality.
- Develop and implement an education, outreach, and technical assistance program to help reduce existing and prevent future flood damage, water quality impairment, and habitat destruction and communicate progress made implementing the Watershed Plan tasks.
- Develop and implement a surface water management monitoring program to track effectiveness of surface water management facilities, assess stormwater quality, and assess impacts on receiving waters.

Planning Horizon

The SWMP shall have a 20 year planning horizon. It is expected that the SWMP *Appendix A: Implementation Work Plan* will be reviewed and updated every year and an annual report on progress submitted to DEQ. Every 5 years the Implement is adopted as a refinement to the City's Comprehensive Plan and must go through a formal review process by the City Council to receive any changes. Appendices to the SWMP do not have this restriction and can be altered by staff as needed to allow for adaptive management.

SWMP Authorization and Coordination

This section describes the City's authorization and authority regarding stormwater management implementation, and its coordination with other jurisdictions.

Program Authorization

Stormwater management is particularly important to the City. A SWMP is mandated by the City's Comprehensive Plan and TMDL implementation plan. This SWMP also fulfills portions of the planning and implementation guidelines outlined Statewide Planning Goals 5 and 6. On (this date) the City Council adopted this SWMP as a refinement plan to the Cottage Grove Comprehensive Plan under Ordinance #.

City Management and Authority

The Community Development Department and Public Works Department are responsible for the overall stormwater program management, compliance reporting, policy development, and program coordination within the City of Cottage Grove. Staff members within these departments serve as the leads for the BMPs contained in the SWMP. City staff outside these departments are also involved in a supportive capacity with stormwater

program development, implementation, and reporting.

Coordination with Other Jurisdictions

The City coordinates with other regional jurisdictions such as the City of Creswell, Lane County, and the Oregon Department of Transportation, to cooperatively address regional water quality issues. The coordination is done directly with the other jurisdictions and through the Coast Fork Willamette Watershed Council.

Chapter 2 Related Stormwater Regulations

The SWMP provides the guiding framework and policy recommendations for managing stormwater runoff within the city limits. These recommendations are based upon the City's Comprehensive Plan and Federal and State policies and regulations, specifically the following:

- Total Maximum Daily Load
- Endangered Species Act
- Federal Emergency Management Agency - Floodplain Management
- Clean Water Act Section 404 - Wetland Management
- State Planning Goals 5 and 6
- Comprehensive Plan

Total Maximum Daily Load (TMDL)

Through the Willamette Basin TMDL Water Quality Management Plan (WQMP), DEQ has required municipalities to prepare a TMDL implementation plan that defines how water bodies will meet load and wasteload allocations specified in a TMDL. See Table 3 Coast Fork Willamette Watershed Waterbodies DEQ 303(d) Listings on page 20 for the listed water bodies in the Coast Fork Willamette Watershed. The plan must present management strategies for controlling sources of TMDL pollutants, such as mercury, bacteria, and mercury. In addition, the plan must be prepared in accordance with Federal and State laws. "Because of the potential for storm water runoff to be a significant source of TMDL pollutants, DEQ will **require** DMAs with a population greater than 10,000 that are not covered under a MS4 permit to address each of the storm water control measures described below,...[while] DMAs with populations under 10,000 will be expected to give **consideration** to them".[4]

1. Public Education and Outreach – Example BMPs include brochures, flyers, or bill inserts to educate homeowners and business operators about the problems associated with stormwater runoff and the steps they can take to reduce pollutants in stormwater discharges.

2. Public Participation/Involvement - Provide notice of stormwater management plan development and hold meetings at which citizens and business operators are encouraged to communicate ideas. Include citizen and business representatives in a Citizens' Advisory Group.

[4] Oregon Department of Environmental Quality, 2006. *Water Quality Management Plan*, Willamette Basin TMDL Report, pg 14-22, September 2006.

3. Illicit Discharge Detection and Elimination - Inventory and map the stormwater system and test for the possible cross-connections of sanitary wastewater to the stormwater conveyance system. Modify system to eliminate illicit discharges.

4. Construction Erosion and Sediment Control - Require the implementation of erosion and sediment controls, and control other waste. Review site plans and perform periodic inspections. Establish penalties for non-compliance.

5. Post-Construction Runoff Control- Require the consideration and implementation of post-construction stormwater controls for any new construction. This might include on-site detention, pollutant reduction, or both.

6. Pollution Prevention/Good Housekeeping- Train maintenance staff to employ pollution prevention techniques and to maintain and operate public facilities to ensure the most efficient pollutant reduction. Materials handling, fleet vehicle maintenance, and application of chemicals in public areas, such as parks and roadways, should be managed to reduce impact on stormwater quality.

The City has chosen to use this SWMP to address these six minimum control measures as one of the strategies for meeting waste load and load allocations recommended by DEQ. For additional information refer to the Willamette Basin TMDL 2006 Report.

The Clean Water Act (CWA) requires that each state implement activities to protect the quality of its rivers, streams, and other water bodies. DEQ has primacy for implementing this law, including the responsibility for developing standards to protect the beneficial uses that have been determined for each water body. DEQ developed the 303(d) list to identify water bodies that do not meet current standards. Once a water body has been listed and/or TMDLs have been established, local governments are responsible for working with DEQ to develop and implement recovery plans to protect the beneficial uses.

DEQ develops TMDL levels for each stream on the 303(d) list within 10 years of its listing. TMDLs define the quantity of the pollutant that can enter a water body without violating water quality standards. TMDLs apply to both point (end of pipe) and non-point (stormwater runoff) sources, and include a factor of safety to account for uncertainty and allow for some future discharges into the water body.

Relationship of the SWMP to Annual Compliance Reports

The SWMP is a comprehensive plan that expresses the overall intent and breadth of the City's stormwater management program. It includes implementation tasks and, where possible, schedules. In many cases, however, it is difficult to determine implementation details years in advance because so many variables are involved. For that reason, a greater

level of detail is included in the annual TMDL compliance reports the City submits to DEQ by April 30th of each year. The annual compliance reports provide information about BMP activities that have been implemented in the previous fiscal year (July 1 to June 30). They include reporting on the measurable goals identified under each stormwater minimum control measure described in the Implementation Work Plan (Appendix A), as well as other activities that are essential elements of the stormwater management program. The annual compliance reports also identify activities planned for implementation in the coming fiscal year.

Endangered Species Act

The City of Cottage Grove is not currently required by DEQ to submit a permit under NPDES Phase II. Until the City is required to submit a NPDES Phase II MS4 permit, the City addresses the Endangered Species Act (ESA) through plans like the TMDL implementation plan, which shows how the City is actively protecting and improving local water quality from degradation. The ESA was enacted to prevent extinction of certain species of fish, wildlife, and plants that have seen significant declines in their populations within a defined geographic range or Evolutionarily Significant Unit (ESU). The rules prohibit a "take," which the ESA defines as "harass, harm, pursue, hunt, shoot, wound, trap, capture, or collect, or attempt to engage in any such conduct." The rules go into effect immediately upon listing by the government. The term "harass" is further defined as any intentional or negligent act that creates the likelihood of injuring wildlife by disrupting normal behavior such as breeding, feeding, or sheltering, whereas "harm" is an act that either kills or injures a listed species. By definition, "take" and "harm" can include any habitat modification or degradation that significantly impairs the essential behavioral patterns of fish or wildlife.

Federal Emergency Management Agency - Floodplain Management

The City's existing stormwater infrastructure is designed to minimize flooding within the city limits. Zoning laws, building codes, and development regulations serve to manage the floodplain by setting restrictions and requirements for new construction within flood-prone areas.

Funding for stormwater management projects that mitigate potential flooding hazards is available through the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP) and the Pre-Disaster Mitigation (PDM) Grant Program. HMGP provides grants to local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented

during the immediate recovery from a disaster.[5] The PDM Grant Program provides funds to communities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event.[6] More information on these programs is available on the FEMA website.

CWA Section 404 - Wetland Management

Section 404 of the CWA requires approval prior to discharging dredged or fill material into the "waters of the United States." The U.S. Army Corps of Engineers (USACE) is responsible for administering Section 404 of the CWA. "Waters of the United States" includes essentially all surface waters such as all navigable waters and their tributaries, all interstate waters and their tributaries, all "wetlands adjacent" to these waters, and all impoundments of these waters. Typical activities requiring Section 404 permits are:

- Depositing of fill or dredged material in waters of the U.S. or adjacent wetlands.
- Site development/fill for residential, commercial, or recreational developments.

As defined in Section 404, wetlands are: "Those areas that are inundated or saturated with surface or groundwater 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." In addition to the USACE, the Oregon Division of State Lands (DSL) regulates activities on wetlands.

The primary state regulation that affects development activities in and near wetlands is the Removal-Fill Permit Program, ORS 196.800 through 196.990, administered by DSL. The 1987 USACE manual is used to delineate wetlands. The Removal-Fill Permit Program regulates:

- The removal of 50 cubic yards or more of material from one location in any calendar year.
- The filling of a waterway with 50 cubic yards or more of material at one location at any time.

Any public or private project that involves filling or removing fill from wetlands included in the City's wetland inventory requires a DSL permit if the quantities exceed 50 cubic yards. The City's National Wetland Inventory can be found on the City's website. In addition, a Local Wetland Inventory developed by ES&A Adolfson, acknowledged by DSL on January 5,

[5] *Hazard Mitigation Grand Program.* Federal Emergency Management Agency website, June 1, 2011, www.fema.gov/government/grant/hmgp.
[6] *Pre-Disaster Mitigation Grand Program.* Federal Emergency Management Agency website, September 28, 2011, www.fema.gov/government/grant/pdm/index.shtm.

2012, provides detailed information on wetland locations. The absence of wetlands, streams, and drainage channels on inventory maps does not automatically relieve the owner or developer of acquiring permits. Wetlands can be present on a site and not appear on an inventory map. The owner or developer must determine if wetlands are present and determine whether a DSL permit is required. DSL also regulates irrigation ditches and intermittent streams if they are considered a source of food for wildlife or provide habitat for game fish. Further, DSL regulates intermittent streams if they meet federal wetlands criteria.

The City will implement wetland regulations that comply with Statewide Planning Goal 5 in 2012.

Safe Drinking Water Act – Underground Injection Control

The Safe Drinking Water Act (SDWA)[7] is the main federal law that ensures the quality of American's drinking water. Under SDWA, EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards. The Underground Injection Control (UIC) Program is responsible for regulating the construction, operation, permitting, and closure of injection wells that place fluids underground for storage or disposal. The UIC Program[8] defines an injection well as:

- A bored, drilled, or driven shaft, or a dug hole that is deeper than it is wide,
- An improved sinkhole, or
- A subsurface fluid distribution system.

This SWMP does not recommend the use of UIC facilities except when no other alternatives are available. Each UIC facility must be authorized under either general rules or specific permits enforced by DEQ. The design guidelines provided for structural BMPs in the SWDMM are not intended to result in facilities that qualify as UICs.

Statewide Planning Goals 5 and 6

The SWMP fulfills portions of the planning and implementation guidelines outlined by Goals 5 and 6 of the Statewide Planning Goals. Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces, states that "local governments shall adopt programs that will protect natural resources and conserve scenic, historic, and open space resources for present and future generations." Goal 6: Air, Water and Land Resources Quality states that

[7] *Safe Drinking Water Act (SDWA).* United States Environmental Protection Agency website, October 28, 2011, Accessed January 12, 2012:water.epa.gov/lawsregs/rulesregs/sdwa

[8] *Basic Information about Injection Wells.* Water: Underground Injection Control, United States Environmental Protection Agency website, October 20, 2011, Accessed January 12, 2012: water.epa.gov/type/groundwater/uic/basicinformation.cfm.

"all waste and process discharges from future development, when combined with such discharges from existing developments, shall not threaten to violate, or violate applicable state or federal environmental quality statutes, rules and standards." Through the implementation of the programs listed in Appendix A: Implementation Work Plan and the design guidelines provided in Appendix C: Stormwater Design and Maintenance Manual the carrying capacity of local river basins shall not be exceeded, existing water quality shall be improved and protected, and available ground and surface water shall be maintained or increased as appropriate.

Comprehensive Plan

The City's Comprehensive Plan addresses the requirements of the Statewide Planning Goals and contains the community's vision on land use. It defines how land will be used and managed within the City. The comprehensive plan is loosely organized around the topic areas defined by the Statewide Planning Goals. Each topic area is in a chapter (element) that includes a background discussion followed by findings and policies in support of the goals. The findings provide statements of fact or conclusions, while the policies provide guidance for actions required for meeting the community's vision. Policy 1.5 of the Natural Resources Element of the Comprehensive Plan states, "The City shall adopt and implement a stormwater management plan which addresses..." the six stormwater minimum control measures described previously under the Total Maximum Daily Load heading. This SWMP has been adopted as a refinement plan to the Natural Resources Element to specifically address these goals.

Chapter 3 Study Area Characteristics

General Description

The Coast Fork Willamette Sub-basin[9] (Sub-basin) is located in the southernmost portion of the Willamette Basin, as shown in Figure 1. The Willamette River begins at the confluence of the Middle Fork Willamette River and the Coast Fork Willamette River. The Sub-basin's 666 square miles (426,238 acres) include the following four watersheds:

- Lower Coast Fork Willamette River Watershed
- Upper Coast Fork Willamette River Watershed
- Mosby Creek Watershed
- Row River Watershed

The Sub-basin is located within portions of Lane and Douglas Counties, and includes the cities of Cottage Grove and Creswell. BLM and USFS administer much of the upland area, but most of the land in the Sub-basin is privately owned. The land use is primarily forestry, with agriculture and urban land uses near the main stem Coast Fork Willamette River.

The City of Cottage Grove is located in the southern part of Lane County. The Coast Fork Willamette River bisects the city. The Row River, which forms the eastern boundary of the city, is the City's drinking water source. These two rivers, in addition to Silk Creek and Bennett Creek that enter from the west, form the backbone of the City's natural areas system and give the City much of its distinctive character and history. The waterways also include many of the City's recreation areas, historic sites, and corridors for both human and wildlife travel. Two upstream USACE reservoirs control flooding in this Subbasin: Dorena Reservoir on the Row River and Cottage Grove Reservoir on the Coast Fork Willamette River.

The City of Cottage Grove 2007 Storm Drainage Master Plan Draft (2007 Draft)

The 2007 Draft is an update to the 1985 Drainage Master Plan. These documents provide the technical data background for the policies presented in this SWMP and the associated SWDMM. For engineering standards, modeling parameters and assumptions, and system improvement recommendations refer to the 2007 Draft.

Drainage Basins

The original 1985 drainage study divided Cottage Grove into eight major drainage basins according to the area topography and existing drainage systems. However, these 8 sub-basins were not used in the 2007 Draft. The 2007 Draft sub-basins were automatically

[9] Hydrologic Unit Code 17090002

generated from GIS data. The delineation of the sub-basin boundaries was based primarily on high resolution digital elevation models and existing conveyance system information. Selection of the number and size of sub-basins was driven by a number of factors, including topography, the character and configuration of the drainage network, and storage components. The smaller sub-basins were generally located in the central portion of the watershed, coinciding with the higher concentrations of development and in areas with known and suspected drainage problems. For the full methodology and description of the sub-basins please refer to the 2007 Draft, or most recent Drainage Master Plan.

