

# Willamette Basin TMDL Five-Year Review: Designated Management Agency Implementation 2008 - 2013

February 2014



#### **TMDL**

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## **Introduction**

DEQ issued a pollution reduction plan for temperature, bacteria, and mercury in the Willamette Basin in September 2006. The pollution reduction plan came as a department order called a Total Maximum Daily Load. DEQ required several entities with land and water management responsibilities to submit plans for reducing their nonpoint source pollutant inputs within 18 months. These plans are TMDL implementation plans. Reporting requirements for those entities, called Designated Management Agencies, included an annual progress report and a comprehensive assessment of activities after five years. This report summarizes the last five years of activities undertaken by most DMAs in the Willamette Basin responsible for urban, suburban and some rural land use. Many other DMAs, including state and federal agency partners, are implementing TMDLs in the Willamette Basin, but their data is not captured in this report. To the extent the DMAs included such information, the report also describes their successes as well as impediments to implementing pollution reduction strategies. This report provides a comprehensive look at the kinds of strategies DMAs are using to reduce their pollutant contributions, as well as a qualitative evaluation of their compliance with TMDL reporting requirements. The report