For capital improvement projects, see the 2011 Public Facility Plan. For recommended regulatory changes and recommended programmatic changes, please refer to the 2007 Draft, or most recent Drainage Master Plan.

Land Use

Land use information is an integral component in determining the amount of stormwater generated within the City. Land use types will affect the volume and character of the stormwater runoff generated from that area. Accurate estimations of stormwater runoff from these land uses are important in sizing and maintaining collection system facilities.

The City of Cottage Grove is primarily a residential community with some commercial and some industrial areas. Table 1 provides specific land use data acres and percentages.

Table 1 Cottage Grove Land Use Designations 2011

Land Use	Acres	Percent
Residential	1781.17	59%
Parks and Open Space	306.13	14%
Commercial	374.84	12%
Other, Public and Semi-Public	113.35	10%
Industrial	420.13	4%
Mixed-Use (Commercial and Residential)	29.51	1%
Totals	3025.37	100%

Source: Lane County GIS, August 2011

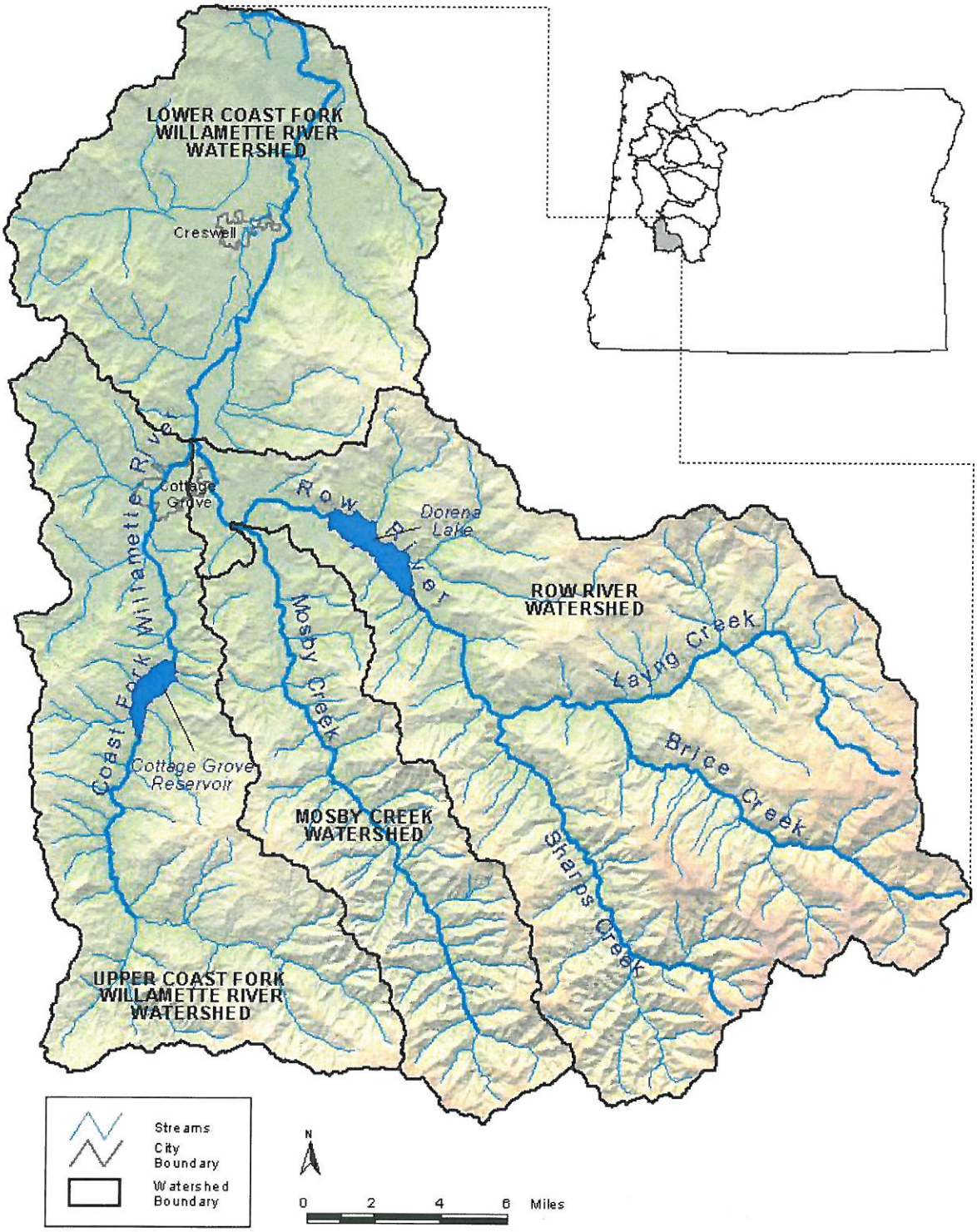
Topography and Physical Characteristics

The topography is variable and the area is challenging in terms of stormwater drainageway conveyance. The City includes approximately 5 miles of channel and floodplain. The floodplains of the Coast Fork, the Row River, and Silk Creek consist of alluvial soil.

Within the UGB and associated drainage areas, surface elevations range from 625 feet on

the valley floor at the north end of the UGB to 660 feet at the south end. Hillsides rise to approximately 990 feet on the northwest and southeast sides of the UGB. The upper

FIGURE 1 COAST FORK WILLAMETTE WATERSHED SUB-BASIN[10]



[10] Willamette Basin TMDL: Coast Fork Willamette Sub-basin, September 2006

reaches of hillsides outside the UGB that drain into the UGB rise to a maximum of 1,200 feet on the west side of the UGB and to a maximum of 1,400 feet on the southeast side of the UGB.

Surface slopes range from nearly flat on the alluvial plains, to between 5 and 10 percent on the gentle slopes rising from the valley floor, and from 10 to 40 percent on the hillsides. The average slope within the UGB is 6 percent. The valley floor slopes uphill in a southerly direction at an average grade of 0.3 percent, rising from 625 feet to 660 feet in a distance of over two miles. The area west of the Coast Fork slopes uphill to the west at an average grade of 0.4 percent for approximately one mile, while the valley floor east of the Coast Fork is virtually flat extending east from the river.

The soils in a drainage basin play a pronounced role in watershed hydrology and runoff processes. These processes invariably affect natural and constructed conveyance systems. Figure 2 shows the soil distribution within Cottage Grove. The three soil types that cover the most area within the UGB (about 10 percent each) are Nekia, Chehalils, and Salkum. These three soils are in hydrologic soil group B and are moderate to well-drained.

Hydrologic soils are broken down into four groups from having a very high infiltration rate to a very slow infiltration rate: A, B, C, and D[11]. Table 2 shows the percentage of soil coverage in Cottage Grove broken down by hydrologic soil groups and soil types. Soil groups B and C cover the largest percent of the Cottage Grove area. This indicates that, in general, soils in the area have a moderate to slow infiltration rate when thoroughly wet. While soil group B is moderate to well-drained, soil group C typically has a layer that impedes the downward movement of water. However, when designing stormwater treatment facilities, an investigation of soils and conditions should be performed at the site scale to determine actual infiltration rates. For the full soil report and map see *Appendix F: Cottage Grove Web Soil Survey Report.*

[11] **Group A** soils have a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission. **Group B** soils have a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission. **Group C** soils have a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission. **Group D s**oils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

TABLE 2 COTTAGE GROVE AREA HYDROLOGIC SOIL GROUP PERCENTAGES[12] 2011

Soil Group	Percent	Soil Group	Percent	Soil Group	Percent	Soil Group	Percent
A	**5%**	**B**	**51.7%**	**C**	**31.8%**	**D**	**11.1%**
Camas	5%	Abiqua	2.7%	Bellpine	1.1%	Bashaw	0.3%
		Chapman	6.3%	Coburg	5.9%	Chehulpum	0.3%
		Chehalis	11.5%	Dupee	5.7%	Conser	0.4%
		Cloquato	0.4%	Fluvents	2.5%	Dixonville	1.2%
		Jory	1.7%	Malabon	0.8%	Hazaelair	2.6%
		Nekia	9.0%	McAplin	6.2%	Natroy	0.7%
		Newberg	2.9%	McBee	2.5%	Panther	0.8%
		Salem	7.0%	Oxley	1.0%	Philomath	0.1%
		Salkum	10.2%	Pengra	1.0%	Salem	1.1%
				Ritner	1.2%	Waldo	2.4%
				Willakenzie	3.9%	Wapato	1.1%
						Witzel	0.1%

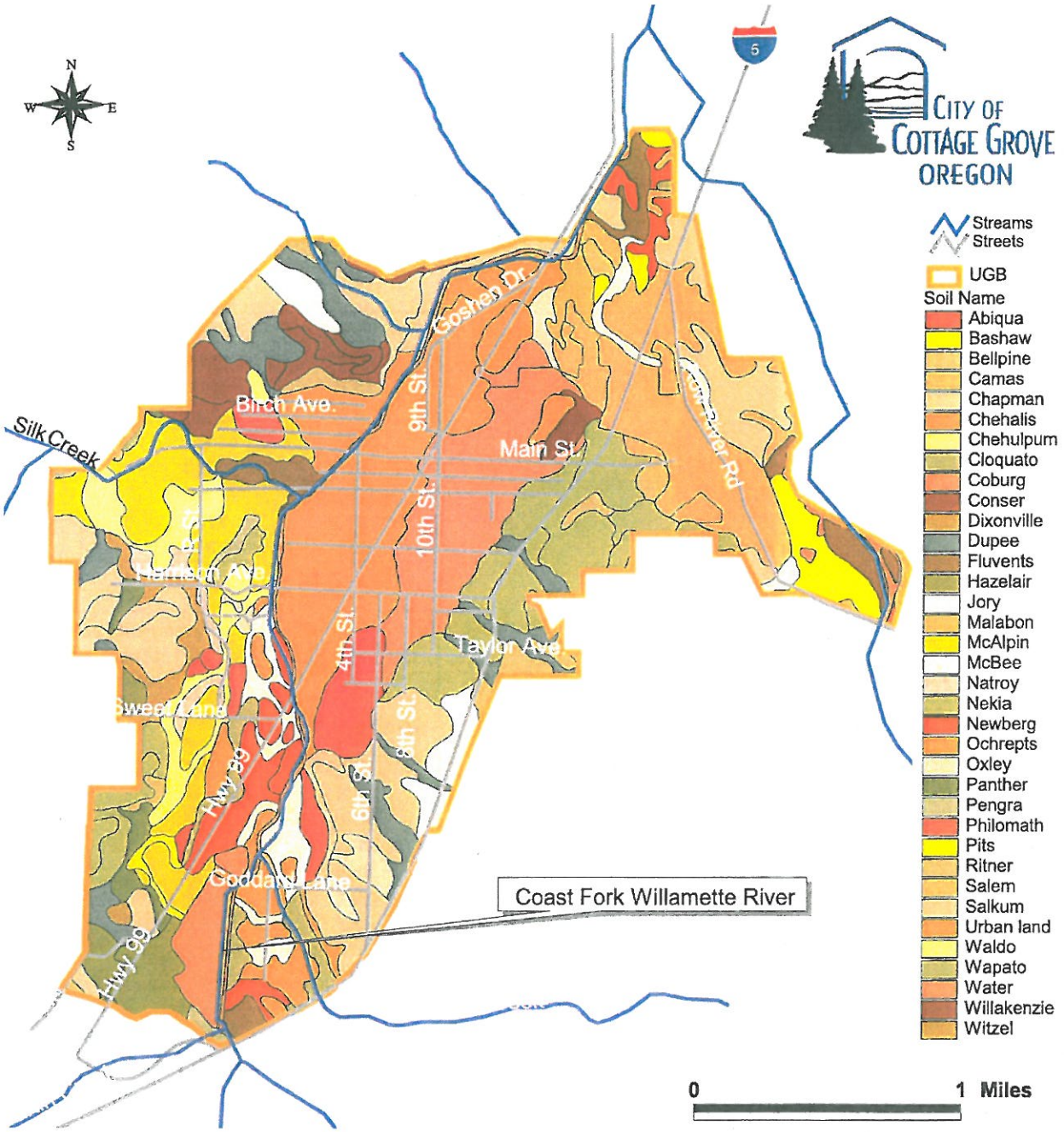
Soil types without hydrologic soil group designations included Ochrept, Pits, and Water (0.2 percent, 1.8 percent, and 2.9 percent respectively). The urbanized land category has been omitted from these calculations, because the soil beneath the urban land is still the same soil.

CLIMATE

Cottage Grove experiences four mild seasons each year. The climate is typical of the Willamette Valley, with hot dry days and cool nights in the summer, and mild, wet weather in the winter. Average seasonal temperatures range from 32° Fahrenheit (F) to 95° F. The average yearly temperature is approximately 52° F.

[12] These percentages are approximate based on an Area of Interest designation created using the U.S. Department of Agriculture Web Soil Survey and the City's 2011 UGB.

FIGURE 2 COTTAGE GROVE SOIL DISTRIBUTION WITHIN UGB 2007[13]



Annual rainfall has averaged 58 inches per year since 1971, based on records maintained at the Cottage Grove wastewater treatment plant, with a range of 37 inches to 65 inches per year. Typically, over 40 percent of the yearly rainfall occurs from mid-November to mid-January. Most of the problems related to storm drainage occur during this period. However,

[13] City of Cottage 2007 Grove Storm Drainage Master Plan Draft, May 2007, Corollo Engineers

these patterns may be in the process of changing according to climate change model predictions.

The March 2009 report *Preparing for Climate Change in the Upper Willamette River Basin of Western Oregon*[14] states that mean annual precipitation is projected to remain similar to today, with possibly a slight increase over the next century. Data on precipitation patterns is highly uncertain, but warmer oceans and more available moisture in the atmosphere are expected to increase the intensity of storm events. A 3.5º F (2º C) increase in winter temperatures would likely convert much of the winter precipitation from snow to rain. This study concluded that approximately 22 percent of the area in the Cascades now covered by snow in the winter would receive no snow accumulation by 2040. As snow melts earlier in the spring, increased stream flows will occur earlier, but peak at lower levels than have been typical during the past century.

Decreased flow during summer and an expansion of the low flow period is likely to lead to warmer water. A decline in water quality is likely to harm fish and amphibian survival as warmer temperatures make these species more susceptible to disease and may exceed their range of tolerance. This potential warming underlines the importance of protecting local riparian corridors, encouraging the planting of trees, and cleansing stormwater before it reaches the Coast Fork Willamette and Row Rivers.

HABITAT AND VEGETATION

The vegetation in Cottage Grove has, like much of the vegetation in the Willamette Valley, been altered by immigration. Early settlers found the Willamette Valley a host to prairies, with wide forests of cottonwood, alder, willow, ash, maples, and fir along the river corridor. The Willamette River meandered through the valley, creating swales and marshes as the channel changed courses. The low hills were populated with oak trees. For thousands of years these vegetation communities were maintained by the Kalapuya tribe who lived in the Valley and set fires annually to control the growth of underbrush. With the arrival of the pioneers, the vegetation was substantially altered as forests were cut to build houses, land cleared for farming, and rivers and streams dammed and channelized to protect residents from flooding and to provide corridors to transport lumber to market. These changes resulted in a loss of wetlands and other traditional habitats. Exotic plant and animal species now crowd out many of those native populations that remain.

Today, large native trees, including Douglas fir, oak, and floodplain species such as Big-leaf maple, Snowberry, Cottonwood, and Red-osier dogwood along the river define the Cottage Grove landscape. The City, residents, and businesses have planted trees in their yards and

[14] By Bob Doppelt, Roger Hamilton, and Stacy Vynne, Climate Leadership Initiative, Institute for Sustainable Environment, University of Oregon.

along some of the streets. Cottage Grove is consistently recognized as a Tree City USA, reflecting the importance trees play in defining local character.

There are no documented wildlife corridors through the City, but the Willamette River Greenway, Silk Creek, Bennett Creek, and Row River likely provide the best wildlife corridors through the City. Little if any attention has been paid to maintaining wildlife connectivity between riparian and upland habitat.

Fisheries and Wildlife

Native cutthroat trout, steelhead, Chinook, and Coho salmon are the main fish species found in the Coast Fork Willamette Watershed river systems. Western pond turtles reside in the area as well.

Stormwater Conveyance System

In general, the existing stormwater conveyance system collects surface water runoff at various locations throughout the City and routes it to the Coast Fork Willamette River. The City's stormwater system consists of storm sewers in the heavily developed regions of the City, and open channels in the less developed areas. The west and southeast borders of the City are steep hillsides, but the majority of the central City is located on very flat areas of land that formed as floodplains of the Row River, the Coast Fork of the Willamette River, and Silk Creek.

Existing Effects of Urbanization

Drainage and Flood Issues

A number of flooding problems in the watershed have been reported. Historically observed problems are frequent flooding, localized ponding, hillside erosion, and combined sewer overflow. These problems are largely due to under-capacity or non-existent storm drainage systems or due to the inability to effectively maintain the existing system. Backwater and surcharging of storm sewers are also commonly observed due to low outfall elevations into Silk Creek and the Coast Fork of the Willamette River. For a full list of problem areas refer to the City of Cottage Grove 2007 Storm Drainage Master Plan Draft.

TMDL Water Quality Analysis Results

The information presented in this section was retrieved from the 2006 Willamette Basin TMDL: Coast Fork Willamette Sub-basin report. This section should be updated to reflect the most recent Willamette Basin TMDL report available. The Coast Fork Willamette Sub-basin (Figure 1) has stream segments listed under section 303(d)[15] of the CWA that are exceeding water quality criteria for temperature, dissolved oxygen, bacteria, and mercury

[15] The 303(d) list is a list of stream segments that do not meet water quality criteria.

(Table 3). Wasteload allocations for non-point sources are developed for each geomorphic unit and apply to all sectors in the Sub-basin.

TABLE 3 COAST FORK WILLAMETTE WATERSHED WATERBODIES DEQ 303(D) LISTINGS

Waterbody Name	Listed River Mile	Parameter(s)
Brice Creek	0 to 11.2	Temperature
Camas Swale Creek	0 to 9.4	Dissolved Oxygen
Coast Fork Willamette River	0 to 31.3	Temperature, Fecal Coliform, Mercury
Cottage Grove Reservoir	28.5 to 31.3	Mercury
Dorena Lake/Row River	7.4 to 11.3	Mercury
King Creek	0 to 1.6	Temperature
Layng Creek	0 to 7.7	Temperature
Martin Creek	0 to 3.4	Temperature
Mosby Creek	0 to 21.2	Temperature
Row River	0 to 7.4, 11.3 to 20.8	Temperature
Sharps Creek	0 to 12.5	Temperature

Temperature

Non-point source allocations are determined using the amount of heat absorption by the stream based on the type of vegetation that is expected to be located near the stream. The expected type of vegetation is determined by plant biology, site elevation, soil characteristics, local climate, channel morphology, and stream flow. The warmest part of the river is generally allowed to receive an increase in temperature by 0.05°C.

Human caused temperature increases are primarily from (1) solar radiation loading and (2) warm water discharge to surface waters. The Willamette Basin TMDL identified multiple sources for the temperature increase in the Coast Fork Willamette Sub-basin. Disturbance or removal of vegetation near a stream reduces stream surface shading because of decreased vegetation height, width and density. This results in greater amount of solar radiation reaching the stream surface. In addition, loss or disturbance of riparian vegetation may precede lateral stream bank erosion and channel widening. This decreases the effectiveness of remaining vegetation to shade the stream and increases the stream surface area exposed to heat exchange processes, particularly solar radiation.

The two reservoirs in the Coast Fork Willamette Sub-basin, Cottage Grove Reservoir and Dorena Reservoir, are both impacting the mainstem Coast Fork Willamette River. Dams and reservoir operations can affect stream temperature through the modification of flow regimes and through the delivery of heat stored within the system. Operations that divert flows from natural channels during low flow periods may substantially diminish the ability

of the stream to remain at its normal temperature while also increasing the time and intensity of the sun shining on the stream because the water flows more slowly through exposed reaches.

The release of water from reservoirs may also increase downstream temperatures as the heat held by the impounded water is also released. The timing, duration, and magnitude of such impacts are dependent upon reservoir characteristics such as surface area, depth, and whether water is released from the bottom of the reservoir or may be selectively withdrawn at various depths. Both Cottage Grove and Dorena Reservoirs release water from the bottom of the flood control structure.

Bacteria

The bacteria tested for water quality are produced in the gastro-intestinal tracts of warm-blooded animals, and indicate the presence of pathogens that may cause illness in humans. These bacteria affect surface water quality relative to human contact during recreational use. The water quality bacteria data collected during 1996 to 2002 at DEQ's ambient monitoring site, Coast Fork Willamette River at Mt. Pisgah Park, shows that a decreasing trend in the *E. coli* counts in the Coast Fork Willamette River is occurring and the river is in attainment of the bacteria standard. As a result, the Coast Fork Willamette has been recommended for de-listing from 303(d) bacteria. The only point source that contributes a monitored amount of bacteria within the UGB is the Cottage Grove wastewater treatment plant.

Mercury

Mercury is a parameter of concern throughout the Willamette Basin. A 27 percent reduction in mercury pollution is needed in the mainstem Willamette to remove fish consumption advisories. Pollutant load allocations are set for each sector but no effluent limits are specified at this time. Source identification of mercury in the Sub-basin will be required to develop mercury reduction plans.

The Coast Fork Willamette Sub-basin contains areas known to be associated with mercury mining and mercury use in gold and silver amalgamation. The Black Butte abandoned mine site, located in the headwaters of the Coast Fork Willamette River above the Cottage Grove Reservoir, represents a likely source of mercury to downstream waterbodies particularly the Cottage Grove Reservoir (see Figure 3). The Black Butte abandoned mine site is characterized by exposed tailing piles and elevated mercury concentrations in soils resulting from inefficient mercury extraction and recovery processes. Mercury was used historically in the Bohemia Mining District (along Sharps and Brice Creeks upstream of the Dorena Reservoir) to enhance the recovery of gold.

This historical use of mercury represents a legacy mining source with the potential to impact downstream waterbodies. These downstream impacts are most likely to be observed in the reservoirs immediately below the legacy mining areas since the reservoirs represent barriers to the transport of particle-bound mercury to the lower watershed and most likely create conditions favorable for the production of methyl mercury. Whereas legacy mining sources appear to represent relatively minor sources of mercury to the mainstem Willamette River system and the Dorena Reservoir, these sources have the potential to significantly impact the Cottage Grove Reservoir.

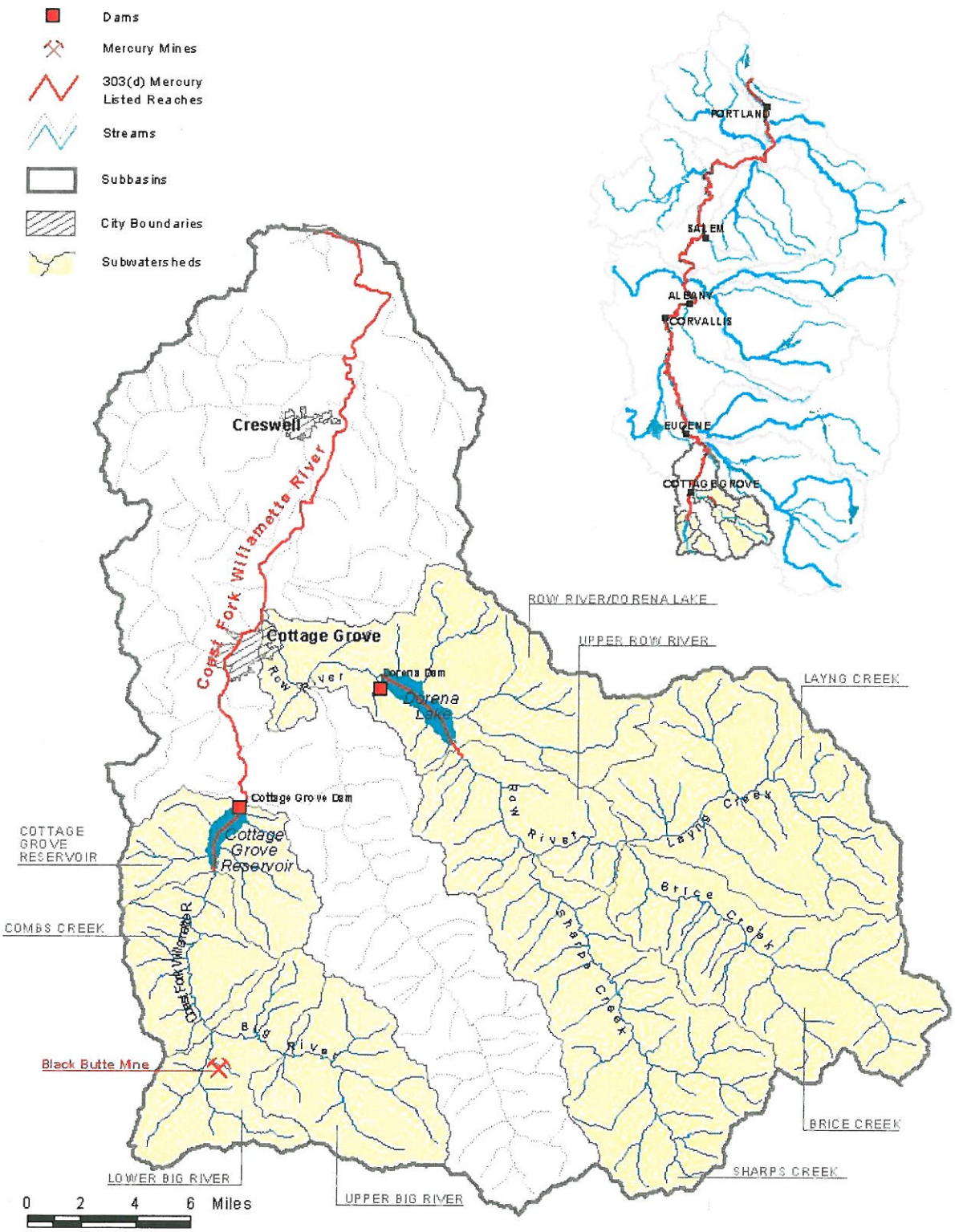
The Oregon Department of Human Services (DHS) has issued multiple fish consumption advisories for mercury in the Willamette Basin (DHS, 1997, 2004, 2004) advising consumers of fish of the health risks associated with eating fish caught from the Willamette River[16] and the Dorena[17] and Cottage Grove[18] Reservoirs. The initial fish consumption advisory for the mainstem Willamette River, dated February 13, 1997, advised the public of elevated mercury levels in the edible fish tissue of bass and northern pikeminnow (squawfish) and recommended specific limits for consumers who eat these fish caught anywhere in the mainstem river system (from the mouth of the river upstream to the Cottage Grove Reservoir).

It should be noted that in November, 2001, DHS issued a 'consolidated' advisory for the Willamette River advising that *all species* of resident fish in the mainstem of the Willamette River should be eaten in only moderate amounts[19]. This consolidated listing also considered pollutants other than mercury. The Row River is not listed for Mercury.

Mercury sources considered in the Willamette Basin TMDL: Mercury[20] report include: atmospheric deposition (from both local and far-field sources); erosion of native soils; historical mining activity; sediment re-suspension; and municipal and industrial water discharges.

[16] Oregon Department of Human Services (1997). Elevated Levels of Mercury in Sport-Caught Bass and Squawfish from the Willamette River. Issued February 13, 1997.
[17] Widerburg, Bonnie (2004). Elevated Levels of Mercury in Sport-Caught Fish from Dorena Reservoir in Lane County. Oregon Department of Human Services. Issued April 22, 2004. http://www.oregon.gov/DHS/news/2004news/2004-0422a.shtml
[18] Widerburg, Bonnie (2004). Elevated Levels of Mercury in Sport-Caught Fish from Cottage Grove Reservoir in Lane County. Oregon Department of Human Services. Issued April 22, 2004. http://www.oregon.gov/DHS/news/2004news/2004-0422.shtml
[19] Agencies Issue Consolidated Advisory for Consumers of Willamette River Fish. Issued November 20, 2001.
[20] 2006

FIGURE 3 MERCURY SOURCES IN THE COAST FORK WILLAMETTE SUB-BASIN 2006



Source: Willamette Basin TMDL: Mercury, Oregon Department of Environmental Quality, September 2006

Coast Fork Willamette Sub-Basin Water Quality Monitoring Study

A water quality monitoring study of Cottage Grove was performed over a two-year period from 2008 to 2010. Five sites were sampled in and around Cottage Grove. Two sites were on the Coast Fork Willamette River, upstream and downstream of Cottage Grove. The upper site was by the bridge on Highway 99 near Cottage Grove High School, and the lower site was just below the Cottage Grove Wastewater Treatment Facility outfall.

The other three sites were sampled on Silk Creek, which is a small perennial stream that empties into the Coast Fork within the city limits. One site was high in the watershed a few miles northwest of Cottage Grove. The other two sites were at the upstream city limit and at the mouth of Silk Creek to estimate the potential impacts the urban area has had on the water quality. The flow of Silk Creek is only about 1 percent of the flow of the Coast Fork Willamette River at their junction, which is too small to have a measurable influence on the Coast Fork Willamette water quality for the parameters in this study. However, as a significant urban creek to the City it is important to understand any degradation being experienced by Silk Creek.

The State of Oregon has year-round water quality standards for water temperature, dissolved oxygen (DO), and *E. coli*. DEQ benchmarks for turbidity, total suspended solids (TSS), total inorganic nitrogen (N), and total phosphorus (TP) were developed for summer baseflow (i.e. not surface runoff). For specific standards see DEQ's Water Quality Standards webpage. For this study, **continuous temperature data were not collected**. Therefore, the temperature results from this study will need to be confirmed by future studies. The US Forest Service has collected continuous temperature data in previous years that documented summer water temperatures not meeting the state standard.

Table 4 lists stream reaches in Cottage Grove that exceed pollutant parameters and the recommended actions to address them. *E. coli* levels decreased as Silk Creek flowed through the City of Cottage Grove and into the Coast Fork Willamette. The highest pulses of *E. coli* were upstream of Cottage Grove in the fall–early winter months. The timing suggests the source of bacteria may be from surface runoff during the fall flush. On the Coast Fork Willamette River, levels of *E. coli* were much higher downstream of Cottage Grove than upstream suggesting the city does have an input of bacteria into the Coast Fork Willamette. Results suggest there may be nutrient concerns in the Coast Fork Willamette River and Silk Creek from the urban area, but not in the rural areas. TP and N were unusually high on the Coast Fork downstream of Cottage Grove and TP was high at the mouth of Silk Creek. More information can be found from the report: *Water Quality Results for the Middle and Coast Fork Willamette Watersheds and Eight Small Cities in the Upper Willamette Sub-basin: 2008-2010* by Aryana Ferguson, July 2011.

TABLE 4 HIGH AND MEDIUM STREAM REACHES FOR ACTION IN COTTAGE GROVE

Parameter	Priority	Stream reach	Basis of Priority	Action
DO Summer	HIGH	Silk Creek in Cottage Grove	Data ranking, standards exceeded and statistical difference between upstream and downstream Cottage Grove	Reduce stream temperatures and nutrients
DO Fall-Winter-Spring	MED	Coast Fork Willamette in Cottage Grove	Data ranking, standards exceeded	Reduce nutrients
E.coli Year Round	HIGH	Coast Fork Downstream Cottage Grove	Data ranking standards exceeded Statistical difference between upstream and downstream data	Remove livestock from stream Investigate potential septic tank failures
E.coli Year Round	HIGH	Silk Cr. @ Mouth	Data ranking standards exceeded Statistical difference between upstream and downstream data	Remove livestock from stream Investigate potential septic tank failures

Source: Water Quality Monitoring Report and Interpretive Maps: Coast Fork Willamette Subbasin Data 2008-2010. State of Oregon Department of Environmental Quality, Pamela Wright, December 21, 2011.

EROSION AND SEDIMENTATION

Erosion and sedimentation are naturally occurring processes that are unnaturally accelerated by land development. The risks of erosion are highest in areas with fine soils, on steep slopes, and areas undergoing active construction activities. Soils denuded of vegetation and the resultant decreased perviousness are two potential effects of development that contribute to greater peak flows, longer duration of high flows, and other factors that increase erosion. This eroded material is often deposited downstream where it decreases culvert and channel capacity and smothers natural habitat.

ENDANGERED SPECIES

In March of 1999, the Upper Willamette River Evolutionarily Significant Unit of Chinook Salmon was listed as Threatened under the ESA by the National Marine Fisheries Service. Historically, spring Chinook Salmon spawned in the Coast Fork of the Willamette River; however, Dorena and Cottage Grove dams currently prevent the migration of salmon to upstream spawning locations. Downstream from the dams, flow rates and high water temperatures impair the quality of spawning habitat.

Salmonid fish spawning and rearing, anadromous fish passage, resident fish and aquatic life are the most sensitive beneficial uses in the Coast Fork Willamette Sub-basin. The Coast Fork Willamette Sub-basin has seven stream segments on the 303(d) list for exceeding the summer rearing criteria. Brice Creek, King Creek, Layng Creek, Martin Creek, Mosby Creek, Row River upstream of Dorena Reservoir, and Sharps Creek exceeded numeric criteria to protect salmon and trout rearing. The Coast Fork Willamette River downstream of Cottage Grove Reservoir and the Row River downstream of Dorena Reservoir are listed year round for exceeding rearing and spawning temperature criteria. For specific temperature criteria refer to the Willamette Basin TMDL: Coast Fork Willamette Sub-basin, September 2006.

FIGURE 5 BASKING WESTERN POND TURTLES IN ROW RIVER NATURE PARK

The Western Pond Turtle is native to Oregon, including the Cottage Grove area. This turtle is designated as a Vulnerable species by the International Union for the Conservation of Nature (IUCN), the world's primary authority on the conservation status of species. Vulnerable species are described by IUCN as those with a high risk of endangerment in the wild. They inhabit a variety of aquatic habitats, including: ponds, rivers, reservoirs, streams, seasonal wetlands, and flooded gravel pits. Their habitat includes streams, large rivers, and slow-moving water. Some of their lives are spent in upland forests, but they prefer living in areas with large rocks and boulders, and use them to bask in the sun. Predators are avoided by using underwater hiding places such as undercut stream banks, mud substrates, logs, and dense patches of aquatic plants. These native turtles are disappearing due to many factors:

FIGURE 4 WESTERN POND TURTLE

- Loss of wetlands
- Loss of nesting sites
- Poaching, boaters, and traffic
- Competition from non-native turtles (red-eared sliders and snapping turtles)
- Fishing bait and hooks
- Predation by young bullfrogs and other non-native predators

Western Pond Turtles inhabit the Row River Nature Park and the Middlefield Golf Course. The City and local non-profits have made concerted efforts to protect them and continue to seek funding to support future projects.

Federally Listed Species for Lane County[21]:

Birds

- Marbled murrelet *Brachyramphus marmoratus,* Threatened
- Western snowy (coastal) plover *Charadrius alexandrinus nivosus*, Threatened
- Short-tailed albatross *Phoebastria albatrus* , Endangered
- Northern spotted owl *Strix occidentalis caurina*, Threatened

Fish

- Oregon chub *Oregonichthys crameri*, Threatened
- Bull trout *Salvelinus confluentus*, Threatened

Invertebrates

- Fender's blue butterfly *Icaricia icarioides fenderi*, Endangered
- Oregon silverspot butterfly *Speyeria zerene hippolyta*, Threatened

Plants

- Willamette daisy *Erigeron decumbens var. decumbens*, Endangered
- Bradshaw's desert parsley *Lomatium bradshawii* Endangered
- Kincaid's lupine *Lupinus sulphureus ssp. kincaidii*, Threatened

[21] Federally Listed, Proposed, Candidate Species and Species of Concern Under the Jurisdiction of the Fish and Wildfire Service Which May Occur within Lane County, Oregon. US Fish and Wildlife Service, Oregon Fish and Wildlife Office, August 13, 2011.

Chapter 4 Implementation Strategies

This chapter outlines the 7 topics that form the backbone of the SWMP goals and strategies. Each topic has an associated goal and each goal has one or more broad strategies for reaching that goal. Under each strategy there are one or more specific programs that are either already currently in use or are being proposed. The program descriptions, along with tasks and benchmarks that describe in detail exactly what is being proposed, are located in *Appendix B: Implementation Work Plan*.

Public Education and Outreach (PE)

PE Goal

To inform citizens about the causes of stormwater pollution, the effects on local streams and rivers, and the need for stormwater management.

PE Goal Overview

An effective way to influence attitudes, change perceptions, provide accurate information, and modify behavior is through a public education and outreach program. Through education and outreach, citizens, businesses, etc. gain a greater understanding of water quality impacts from stormwater discharges and the steps necessary to reduce stormwater pollution. As a result, members of these target audiences may help with the implementation of a stormwater management program by providing valuable resources and support (e.g., financial support, volunteer time, equipment). Much of the outreach and education does not target specific pollutants, but instead promotes environmental stewardship, pollution prevention, and water quality protection.

PE Strategy

Strategy PE-1: Provide the public with information about the impacts of stormwater discharges on waterbodies and the steps that the public can take to reduce pollutants in stormwater runoff.

PUBLIC INVOLVEMENT (PI)

PI GOAL

To encourage active citizen participation in stormwater program development and implementation of pollution reduction strategies.

PI GOAL OVERVIEW

Public involvement is an integral part of the City's stormwater program. The public must be involved in stormwater issues and solutions if the program is to be effective. The pollutants addressed by the public involvement goal depend on the target audience. Many of the involvement activities do not target specific pollutants, but instead promote environmental stewardship, pollution prevention, and water quality protection.

PI STRATEGIES

Strategy PI-1: Implement public involvement and stewardship activities that will raise awareness, foster community stewardship, and promote pollution prevention.

Strategy PI-2: Comply with state, tribal, and local public notice requirements when implementing a public involvement/participation program.

Illicit Discharges Controls (ILL)

ILL Goal

To identify, investigate, and, if appropriate, control or eliminate illicit discharges and non-stormwater discharges to the stormwater system.

ILL Goal Overview

Illicit discharges are generally any discharge into a storm drain system that is not composed entirely of stormwater. Often times, illicit discharges are the result of illegal activity. For example, dumping materials into a storm drain or connecting a wastewater pipe into the storm drain system are both prohibited under various state and local laws, and result in an illicit discharge. The exceptions include water from fire fighting activities and discharges from facilities already approved by DEQ.

Illicit discharges are a problem, because unlike wastewater which flows to a wastewater treatment plant, stormwater generally flows to waterways without any additional treatment. Illicit discharges often include pathogens, nutrients, surfactants, and various toxic pollutants. The best way to prevent illicit discharges is to prevent material from entering the storm drain system. This is done through education, enforcing dumping ordinances, and controlling spills.

The City's activities under the illicit discharges controls goal address most pollutants commonly found in urban runoff. The type and amount of pollutants addressed depend on the pollutant source(s). For example, eliminating an illicit wash water discharge would address detergents (surfactants, phosphorous, and nitrogen), solids, and oil and grease. Pollutants addressed by controlling non-stormwater discharges (such as discharges from flushing of water systems, pumped groundwater, or air conditioner condensate) include chlorine, phosphorus, and metals.

ILL Strategies

Strategy ILL-1: Identify, investigate, control, and/or eliminate illicit discharges (illicit connections, illegal dumping, and spills) to the stormwater system.

Strategy ILL-2: Maintain an up-to-date storm sewer system map, showing the location of all outfalls and the names and location of all waters of the United States that receive discharges from those outfalls.

Strategy ILL-3: Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.

Construction Erosion and Sediment Control (CESC)

CESC Goal

To prevent and mitigate pollutant discharges and other water quality impacts associated with active construction sites for new development and redevelopment projects.

CESC Goal Overview

The design and construction of new development and redevelopment can have significant impacts on water quality. If not properly managed, ground-disturbing construction can result in erosion and the discharge of sediment and other pollutants into storm drains and local waterbodies.

The main pollutants addressed by the construction erosion and sediment control goal are total suspended solids (TSS) and pollutants (such as metals and mercury) that bind to TSS. Construction site controls also reduce the discharge of floatable litter and debris, concrete washwater, bacteria, slurry, paints, and other potential toxins into the stormwater system.

CESC Strategies

Strategy CESC-1: Enact regulatory mechanisms to require erosion and sediment controls, as well as sanctions to ensure compliance.

Strategy CESC-2: Implement and refine stormwater management requirements for construction site operators to implement appropriate waste, erosion, and sediment control BMPs.

Strategy CESC-3: Enhance procedures for site plan review, which incorporate consideration of potential water quality impacts.

POST-CONSTRUCTION RUNOFF CONTROLS (PC)

PC GOAL

To protect water quality by intercepting stormwater runoff from new development and redevelopment projects using land planning, biological, and structural methods before discharging into the City's stormwater system.

PC GOAL OVERVIEW

Development alters the natural landscape by increasing impervious surfaces and introducing pollutants, which are then transported in stormwater runoff. The natural stormwater management provided by vegetation includes filtering pollutants, slowing down flow, and providing shade. Preserving and restoring vegetation, streamside buffers, and pervious areas can help restore these critical functions. Land use changes impact stormwater quality in primarily two ways: by increasing stormwater flow (quantity) and the pollutants available to be transported in stormwater runoff (quality).

Increases in stormwater quantity over historic levels can result in downstream flooding and stream bank erosion, impacting water quality regardless of what measures have been used upstream to clean that additional water volume. The conventional approach of piping this additional stormwater decreases recharge of ground water. The impacts on water resources caused by increased impervious surfaces have been well documented, with a generally linear relationship between increased imperviousness and decreased water quality.[22]

Development also impacts water quality by introducing pollutant loads into stormwater runoff. Oils, grease, litter, and toxic substances collect on both impervious and pervious surfaces until the small and frequent storm, called the "water quality design storm," scours them from these surfaces and they enter the waterways. Studies have shown a direct correlation between total impervious area and in-stream aquatic habitat for salmonid species.[23]

The main pollutants addressed by these BMPs are total suspended solids (TSS) and pollutants (such as metals and nutrients) that bind to TSS. Construction site controls also reduce the discharge of floatable litter and debris, concrete washwater, bacteria, slurry, and paints. The main pollutants addressed are nutrients (phosphorous and nitrogen), total suspended solids (TSS), and pollutants that bind to TSS, herbicides, and pesticides.

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[22] Center for Watershed Protection, *The Importance of Imperviousness, Watershed Protection Techniques,* 1(3): 100-111

[23] C. May, E. Welch, R. Horner, J. Karr, and B. Mar. 1997. *Quality Indices for Urbanization Effects in Puget Sound Lowland Streams.* Water Resources Series Technical Report No. 154. Ecology Publication No. 98-04

PC STRATEGIES

Strategy PC-1: Use regulatory mechanisms to address post-construction runoff from new development and redevelopment projects by requiring BMPs and by developing, protecting, and restoring natural areas and vegetation to reduce pollutants in discharges into and from the municipal stormwater system.

Strategy PC-2: Develop and implement strategies which include a combination of structural and/or non-structural best management practices (BMPs).

Strategy PC-3: Ensure adequate long-term operation and maintenance of BMPs.

POLLUTION PREVENTION AND GOOD HOUSEKEEPING (PP)

PP GOAL

To prevent or reduce pollutant runoff from municipal operations.

PP GOAL OVERVIEW

It is important that a municipality's own operations minimize contamination of stormwater discharges and serve as a model for the entire regulated area. Municipal operations can contribute significant amounts of pollutants to stormwater. Examples of municipal operations that can negatively impact stormwater runoff – and ultimately water quality – include:

- Landscaping and maintaining parks, golf courses, and other municipal open spaces (e.g., sidewalks and plazas). These areas can contribute pesticides, herbicides, fertilizers, litter, and sediment to the storm drainage system if they are not properly maintained, or if municipal staff does not carry out maintenance activities in an efficient manner.
- Washing, repairing, and fueling municipally-owned vehicles and equipment. Spills and leaks not contained during repairs and fueling can contribute gasoline, oil, and grease to the storm drainage system.
- Maintaining city surfaces, including streets, parking lots, and buildings. Roads and other paved areas collect pollutants such as heavy metals, oil and grease, sediment, and litter from vehicles and motorists. These materials collect and wash into the storm drainage system during the "first flush" of a rain event. Many municipalities have street sweeping programs in place for aesthetic, safety, and public health reasons. These programs, if implemented properly, can reduce the amount of pollutants entering the storm drainage system. Sand and/or salt for deicing operations can also enter the storm drainage system. Another avenue for pollutants to enter the storm drainage system is from power washing or sand blasting buildings.
- Waste and materials storage, particularly in uncovered areas. Given all the activities that a municipality conducts, there is a vast array of materials and wastes stored at municipally-owned facilities. If spills or leaks of these materials occur, it is possible for pollutants to drain to the storm drainage system.
- Construction activities and other land disturbances. Like any other type of construction activity, those initiated by the municipality can contribute sediment and other pollutants associated with construction equipment to stormwater runoff.

By implementing good housekeeping and pollution prevention procedures, employees can ultimately reduce stormwater pollutants and save the municipality money over time. Preventing litter and other debris from entering the system can reduce damage to the system and reduce the need for expensive, time-consuming repairs and maintenance.

The main pollutants addressed by the pollution prevention and good housekeeping goal are stream and river water temperature increases, TSS, and pollutants that bind to TSS, horticultural chemicals, metals, nutrients (phosphorous and nitrogen), petroleum hydrocarbons, oil and grease, floatables (debris and litter), and chlorine from water system flushing. The goal's strategies do not directly address pollutants; however, they ensure that City staff have the proper training to effectively implement the SWMP.

Municipal operations to be addressed:

- Park and Open Space Maintenance
- Vehicle and Equipment Washing, including fleet and building maintenance
- New Construction and Land Disturbances
- Dust Control Practices
- Stormwater System Maintenance
- Open Channel and Structural Stormwater Controls
- Road, Highway, and Parking Lot Maintenance
- Flood Management Projects
- Employee Training on Operations and Maintenance Plan (O&M Plan) Implementation
- Stormwater Plans for Municipal Facilities

Appendix B: Implementation Work Plan Program PP-1 describes the development of the O&M Plan that addresses pollution prevention and good housekeeping procedures for six municipal activities. *Appendix B: Implementation Work Plan Program PP-2* addresses employee training on the procedures contained within the O&M Plan.

Note: This pollution prevention/good housekeeping program only applies to operations and maintenance facilities within the municipality's city limits.

PP STRATEGIES

Strategy PP-1: Development and implementation of an operation and maintenance (O&M) plan with a focus on pollution prevention that addresses municipal operations.

Strategy PP-2: Development and implementation of a training program for municipal employees.

Program Management (PM)

PM Goal

To ensure effective program management, coordination, and reporting.

PM Goal Overview

A key focus of the City is to provide sound program management, coordination, and reporting to ensure effective implementation of the *Stormwater Management Plan* (SWMP) and compliance with permit conditions. This effort involves multiple City departments.

The program management goal does not in itself reduce pollutants; rather, it facilitates pollutant reduction by ensuring that the SWMP is effectively implemented.

PM Strategy

Strategy PM-1: Conduct program management, coordination, and reporting.

Chapter 5 GLOSSARY

A

B

Beneficial Uses - The beneficial uses assigned by basin in the Oregon Administrative Rules for water quality and for City streams are as follows: public and private domestic water supplies, industrial water supplies, irrigation, livestock watering, anadromous fish passage, salmonids fish rearing and spawning, resident fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, and hydropower, unless changed through a use attainability analysis.

Best Management Practices – Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practice to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. They include structural and non-structural measures to control pollutants at the source before they enter a stream.

Structural BMPs include:

- Retention basins
- Detention basins
- Constructed wetlands
- Infiltration practices
- Filters
- Bioretention (rain gardens)
- Biofilters (swales and filter strips)

Non-structural BMPs include:

- Street sweeping
- Illicit connection identification and elimination
- Public education and outreach
- Land use modifications to minimize the amount of impervious surface area
- Waste collection
- Proper materials storage

Bioswale – A constructed shallow, wide vegetated ditch through which storm runoff travels and that uses natural methods of cleaning water, such as sediment trapping and microorganism activity,

to remove pollutants.

C

City Limits – Boundary line that identifies land within the City.

D

Designated Management Agency - A federal, state, or local governmental agency that has legal authority of a sector or source contributing pollutants.

Detention Basin - Detention ponds (a.k.a. dry ponds, extended detention basins, dry detention ponds, extended detention ponds) are basins whose outlets have been designed to detain stormwater runoff for some minimum time (e.g., 24 hours) to allow particles and associated pollutants to settle. Unlike wet ponds, these facilities do not have a large permanent pool of water. However, they are often designed with small pools at the inlet and outlet of the basin. They can also be used to provide flood control by including additional flood detention storage.[24]

Development – All improvements on a site, including: buildings; other structures; parking and loading areas; landscaping; paved or graveled areas; areas devoted to exterior display, storage, or activities; dredging, mining, grading and filling; and the partitioning or subdividing of land. Development includes improved open areas such as plazas and walkways, but does not include natural geologic forms or unimproved land. *Refer to Cottage Grove Development Code for most up-to-date definition.*

Drainage way – An open linear depression, whether constructed or natural, that functions for the collection and drainage of surface water. It may be permanently or temporarily inundated.

E

Endangered Species – Animals, plants, birds, fish, or other living organisms threatened with extinction by man-made or natural changes in the environment.

Endangered Species Act – Under the Endangered Species Act of 1973 (ESA), the federal government protects endangered and threatened plants and animals (listed species) and the habitats upon which they depend. The ESA requires federal agencies to ensure that any action they authorize, fund, or carry out will not likely jeopardize the continued existence of any listed species, or destroy or adversely modify any critical habitat for those species.

Enhance – Augment into a more desirable condition.

Erosion – The wearing away of the earth's surface as a result of the movement of wind, water, or ice.

[24] Dry Detention Ponds, National Pollutant Discharge Elimination System, U.S. Environmental Protection Agency, May 24, 2006, http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&view=specific&bmp=67

F

Floodplain – Area adjacent to a stream or a river channel that is covered by water when the river or stream overflows its banks.

Floodway – The active flowing channel during a flood, as designated on flood maps for the City; the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

Flow-through Design – Typically a structure that does not hinder or obstruct the movement of, or misplace, surface floodwater.

G

Green Infrastructure – The protection and restoration of natural landscape features and the use of natural systems (or systems engineered to mimic natural processes) to treat and detain stormwater runoff.

H

I

Illicit Discharge – Illicit discharges are generally any discharge into a storm drain system that is not composed entirely of stormwater. The exceptions include water from fire fighting activities and discharges from facilities already under an NPDES permit. Illicit discharges are a problem because, unlike wastewater which flows to a wastewater treatment plant, stormwater generally flows to waterways without any additional treatment. Illicit discharges often include pathogens, nutrients, surfactants, and various toxic pollutants.

Impact – The consequences of a course of action; the effect of a goal, guideline, plan, or decision.

Infill – The development of vacant, bypassed lands located in an area that is mainly developed.

Injection Well – An injection well is a device that places fluid deep underground into porous rock formations, such as sandstones or limestone, or into or below the shallow soil layer. These fluids may be water, wastewater, brine (salt water), or water mixed with chemicals.

Intermittent Streams – An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

J

K

L

Large Wood – The National Marine Fisheries Service defines large wood as 60 centimeters (24 inches) in diameter and at least 15 meters (49 feet) long.

M

Maintain – Support, keep, and continue in an existing state or condition without decline.

N

Non-Point Source – The EPA defines a non-point source as any source of pollution not associated with a distinct discharge point. Includes sources such as rainwater, runoff from agricultural lands, industrial sites, parking lots, and timber operations, as well as escaping gases from pipes and fittings.

National Pollutant Discharge Elimination System – The permitting system established by the Environmental Protection Agency to administer the Federal Clean Water Act.

O

P

Perennial Stream – A stream that has flowing water year-round during a typical year. The water table is located above the streambed for most of the year. Groundwater is the primary source of water for stream flow; runoff from rainfall is a supplemental source of water for stream flow.

Permeability – (aka porous, permeable) Ability of the material (soil, asphalt, or concrete) to allow water to move through void spaces within it and eventually infiltrate into underlying soils.

Planter Strip –A landscape area for street trees and other plantings within the public right-of-way, usually a continuous planter area between the street and a sidewalk.

Point Source – Any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock concentrated animal feeding operation (CAFO), landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.

Policy – Decision-making guideline for actions to be taken in achieving goals and the community's vision.

Pre-development – Phrase used in the Stormwater Master Plan (SWMP) as a reference to the land characteristics and habitat condition prior to European settlement.

Preserve – Save from change or loss and reserve for a special purpose; the most strict non-degradation standard.

Pretreatment – Treatment of urban runoff prior to discharging into a public waterbody.

Protect – Save or shield from loss, destruction, or injury or to save for future intended use. After "preserve," the next most strict non-degradation standard.

Q

R

Redevelopment – Restoration or replacement of existing buildings.

Restoration – Process of returning an area to a close approximation of a former condition, and reestablishing functions.

Retention Basin – An area designed to hold stormwater until the effects of percolation, evapotranspiration, and/or controlled release return the area to its normally dry state. The area is designed so stormwater inflow is dissipated (or slowly released) within 72 hours so that a new volume can be accommodated. Since these stormwater areas are designed to be dry, they are often called "dry-retention systems."

Riparian areas – Lands adjacent to rivers, streams, lakes, ponds, and other waterbodies. They are transitional between aquatic upland zones, and as such, contain elements of both aquatic and terrestrial ecosystems. They have high water tables because of their close proximity to aquatic systems, soils that are usually made up largely of water-carrier sediments, and some vegetation that requires free (unbound) water or conditions that are more moist than normal.

S

Sensitive Lands – Wetlands, significant vegetation, steep slopes, floodplains, Willamette River Greenway, and other natural resource areas designated for protection or conservation by the Comprehensive Plan.

Shall – Expressing what is mandatory.

Should – Expressing what is desired, but not mandatory.

Significant Vegetation – Individual trees and shrubs within designated Willamette River Greenway and/or Riparian areas, in accordance with the City of Cottage Grove Development Code 14.3.2.200.B, and trees not within a Sensitive Lands area that have a caliper of 8 inches or larger, except that protection shall not be required for plants listed as non-native, invasive plants by Oregon State University.

Significant Wetland – An inventoried wetland that meets the criteria in OAR 141-086-300. A wetland is NOT significant if it is:

(A) Artificially created entirely from upland for the purpose of controlling, storing, or

maintaining stormwater, active surface mining, or active log ponds; or

(B) A ditch without a free and open connection to natural waters of the state (as defined in OAR 141-085-0010(9)) and which does not contain food or game fish (as defined in ORS 496.009); or

(C) Less than one acre in size and created unintentionally as the result of:

a. Irrigation water overflow or leakage; or

b. Construction activity not related to compensatory mitigation for permitted wetland impacts; or

(D) Of any size and created for the purpose of wastewater treatment, cranberry production, farm or stock watering, settling of sediment, cooling industrial water, or as a golf course hazard.

Stormwater – Water derived from a storm or conveyed through a storm sewer system.

Stormwater Conveyance Facility – Includes conveyance systems that are meant only for conveying the stormwater from one place to another and do not affect the quality or quantity of the stormwater.

Stormwater Functions – Includes preventing flooding, minimizing ponding, sustaining aquatic habitats, runoff cleansing, nutrient transfer, and other beneficial functions.

Stormwater Management System – A system of stormwater facilities (e.g. conveyance, detention/retention, treatment system, or outfall).

Stormwater Quality Facility – A facility designed to maintain and/or improve the quality and accommodate the quantity of stormwater runoff. Stormwater facilities include vegetated swales and sand filters, wet or dry ponds, marshes, infiltration facilities, and structural storm sewer devices. Stormwater Quality Facilities do not include conveyance systems that are meant only for conveying the stormwater from one place to another and do not affect the quality or quantity of the stormwater.

Stream – An area where enough natural surface water flows to produce a stream channel, such as a river or creek that carries flowing surface water either intermittently or during most of the year. This includes:

- The water itself, including any vegetation, aquatic life, or habitat;
- Beds and banks below the high water level which may contain water, whether or not water is actually present;
- The floodplain between the high water levels of connected side channels;
- Beaver ponds, oxbows, and side channels if they are connected by surface flow to the stream during a portion of the year; and

- Stream-associated wetlands.

Stream Channel – An area with evidence of perennial or seasonal water passage. The depression between the banks worn by the regular and usual flow of the water. The channel need not contain water year-round. This definition does not include irrigation ditches, canals, storm or surface water runoff devices, or other entirely artificial watercourses.

Stream System – The channel, subsurface flow, and adjacent corridor, including the floodplain.

Sustainable – Able to be maintained or continued indefinitely.

Swale – A type of stormwater facility. Usually a broad, shallow depression with plants that filter and process contaminants.

T

U

Urban Fringe – Area within the Urban Growth Boundary and outside the city limits.

Urban Growth Boundary – A line that circumscribes the urban fringe and the city limits and that is intended by state and local regulations to contain the area available to urban development.

V

W

Waterbodies – Permanently or temporarily flooded lands which may lie below the deepwater boundary of wetlands. Waterbodies include rivers, streams, creeks, sloughs, drainage ways, lakes, and ponds.

Watershed – Drainage area of a specific stream system. Small watersheds are components of larger watersheds.

Waters of the United States – All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters subject to the ebb and flow of the tide. Waters of the United States include all interstate waters and intrastate lakes, rivers, streams (including intermittent streams), mudflats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds. [See 40 CFR 122.2 for the complete definition.]

Wetland – An area that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include swamps, marshes, bogs, and similar areas. [See 40 CFR 240 Section 404.B.1.230.3T for the complete definition.]

X

Y

Z

Appendix A Implementation Work Plan

Table of Contents

Public Education and Outreach (PE) Programs, Tasks, and BMPs

Program PE-1.1: Stormwater Education and Outreach

An effective education and outreach program begins with a comprehensive education and outreach strategy. The strategy focuses on identifying target audiences, including what they value and how they communicate. This information directly relates to determining the other education and outreach programs that are most appropriate for target audiences.

The City shall develop new and use existing communication mechanisms, such as a new website or webpage, mailed information, or radio broadcasts, to provide the public with information about actions that individuals can take to minimize stormwater impacts on water quality and riparian habitats. This effort will be a combined approach by the City, neighboring cities, Lane County, and community organizations, such as the Coast Fork Willamette Watershed Council (CFWWC). Education and outreach flyers and factsheets may include any of the following topics:

Homeowners

- Stormwater BMP facilities aesthetics and functionality (facilities will typically not appear manicured and may look overgrown, but are still functioning properly)
- Alternatives to toxic substances
- Bioswale design
- Chlorinated water from hot tubs or swimming pools discharge options
- Landscaping and lawn care
- Pest control
- Proper disposal of household hazardous wastes
- Residential car washing
- Riparian corridor benefits
- Trash and debris management
- Water conservation practices for homeowners
- Hillside water runoff erosion and sediment prevention
- Private road management practices

Education for Businesses

- Automobile maintenance
- Pollution prevention for business
- Promoting low impact development
- Water conservation practices for businesses
- Hillside water runoff erosion and sediment prevention

City Staff/Public Officials

- City staff and public officials should be able to explain all topics listed for homeowners and businesses to the public when questioned.

Tasks

1. Identify funding for the designated employee implementing the Stormwater Education and Outreach program.
2. Identify staff member, intern, or part-time staff member in charge of creating or obtaining and distributing educational materials in water bills.
3. Target stormwater information to a specific audience and provide detailed guidance. Example topic: How to build a bioswale or rain garden on a hillside and when it is appropriate to do so.
4. Distribute flyers with stormwater tips in water bills.
5. Coordinate with CFWWC annually to identify schools interested in participating and key topics related to stormwater and water quality protection.
6. Train city staff at least once annually in the topics listed on page A.1.

PROGRAM PE-1.2: RIPARIAN EDUCATION

Educate community members about the importance of riparian areas and proper management of such areas. Specifically target landowners with property within or directly adjacent to a riparian zone to inform them of the benefits of bank stabilization using native or naturalized vegetation for the safety of their property in addition to the river habitat.

Tasks

1. In coordination with CFWWC explore criteria for the placement or removal of wood debris within streams and rivers located inside the city limits. This task will require the approval of multiple state and federal organizations that have competing protocol for woody debris removal.
2. Identify funding for the employee designated to implement Riparian Education Program tasks.
3. Identify staff member, intern, or part-time staff member in charge of creating and distributing educational materials.
4. Develop educational materials regarding riparian vegetation, joint mailing, and events with the CFWWC and other interested community organizations.

5. Coordinate with CFWWC to provide classroom presentations, educational booths at community events, and organize community outreach events.

6. Continue to encourage tree planting by property owners on their properties.

PROGRAM PE-1.3: PET WASTE MANAGEMENT

When pet waste is improperly disposed of, it can be picked up by stormwater runoff and washed into storm drains or nearby waterbodies. Since storm drains do not always connect to treatment facilities, untreated animal feces often end up in rivers and streams, causing significant water pollution. Decaying pet waste consumes oxygen and sometimes releases ammonia. Low oxygen levels and ammonia can damage the health of fish and other aquatic life. Pet waste carries bacteria, viruses, and parasites that can threaten the health of humans and wildlife. Pet waste also contains nutrients that promote weed and algae growth (eutrophication). Cloudy and green, eutrophic water makes swimming and recreation unappealing or even unhealthy.

The first step in a pet waste management program is to increase public awareness. Pet waste management programs encourage proper waste disposal by passing local ordinances and launching public education campaigns that inform pet owners about the importance of cleaning up after their pets. Many communities implement pet waste management programs by posting signs in parks or other pet-frequented areas, by mass mailings, and by broadcasting public service announcements.

Tasks

1. Adopt ordinance outlining the requirements for disposal of pet waste in the City.

2. Identify parks and City-owned open space without pet waste pick-up facilities.

3. Prioritize funding and/or coordinate with local organization for purchase and installation of signage and facilities.

4. Establish monitoring protocol to gather data for the analysis of pet waste station effectiveness and a staff member/department to manage the pet waste pick-up program.

5. Install and maintain dog waste facilities at all City parks and keep track of bags used.

PROGRAM PE-1.4: STORM DRAIN CATCH BASIN PLAQUES

Stenciling or placing plaques on storm drain catch basins with messages such as "Do Not Dump – Drains to River" or "Do Not Dump – Drains to Ground Water" have proven very effective in many jurisdictions. Some residents still do not know that material placed in storm drain catch basins is not treated at a wastewater treatment plant before reaching a

river or infiltrating into the ground. These permanent messages on storm drain catch basins serve as constant reminders and teaching tools for everyone who sees them.

The City and CFWWC have partnered to place plaques above each storm drain catch basin within the City to increase awareness of the connection between drains and local rivers. Each plaque states "No Dumping – Drains to River".

Tasks

1. Identify all storm drain catch basins within the City.
2. Identify individuals and host events, with the assistance of CFWWC, to adhere metal plaques to the concrete above each storm drain catch basin.
3. Establish protocol to ensure the placement of a plaque above newly constructed or renovated storm drain catch basins.
4. Establish monitoring and replacement protocol for plaque repair or replacement.

Program PE-1.5: Construction Operator Training

The construction process often removes the protective vegetation and natural systems keeping soil in place. During storm events this soil erodes away and fills local waterbodies with sediment and any waste or toxins left on the construction site. Sediment and erosion control BMPs are available and required by the City staff in order to first prevent construction site erosion and then to filter any runoff before it enters adjacent storm drains or waterbodies.

Tasks

1. All construction operators shall receive training in appropriate sediment and erosion control BMP installation, maintenance, and disposal before receiving a building permit.

Benchmarks: Public Education and Outreach

1. Distribute stormwater educational material annually, with updated information and lists of additional resources, to assure that community members remain current on water quality and quantity issues.
2. Distribute riparian educational material annually, with updated information and lists of additional resources, to assure that community members remain current on water quality and quantity issues.
3. Continue to add pet waste signage and stations throughout City parks. Monitor the

number of bags distributed.

4. Continue placing no-dumping plaques on City storm drain catch basins.
5. Begin placing information of upcoming stormwater education and outreach events and existing programs on City website.

PUBLIC INVOLVEMENT (PI) PROGRAMS, TASKS, AND BMPS

PROGRAM PI-1.1: PARTNERSHIP WITH NON-PROFIT AND VOLUNTEER ORGANIZATIONS

Non-profit and volunteer organizations have been an excellent source of wisdom and stormwater program assistance to the City. Non-profit organizations and volunteer groups provide an essential role in protecting, enhancing, and promoting natural systems. These organizations host events that involve local residents and businesses in stewardship projects, which increase exposure to local water quality issues and solutions.

The Coast Fork Willamette Watershed Council (CFWWC) serves to improve water quality and quantity and watershed conditions in the Coast Fork Willamette river basin through education, coordination, consultation, and cooperation among all interests, using the collective wisdom and voluntary action of the City's community members.

CFWWC performs water quality monitoring, habitat restoration, stream woody debris re-establishment, school presentations, and public meetings on various issues occurring within the watershed.

Lane Community College (LCC) has participated in project tours and presentations hosted by the CFWWC. There is continued interest by the LCC faculty and the CFWWC to foster this collaborative relationship. LCC has two degrees with curriculum related to water quality and quantity and environmental protection issues.

Water Conservation Technician – This degree prepares students to enter careers in the water field as water efficiency technicians and workers, coordinators, specialists or managers or as water management specialists and technicians. The students design, implement, and evaluate water conservation programs.

Sustainable Coordinator – This degree prepares students for careers as sustainability coordinators, resource management technicians, corporate social responsibility coordinators, environmental specialists, recycling coordinators, pollution prevention specialists and energy or waste reduction analysts. Graduates may work for public agencies, school districts, colleges or universities, non-governmental organizations, nonprofit organizations, private businesses or corporations.

Tasks

1. Assist homeowners with stream bank and riparian habitat care along waterways through grant funded projects.
2. Monitor, identify, and remove impoundments and trash on streams in City limits.
3. Work with local group(s) to label storm drain catch basins to warn people not to

dump anything but clean water into them.

4. Host at least one annual river cleanup in conjunction with CFWWC.

PROGRAM PI-1.2: STUDENTS TRAIN IN RIVER ENHANCEMENT, ASSESSMENT, AND MONITORING

CFWWC has established the Students Train in River Enhancement, Assessment, and Monitoring (STREAM) program with two Cottage Grove high schools: Cottage Grove High School and Kennedy Alternative High School. This program provides high school students with the opportunity to learn about river enhancement, assessment, and monitoring. The monitoring results provide the City with consistent water quality data on local rivers.

Tasks

1. Continue to support CFWWC's STREAM program with the Cottage Grove High School and the Kennedy Alternative High School.

2. Encourage and support the expansion of the STREAM program to additional local schools in order to establish a region-wide monitoring program. Specifically provide bi-weekly monitoring of temperature, dissolved oxygen, *E. coli*, phosphorous, nitrate, and turbidity to establish a baseline for waterbodies throughout the watershed.

3. Collect monitoring data from CFWWC and ensure data is also received by DEQ.

PROGRAM PI-1.3: NO IVY LEAGUE

The spread of the exotic species English Ivy in the United States has caused extensive damage to natural habitats and riparian habitats in particular. The ivy is able to climb up into the canopy of trees and tighten around the trunks to the extent of killing the trees. This poses both an environmental problem and a public safety hazard. Losing mature trees within riparian areas along rivers has the potential to increase the water temperature and the speed of bank erosion. The purpose of the No Ivy League is to organize and host volunteer ivy removal events along creeks and rivers in the Coast Fork Willamette Watershed Sub-basin.

The City and CFWWC have partnered to host annual English Ivy removal work parties. The goal is to protect trees city-wide with a focus on those located in riparian habitats from strangulation by ivy. Protecting the trees maintains bank stabilization, shade coverage of rivers and streams, and the urban canopy. An increase in the City's urban tree canopy helps to reduce the City's overall carbon footprint.

Tasks

1. Identify imperiled trees on public property or by property owner request and

permission within the city limits.

2. Coordinate and recruit volunteers for the annual work party.

3. Host a work party annually.

PROGRAM PI-1.4: PILOT PROJECTS

Stormwater facility pilot projects on publicly managed lands provide the City with the opportunity of testing the effectiveness and cost of new and proposed stormwater facilities. These projects also provide examples for local businesses and residents to visit and learn how they could build a similar facility on their properties.

Tasks

1. Each year budget for at least one stormwater facility pilot project, or the continuation of a project from the previous year.

2. Locate appropriate sites for pilot projects.

3. Prioritize pilot projects by type and location.

4. Complete Bohemia Park bioswale by 2013.

PROGRAM PI-1.5: STORMWATER ADVISORY TEAM

The purpose of Stormwater Advisory Team is to gather together city officials, non-profit staff and board members, and other interested parties to discuss completed, current, and future stormwater management projects. Representatives of businesses, industries, conservation groups, residential and civic associations, and other interested stakeholders may be invited to participate. Work, as needed, shall be done with these stakeholders to discuss stormwater management plan program development and implementation.

Tasks

1. Coordinate Stormwater Advisory Team participants and identify annual meeting date and location.

2. Develop timeline for proposed projects with sufficient advanced notice (approximately one year in advance) to assist non-profits, such as CFWWC, in applying for the appropriate grants.

3. Place updated list of completed, current, and proposed stormwater management projects on City website and CFWWC website.

PROGRAM PI-2.1: NOTICE OF HEARINGS

The City of Cottage Grove shall comply with all state and federal requirements for

providing public notice for applicable stormwater projects and programs. Chapter 4 of the City of Cottage Grove Development Code delineates specific notification protocols and review procedures to be used for all land use and development permit applications and approvals

Tasks

1. Meet or exceed federal, state, and local notice of hearing requirements.

BENCHMARKS: PUBLIC INVOLVEMENT

1. Annual report of efforts to assist landowners with riparian habitat care along waterways.
2. Keep a record of dam impoundment locations and removal dates – along with notes about beaver relocation, if necessary.
3. Continue to support CFWWC's local water quality monitoring research with funding and staff time and provide recommendations on prioritization of future projects.
4. Continue to support the No Ivy League.
5. Continue to support CFWWC in coordinating the STREAM program.
6. Complete at least one pilot project by 2016.
7. Establish the Stormwater Advisory Team and host one meeting annually.
8. Comply with State law and Section 4.1.500 of the City's Development Code ensuring that sufficient public notice is provided.

Illicit Discharges Controls (ILL) Programs, Tasks, and BMPs

Program ILL-1.1: Waste Pick Up and Removal Services

This program is intended to prevent illegal dumping of non-stormwater liquid from entering the storm drain system by providing residents and businesses with waste disposal and recycling services.

Cottage Grove Garbage Service, Inc., presently manages residential, business, and multi-family customers' solid waste and recycling programs to prevent illegal dumping of solid and liquid wastes. These programs include curbside recycling, bio-medical waste, and bulky waste collection.

The City of Cottage Grove manages seasonal yard debris through leaf pick-up and tree branch pick-up programs provided periodically each year. The municipal code also enables the City to enforce the removal of built up debris and waste materials and prohibit unauthorized dumping. Notice of these programs is mailed city-wide each year in addition to notices in the local newspaper.

Lane County Waste Management provides hazardous waste disposal services to residents and businesses. They also provide information on protecting your family's health and environment, and how to make "green" all purpose cleaners and organic pesticides. Electronics recycling is also provided at five of Lane County's transfer sites – Cottage Grove's is located on Sears Road, one half mile north of the intersection of Sears Road and Row River Road. "Household Hazardous Waste Roundups" are scheduled throughout the year at different locations within the County. These roundups include paint, electronics, household cleaners, lawn, and garden chemicals, car care products, arts and crafts products, pool chemicals, fluorescent lamps and other household hazardous waste.

PaintCare Program is a statewide collection program that collects household paint only.

Tasks

1. Continue the City's franchise with a garbage service provider to implement solid waste programs (curbside recycling, yard debris collection, and bulky waste collection) to prevent illegal dumping.

2. Continue to provide residents and businesses with leaf and tree branch pick-up programs each year.

3. Coordinate with Lane County to expand the leaf and tree branch drop-off programs to provide service all year.

PROGRAM ILL-1.2: ORDINANCE TO PROHIBIT NON-STORMWATER DISCHARGES

The key elements of an illicit discharge ordinance include at a minimum: (1) prohibitions on illegal dumping or discharges to the storm drainage system, (2) prohibitions on non-approved connections from sanitary sewers to the storm drainage system, (3) authority to inspect properties for illicit discharges, and (4) penalties and enforcement options.

Non-stormwater discharges that should be allowed to enter the stormwater system are:

Agency Process Waters (discharges from city, state, or other jurisdictions)

- Water line flushing
- Discharges from potable water sources
- Street wash waters
- Discharges or flows from emergency fire-fighting
- Start-up flushing of groundwater wells
- Potable groundwater monitoring wells
- Draining and flushing of municipal potable water storage reservoirs
- Discharges of treated water from investigation, removal and remedial actions selected or approved by DEQ pursuant to ORS Chapter 465, the state's environmental cleanup law

Single Site Behaviors (property owner discharges)

- Landscape irrigation
- Irrigation water
- Lawn watering
- Individual residential car washing
- Dechlorinated swimming pool discharges

Building Discharges

- Foundation drains
- Air conditioning condensate
- Water from crawl space pumps
- Footing drains

Natural Waters

- Diverted stream flows
- Uncontaminated pumped groundwater

- Rising groundwaters
- Uncontaminated groundwater infiltration
- Springs
- Flows from riparian habitats and wetlands

Additional elements in an ordinance could include requirements for the property owner to pay for the cost of abatement and a requirement to notify the City of any spill or illicit discharge.

Tasks

1. Establish funding for staff to review and revise the existing municipal code in order to prohibit non-stormwater discharges into the storm drainage system.
2. Identify staff member to assess whether the required legal authority to prohibit non-stormwater discharges to the storm drainage system currently exists within existing ordinances or municipal codes.
3. Revise municipal code prohibiting non-stormwater discharges.
4. Enforce current Municipal Code Chapter 13.08 Sewer Regulations.

Program ILL-2.1: Storm Drainage Master Plan

In 2007, the City initiated the Storm Drainage Master Plan (2007 Plan) to identify and address stormwater related problems throughout the City. The 2007 Plan identifies opportunities for optimizing existing resources through improved prioritization, mission integration, and a renewed commitment to the use of environmentally responsible, cost-effective, and sustainable solutions. Please review the 2007 Plan for the recommended twenty-six capital projects and seven programmatic actions.

Tasks

1. City staff shall review all recommendations and prioritize each as immediate, short-term, long-term, and completed.
2. Develop a long-term funding strategy and timeline for completing each of the prioritized projects.
3. Coordinate drainage system issues identified in the 2007 Plan with the Stormwater Design and Maintenance Manual.
4. Revise 2007 Plan to include water quality and quantity projects in the list of capital improvement projects.

PROGRAM ILL-3.1: ILLICIT DISCHARGE TRAINING

Provide training to relevant municipal staff, such as field maintenance crews, illicit discharge inspectors, and other first responders, on the proper BMPs to use for spills and illicit discharges. Include in the training who to call for different types of spills.

This training could be combined with other training of municipal staff conducted as part of PE-1.3 Strategy: Stormwater Education Program.

Tasks

1. Identify funding for the Illicit Discharge Training program.
2. Identify BMPs for identifying and preventing illicit discharges.
3. Gather training materials and identify staff member to lead trainings.
4. Expand annual trainings on illicit discharge identification and prevention.
5. Contact Lane Council of Governments and other local, state, and federal agencies to inquire about grant funding for hiring illicit discharge detection experts to host training sessions.

PROGRAM ILL-3.2: ILLICIT DISCHARGE PUBLIC OUTREACH

Provide the general public and local businesses with information about the hazards of illicit discharges and steps they can take to dispose of non-stormwater liquids. Lane County Waste Management and the Oregon PaintCare Program both provide disposal services for hazardous waste.

Tasks

1. Identify staff members responsible for identifying programs, material development, and distribution.
2. Create fact sheets and flyers describing illicit discharge hazards and methods for hazardous material disposal.
3. Distribute informational fact sheets and flyers via water bills, weekly city updates, and other methods as identified by the staff member responsible.
4. Post information about community services for hazardous waste disposal on City website.

BENCHMARKS: ILLICIT DISCHARGES CONTROLS

1. Expand enforcement capacity of non-point source contamination and illegal

discharges into waterways.

2. Adopt revised Ordinance to Prohibit Non-Stormwater Discharges.
3. Revise Drainage Master Plan to include water quality and quantity capital improvement projects.
4. Minimal to no illicit discharges into the municipal stormwater system.
5. Continue to fund storm drainage master plan capital improvement projects.
6. Continue to construct capital improvement projects as identified in the Drainage Master Plan.
7. Update Drainage Master Plan every 10 years.
8. Train relevant staff and re-train as needed.

Construction Erosion and Sediment Control (CESC) Programs, Tasks, and BMPs

Program CESC-1.1: Development Code 3.5 Erosion and Sediment Control Section

For permits or authorizations issued by the jurisdiction for construction operators disturbing less than one acre, require erosion and sediment controls in compliance with an adopted stormwater management plan or other guidance document.

As of 2011, the City's Development Code did not contain a specific Erosion and Sediment Control Ordinance chapter. This ordinance will be developed along with input from local builders and other stakeholders. The ordinance will impact all new construction and redevelopment sites. This ordinance shall require an erosion and sediment control plan prior to receiving a building permit.

Tasks

1. Adopt formal thresholds for the requirement of surface water detention and treatment plans with identified sediment and erosion control BMPs for new development and redevelopment projects developed in Program CESC-3.1: Site Design Review.

2. Establish a Technical Advisory Committee that includes local builders to produce a draft Erosion Prevention and Sediment Control Ordinance.

3. Present Erosion Prevention and Sediment Control Ordinance to City Council for review and adoption.

4. Enforce Erosion Prevention and Sediment Control Ordinance.

5. Review existing Erosion and Sediment Control Manual Booklets.

Program CESC-1.2: Hillside Development Regulations

The purpose of the Municipal Code Title 14.3.7.100 Hillside Development is to implement the landslide hazard prevention goals in the City of Cottage Grove Natural Hazard Mitigation Plan and the "Hillside Development" element of the City's Comprehensive Plan.

In addition it intends to:

- Provide for the review of hillside development applications and evaluate properties for potential slope related hazards;
- Assess the risk that a proposed use or activity may adversely affect the stability and slide susceptibility of an area; and thus promote the public health, safety, and welfare;
- Establish standards and requirements for the development of lands in a hillside

area; and

- Mitigate risk within a hillside area, not to act as a guarantee that the hazard risk will be eliminated, nor as a guarantee that there is a higher risk of hazard in any location.

Tasks

1. Continue to enforce hillside development regulations, specifically vegetation management and erosion control.

PROGRAM CESC-1.3: NPDES 1200-C PERMIT

The NPDES 1200-C, 1200-CN and 1200-CA general permits are the responsibility of the developer and apply to construction activities including clearing, grading, excavation, materials, or equipment staging and stockpiling that will disturb one or more acres of land. They also apply to construction activities that will disturb less than one acre that are part of a common plan of development or sale, if the larger common plan of development or sale will ultimately disturb one acre or more. In addition, DEQ may require registration for any other construction activity based on the potential for contribution to an exceedance of a water quality standard or potential for significant contribution of pollutants to waters of the state. The City shall receive copies from the developer of all approved permits before the building permits are issued.

If there is a potential for discharge of stormwater into a portion of a waterbody that is listed for turbidity or sedimentation or that has an established TMDL for sedimentation or turbidity from the construction site, then one or more of the BMPs listed below must be implemented. Identify the selected BMP(s) in the erosion and sediment control manual as one that address this condition of the permit, and provide the rationale for choosing the selected BMP(s). The 303(d) list can be found at the Oregon DEQ's Water Quality Assessment Database website.

Erosion and Sediment control BMPs may include:

- Compost berms, compost blankets, or compost socks
- Erosion control mats
- Tackifiers used in combination with perimeter sediment control BMPs
- Establish vegetated buffers sized based on soil limitations
- Water treatment by electro-coagulation, flocculation, or filtration
- Other substantially equivalent sediment or turbidity BMP approved by DEQ

Tasks

1. Continue to ensure construction project compliance with 1200-C permit

requirements.

2. Provide staff training in 1200-C permit review and enforcement.

PROGRAM CESC-2.1: EROSION AND SEDIMENT CONTROL MANUAL

There are several erosion and sediment control manuals in use by Oregon cities that have been created by State organizations. The manuals by DEQ and the Oregon Department of Transportation (ODOT) provide a good starting point for creating an erosion and sediment control manual catered to the City's needs.

DEQ Erosion and Sediment Control Manual is designed to assist construction site developers, engineers, designers, and builders in identifying and implementing the most appropriate best management practices to minimize water quality impacts from their construction activities. More specifically, the manual should assist site developers in developing erosion and sediment control plans that must be submitted for sites required to obtain a DEQ NPDES 1200-C Construction Stormwater permit and/or comply with local jurisdictional regulations.

- Erosion and Sediment Control Manual PDF 3.2mb
- Appendix A: Climate Information and Rainfall Data PDF
- Appendix B: Soil Survey Information PDF
- Appendix C: Acronyms and Terms PDF
- Appendix D: Runoff Control BMPs PDF 6.3mb
- Appendix E: Erosion Prevention BMPs PDF 4.1mb
- Appendix F: Sediment Control BMPs PDF 3.6mb
- Appendix G: Non-Stormwater Pollution Control BMPs PDF
- Appendix H: References PDF
- Appendices A through H PDF 1.4mb

ODOT Erosion Control Manual (2005) is a guide on erosion and sediment control for ODOT personnel involved in design and construction. The purpose of the manual is to present the ODOT program to prevent pollution of water caused by erosion from construction sites. Chapter 1 provides an introduction, background on regulations and other agencies, ODOT policies, and the responsibilities of involved parties. Chapter 2 presents information on the processes of erosion and sedimentation and associated environmental impacts. Chapter 3 presents erosion and sediment control measures and BMPs. Chapter 4 covers additional pollution control measures and BMPs. Chapter 5 presents erosion control planning. Chapter 6 presents construction implementation. Chapter 7 presents guidelines for Erosion

and Sediment Control Plan design.

Tasks

1. City shall review available Erosion and Sediment Control Manual Booklets and determine suitability of BMPs.

2. Develop Erosion and Sediment Control Manual.

3. Adopt an Erosion and Sediment Control Manual based on the previous task.

PROGRAM CESC-3.1: SITE DESIGN REVIEW

Site Design Review applies to all development in the City above the thresholds listed for Land Use Review in the City's Municipal Code Title 14.4.2.200. This includes, but is not limited to, proposals for subdivisions with three or more dwellings, non-residential building additions above 1,000 square feet or larger than 50 percent of an existing structure, and major modifications to development approvals as defined by the City's Municipal Code Title 14.4.6.300. Verify with the most current Municipal Code Title 14.

Tasks

1. Establish formal sediment and erosion control BMP standards as part of surface water detention and treatment plans, such as bio-filter bag protection for catch basins, area drains, and ditch inlets (Standard Details Index 700), sediment fence placement (Standard Details Index 701), and temporary gravel entrance (Standard Details Index 702).

2. City staff shall continue to enforce erosion and sediment control BMPs and inspect new development and redevelopment projects during and after construction.

3. City inspector should hold pre-construction meeting on-site with contractor and sub-contractors to identify erosion and sediment control measure locations and to identify stormwater treatment facility locations, if applicable.

PROGRAM CESC-3.2: TRAIN PLAN REVIEWERS AND FIELD INSPECTORS

Provide training or coordinate with existing training efforts to educate plan reviewers and field inspectors in erosion and sediment control BMPs and requirements.

Factors to verify during the site plan review process include:

- Erosion and sediment controls consistent with the DEQ Erosion and Sediment Control Manual Booklet (see Program CESC-2.2) are planned and clearly described on the plan.
- The plan meets all local erosion and sediment control requirements.
- The construction operator is aware of their responsibility for implementing and

maintaining erosion and sediment controls and is aware of the penalties for failing to do so.

A pre-construction site plan meeting between the City and the construction operator is a good way to ensure that both parties are comfortable with the plan and requirements.

Inspectors shall be informed about review and inspection expectations. One tool to use is the DEQ Inspector Guidance Booklet. It is designed as a tool for government inspectors, and inspectors employed by the site developer, to ensure adequate erosion and sediment controls are in place and permit requirements are followed at construction sites.

Inspections need to include all disturbed areas of the site as well as material and waste storage areas, stockpile areas, construction site entrances and exits, and any sensitive areas, discharge locations, and receiving waters. Contractor inspections should document any problems encountered and the contractor must take steps to maintain or improve BMPs to mitigate pollutant discharges for the duration of the project.

- Inspector Guidance Booklet PDF

Tasks

1. Gather all training materials and identify staff member responsible for leading trainings and gathering the materials.
2. Train City staff, possibly using DEQ Erosion and Sediment Control Inspector Guidance Booklet in addition to other materials gathered.
3. Host trainings for plan reviewers and site inspectors annually.
4. Provide trainings for construction operators as needed and provide fact-sheet outlining proper procedures and BMPs for operator to sign.
5. Develop website training course for construction operators to complete as part of each project before construction begins.
6. Continue to hold pre-construction inspector meetings with contractors and sub-contractors on each project site.

BENCHMARKS: CONSTRUCTION EROSION AND SEDIMENT CONTROL

1. Adopt erosion prevention and sediment control ordinance.

2. Maintain current records of erosion prevention and sediment control ordinance enforcement with new computer program "ePermitting"[25]
3. Maintain current records of hillside development requirements and building permits with "ePermitting".
4. Develop inspection timeline using "ePermitting" or other program.
5. Identify staff member as 1200-C permit enforcing officer.
6. Implement erosion and sediment control BMPs at all new development and redevelopment.
7. Train plan reviewers and inspectors; re-train as needed.

[25] www.BuildingPermits.Oregon.gov

POST-CONSTRUCTION RUNOFF CONTROLS (PC) PROGRAMS, TASKS, AND BMPS

PROGRAM PC-1.1: DEVELOPMENT CODE 3.5 POST-CONSTRUCTION RUNOFF CONTROL SECTION
The City shall develop a Post Construction Runoff Control Ordinance that addresses post-construction runoff from new development and redevelopment projects that trigger **site design review** under chapter 14.3.5 of the Development Code. The City shall also develop and adopt a *Stormwater Design and Maintenance Manual* that requires local construction sites to comply with specific water quality protection and stormwater runoff prevention design standards . A maintenance agreement shall be recorded in conjunction with every post-construction runoff control facility:

Maintenance Agreement shall be submitted to the City by the property owner with a description of the stormwater management facility. This description shall include the soil infiltration rate, vegetation health, overflow issues, and facility stormwater treatment successes. This agreement shall outline what will happen if the stormwater management facility fails.

Site Design Review ensures compliance with the City's land use and development standards, such as lot area, building setbacks and orientation, lot coverage, and maximum building height, along with the City's design standards and public improvement requirements. A preliminary grading plan is required for development sites one-half acre or larger. The City Engineer may also deem it necessary to include surface water detention and treatment plans in accordance with the Municipal Code Title 14.3.4.400 below:

> **3.4.400 Storm Drainage Improvements**
>
> **A. General Provisions.** The City shall issue a development permit only where adequate provisions for stormwater and flood water runoff have been made in conformance with the City's Storm Drainage Master Plan and Chapter 3.5, Surface Water Management.
>
> **B. Accommodation of Upstream Drainage.** Culverts and other drainage facilities shall be large enough to accommodate existing and potential future runoff from the entire upstream drainage area, whether inside or outside the development. Such facilities shall be subject to review and approval by the City Engineer.
>
> **C. Effect on Downstream Drainage.** Where it is anticipated by the City Engineer that the additional runoff resulting from the development will overload an existing drainage facility, the City shall withhold approval of the development until provisions have been made for improvement of the potential condition or until provisions have been made for storage of additional runoff caused by the development in accordance with City standards.

D. Over-Sizing. The City may require as a condition of development approval that sewer, water, and/or storm drainage systems serving new development be sized to accommodate future development within the area as projected by the applicable Water, Sewer, and/or Storm Drainage Master Plan, provided that the City may grant the developer credit toward any required system development charge for the same, as outlined in Chapter 15.16 of the Cottage Grove Municipal Code.

E. Existing Watercourse. Where a proposed development is traversed by a watercourse, drainage way, channel, or stream, there shall be provided a stormwater easement or drainage right-of-way conforming substantially with the lines of such watercourse and such further width as will be adequate for conveyance and maintenance to protect the public health and safety.

Tasks

1. The Municipal Code 12.10.030 One Year warranty required shall be adjusted: "All public improvements within the public rights-of-way or easements shall be guaranteed for a period of ~~one~~ **three** years. The warranty period will commence upon completion and acceptance by the city of all items of work. During said warranty period, the permittee shall be responsible for any deficiencies of said improvements. If upon notice of any failure...". The "One Year" warranty shall be changed to "Three Year".

2. Define what "fail" means in terms of stormwater management facility functionality and the consequences of failure.

3. Establish formal thresholds for the requirement of surface water detention and treatment plans for new development and redevelopment projects.

4. Draft and adopt the Development Code 3.5 Post-Construction Runoff Control Code.

5. Review and update this code as necessary.

6. Enforce this code during the City's site design review process.

7. Draft and adopt a Stormwater Design and Maintenance Manual.

8. Establish protocol for maintenance agreement.

PROGRAM PC-1.2: LAND USE AND ZONING TOOLS

The City's Community Development Department has primary responsibility for updating, administering, and enforcing the City's *Comprehensive Plan*. The following City land use and zoning codes and plans address the natural resource conservation and protection goals of the *Comprehensive Plan.*

Development Code Chapter 14.3.7 Sensitive Lands

The following sections contain design standards related to areas of environmental concern within the City of Cottage Grove: 14.3.7.100 Hillside Development, 14.3.7.200 Floodplain Development, 14.3.7.300 Riparian Development, and 14.3.7.400 Willamette River Greenway. These standards are applicable to any development subject to Land Use or Site Design Review on hillsides, in designated floodplains, along river corridors, or within the state-designated Willamette River Greenway.

Tasks

1. Continue to develop, implement, and enforce land use and zoning tools to protect and conserve natural resources and functions.

PROGRAM PC-1.3: PARK AND OPEN SPACE LAND ACQUISITION AND PROTECTION

The City works to protect and restore natural areas and vegetation in numerous ways to maintain natural stormwater infiltration and treatment cycles in addition to maintaining overall community health. Plans for land acquisition and protection have been developed by the City and include the Water to Woods: 2003 Cottage Grove Parks Plan, which updated the 1974 Cottage Grove Parks and Recreation Master Plan and amended the 1980 Cottage Grove Comprehensive Land Use Plan. System development fees are also collected by the City to support City parkland development and acquisition. Parkland acquisition is irregular as the City does not have a large fund reserved for park acquisition. Therefore, the City is reliant on land donations, receipt of major grants, and management of specialized facilities by partners.

The Water to Woods: 2003 Cottage Grove Parks Plan assesses the physical attributes of the City and the needs and desires of the residents, and establishes goals, policies, and specific actions for developing a cohesive and interconnected system of beautification areas, neighborhood and community parks, greenways and natural areas in which the community can take pride. This plan provides goals and policies that will guide park and recreation decisions for the next 15-20 years.

Systems Development Charges (SCDs) are collected from new residential development to be used towards acquisition, design, and improvements to new parkland.

Tasks

1. Continue to update the *2003 Parks Plan* to protect and conserve natural resources throughout the City.

2. Increase SDCs to amount as outlined in the Water, Wastewater and Stormwater

Utility Rate Study and System Development Charges Analysis – 2010.

3. Indentify additional grant funding for land acquisition and park development.
4. Continue to pursue opportunities for land acquisition and protection within the UGB.
5. Coordinate with Lane County and the State of Oregon to ensure the protection of surrounding open space and natural resources areas immediately adjacent to the City.

PROGRAM PC-1.4: STORMWATER FACILITY LAND ACQUISITION

Municipal Code Resolution No. 685 (9) Rights-Of-Way Acquisition states that "cost of right-of-way acquisition for any local improvement project shall be assessed to the property benefited, unless the City Council determines that unusual construction problems exist, or that the adjacent properties are not substantially benefited by the improvement. Acquisition costs shall include legal services and condemnation expenses."

Tasks

1. Coordinate stormwater facility land acquisition with maintenance agreements identified in *Program PC-1.1: Development Code 3.5 Post-Construction Runoff Control Section.*
2. Continue to pursue opportunities for land acquisition and protection for regional stormwater facilities.

PROGRAM PC-2.1: STORMWATER DESIGN AND MAINTENANCE MANUAL

The City has legal responsibility to provide stormwater service to all new development and redevelopment sites. To accomplish this, City Staff review development proposals and the availability/adequacy of storm sewer service.

The City must develop and adopt Code that will give the City legal authority to limit stormwater runoff flow (volume and rate) and pollution discharges from new development and redevelopment. In addition the City must develop and adopt a *Stormwater Design and Maintenance Manual* (SWDMM) that identifies stormwater management principles and techniques that help preserve or mimic the natural hydrologic cycle and achieve water quality and quantity goals.

The SWDMM will identify the following requirements for all projects within the City, whether public or private:

- Projects that propose to develop or redevelop a site are required to comply with

post-construction stormwater requirements as recommended in the SWDMM.

- New development or redevelopment projects that meet the SWDMM impervious surface square footage trigger are required to comply with pollution reduction and flow control requirements. Properties with existing development that propose new offsite discharges or new connections to the public system must also meet these requirements.
- All projects must comply with operations and maintenance requirements identified in the SWDMM.
- Projects with certain site characteristics or uses (e.g. material transfer areas/loading docks, above-ground storage of liquids) must comply with additional structural source control requirements.

Tasks

1. Develop and implement the SWDMM and Development Code text amendments.
2. Review and revise the SWDMM as needed.
3. Inspect newly constructed facilities to ensure they comply with the SWDMM and approved plans.
4. Develop tracking system for project specific stormwater management facilities to identify their locations, capacity, and functionality status.
5. Continue to monitor existing and develop new storm water facilities for functionality and management approaches using the system developed in task 4.

PROGRAM PC-3.1: POST-CONSTRUCTION STRUCTURAL BMPS STAFF TRAINING

The purpose of this program is to ensure adequate long-term operation and maintenance of stormwater facility BMPs through staff training on post-construction control code enforcement, BMPs design, and BMPs site inspections.

Provide training or coordinate with existing training efforts to educate construction plan reviewers and field inspectors on post-construction runoff control BMPs and maintenance standards. Potential sources for this training include the Center for Watershed Protection or the Non-point Education for Municipal Officials Project.

Tasks

1. Coordinate post-construction training for plan reviewers and field inspectors with the tasks under *CESC-3.2 Strategy: Train Plan Reviewers, Field Inspectors, and*

Construction Operators.

2. Review available water quality, stormwater plan review, and similar certification options for staff.

3. Continue to provide training and technical assistance to City staff and the public.

PROGRAM PC-3.2: POST-CONSTRUCTION STRUCTURAL BMPS MAINTENANCE

Maintenance bonds ensure that post-construction structural BMPs maintenance is paid for by the developer for long-term facility performance. If the stormwater facility is located on private property only, then:

Require all new stormwater retention practices and stormwater quality devices to be maintained by the property owner. This can be accomplished by including a maintenance requirement in the local ordinance. In addition, residential owners could be required to sign a maintenance agreement attached to the deed of the property before final permits are issued. This agreement could require the property owners to submit annual forms certifying that an inspection and any necessary maintenance have been completed.

If stormwater runoff enters a private stormwater facility from public property, then:

The responsibility for maintenance of stormwater management facilities including all landscaping, irrigation systems, and other stormwater facilities with sumps shall remain with the property owner/developer for three years (known as the warranty period). The property owner/developer may choose to pay the city to maintain these facilities during this three-year warranty period instead. The owner/developer shall still be responsible for reimbursing the city for replacement trees, shrubs, and grass mixes during this three-year period. The owner/developer shall provide the city a separate three-year landscaping maintenance bond for one hundred ten percent of the landscaping cost. Transfer of maintenance of all other stormwater facilities shall occur when the city accepts the stormwater facility after the three year warranty period has ended.

Tasks

1. Align Municipal Code Chapter 12 to change warranty period to three years.

2. Identify city department responsible for enforcing maintenance and maintenance bonds.

3. Establish protocol for structural BMP facility inspections of commercial and industrial sites.

BENCHMARKS: POST-CONSTRUCTION RUNOFF CONTROLS

1. Adopt post-construction runoff addition to development code.
2. Keep records of enforcement using a computer program, such as "ePermitting," or other.
3. Adopt the Stormwater Design and Maintenance Manual as an appendix to this SWMP refinement to the City's Municipal Code
4. Revise Stormwater Design and Maintenance Manual in concert with the 5 year TDML Implementation Plan review
5. Train staff at least once per year on structural BMP design, maintenance, and inspection.
6. Continue to review and update codes as necessary.
7. All structural BMP facilities have signed maintenance agreements before construction of project.
8. All commercial and industrial structural BMP facilities have been inspected at least once annually.

Pollution Prevention and Good Housekeeping (PP) Programs, Tasks, and BMPs

Program PP-1.1: Municipal Stormwater Operations and Maintenance Plan

An Operations and Maintenance Plan (O&M Plan) is essential to ensure that all municipal activities and programs impacting stormwater are implemented efficiently and effectively. An O&M Plan is intended to ensure the continued operational success of stormwater facilities. Comprised of a description of procedures and associated schedules, the O&M Plan serves as a tool for all municipal employees that are directly involved in stormwater management or administer programs that impact stormwater.

The City should adopt an O&M Plan that includes the stormwater system components managed under the O&M Plan that are contributing drainage areas such as sidewalks and roads, separate storm sewer pipes, drainage ditches, catch basins, inlets, public stormwater management facilities, flow control facilities, and culverts. This program should not include private onsite stormwater management facilities and waters of the state (streams, rivers, etc.), which are not part of the City's stormwater system and are the responsibility of the State of Oregon.

This plan shall address:

- Park and Open Space Maintenance
- Pesticide, Herbicide, and Fertilizer Management
- Landscaping Waste Disposal

- Trash Management
- Vehicle and Equipment Washing
- New Construction and Land Disturbances
- Dust Control Practices

1. Collect information on existing municipal operations.

To gain an understanding of existing municipal operations in the six areas the O&M Plan must address, assemble and review existing materials from various municipal departments who perform these activities. In reviewing information on existing programs, pay specific attention to the following activities:

- Frequency of maintenance activities
- Types of substances used
- Materials storage, handling, and disposal practices
- Type and frequency of employee training
- Record keeping practices
- Inspection procedures and frequencies

If documentation on activities does not exist, it may be necessary to conduct brief interviews with staff from the various departments to gain a thorough understanding of how they implement existing municipal operations. If no municipal program exists for a certain activity (e.g., stormwater system maintenance), then determine which department is best suited to take on this activity.

2. Determine how to incorporate required procedures into existing activities.

Examine the required pollution prevention and good housekeeping procedures for each of the municipal operations that the O&M Plan must address. Using information about existing municipal activities, determine how to best incorporate these procedures into current practices.

3. Create the O&M Plan.

Include in the O&M Plan the following information: 1) a description of the municipality's revised operating procedures that reflect the required pollution prevention and good housekeeping procedures, 2) the responsible departments for each municipal activity and program, and 3) the associated schedule for each activity. The final O&M Plan should serve as a reference manual for all municipal employees involved in these activities and programs, ensuring that all employees consistently implement these activities using the appropriate procedures.

Tasks

1. Develop a description of the required maintenance activities and procedures as it relates to existing municipal operations and programs.

2. Develop a list of responsible departments and personnel for each activity.
3. Establish a schedule of activities, including maintenance, inspections and reporting.
4. Track the construction and operations and maintenance costs for the City's stormwater facility demonstration projects. This will help identify the pros and cons of various stormwater facilities and provide the public with general cost and maintenance expectations.

PROGRAM PP-2.1: MUNICIPAL STORMWATER OPERATIONS AND MAINTENANCE TRAINING

Employees in targeted positions (generally employees involved in stormwater management or municipal maintenance) shall be trained on the requirements in the SWMP within one year after its adoption. Municipal employees engaged in field work shall be trained on the basics of identifying and reporting illicit discharges and spills, including what constitutes an illicit discharge and who to contact if they see an illicit discharge.

This program ensures that municipal employees have access to the public education materials produced under the Public Education goal. Even if a municipal employee's responsibilities do not directly impact stormwater management activities, their day-to-day actions can impact stormwater quality.

Tasks

1. Develop materials and conduct employee training on the procedures contained in the O&M portion of the SWDMM.
2. Provide brief (one hour) training to all municipal employees at least once a year.
3. Develop specialized training for specific stormwater program areas. For example, provide additional training on proper operation and maintenance of the equipment for municipal employees involved in vehicle washing.

BENCHMARKS: POLLUTION PREVENTION AND GOOD HOUSEKEEPING

1. Complete development of an O&M Plan with specific goals and implement the procedures described in the O&M Plan during the TMDL five year update interim period.
2. Implement all pollution prevention/good housekeeping practices for park and open space maintenance at all park areas and other open spaces maintained by the jurisdiction.
3. Conduct all vehicle and equipment washing in a self-contained covered building or a

designated wash area that meets the required criteria.

4. Implement required dust control procedures on all public projects where appropriate.
5. Inspect and maintain, as needed, catch basins and other stormwater system facilities based on a schedule described in the O&M Plan.
6. Inspect structural stormwater controls on a schedule described in the O&M Plan or as specified by the adopted Stormwater Design and Maintenance Manual or an approved equivalent manual.
7. Implement required procedures on all roads, highways, and parking lots per the O&M Plan.
8. Prioritize all existing flood management projects to be identified and re-evaluated with water quality considerations.
9. All employees involved in stormwater management or municipal maintenance receive training on the procedures in the O&M Plan.
10. Submit permit application for municipal facilities that are required to be covered under the NPDES Industrial Stormwater General Permit (1200-Z).

Program Management (PM) Programs, Tasks, and BMPs

Program PM-1.1: City Management and Coordination

City Staff are responsible for overall project management, compliance reporting, policy development, and coordination within the City of Cottage Grove. Because the permit is citywide, staff from many City departments are involved with stormwater program development, implementation, and reporting.

Task

1. Provide overall program management through CDD and Public Works and work with other City departments as necessary to implement the SWMP.

Program PM-1.2: Partnership with Federal, State, and County Agencies

This purpose of this program is to coordinate with other agencies in order to secure grant funding, meet regulatory requirements, receive support, and coordinate water quality and quantity monitoring data. These agencies share the common goal of protecting water quality from the national to the local level.

Task

1. Coordinate with federal, state, and county agencies as necessary to implement the SWMP.

Program PM-1.3: TMDL Annual Compliance Report

The City of Cottage Grove shall submit Annual Compliance Reports to the DEQ by April 30 of each year. The purpose of the report is to convey clear, succinct program information for the previous fiscal year (July 1 - June 30), in compliance with the annual reporting requirements of the permit. The reports also provide other interested parties with an overview of the SWMP's implementation status. In addition, the reports identify activities that are planned for implementation in the coming fiscal year. For more specific information about the report requirements see the *TMDL Implementation Plan Guidance – for State and Local Government Designated Management Agencies* May 2007. The DEQ identified Designated Management Agencies (DMAs), which are federal, state or local governmental agencies, that have legal authority of a sector or source contributing pollutants. In the following descriptions the term DMA refers to the City of Cottage Grove.

Generally, two reports are required to be submitted to DEQ on a regular basis:

1) Progress report

    a. This report tracks implementation of each management strategy. DMAs must monitor implementation of management strategies by tracking the progress and accomplishments of each activity. A TMDL implementation tracking

matrix is used to monitor implementation of management strategies. A blank matrix is available on the DEQ's TMDL Implementation webpage. The management strategies included in the matrix should be linked to the specific pollutant sources relevant to that particular DMA. Submittal of this matrix to DEQ with the most updated information will also satisfy the annual reporting requirement.

2) Implementation plan review report

   a. All DMAs are expected to review and, if necessary, revise their implementation plan following submittal. The review is to be conducted as specified in the TMDL Water Quality Management Plan (WQMP). If there is no frequency specified in the WQMP, the review should occur once every five years. This review does not require additional monitoring or measurements. Rather, the review should use existing data and other information to evaluate plan effectiveness relative to pollution reduction goals. The review report should describe what information was used in the evaluation, the outcome of the evaluation and the basis for this reasoning. If the evaluation indicates that the plan is not likely to be adequate to meet the pollution reduction goals, the DMA must describe how they will modify their plan or undertake other efforts to achieve these goals and the timeline for accomplishing this.

Task

1. Submit annual compliance reports.
2. Develop and complete the implementation tracking matrix.
3. Perform five year TMDL implementation plan review.

BENCHMARKS: PROGRAM MANAGEMENT

1. Continue to provide overall program management through CDD and to work with other City departments as necessary to implement the SWMP.
2. Continue to coordinate with federal, state, and county agencies as necessary to implement the SWMP.
3. Continue to submit annual reports by April 30th of each year to the DEQ.

Appendix B Annual TMDL Reports

Place Implementation Matrix Here

Appendix C STORMWATER DESIGN AND MAINTENANCE MANUAL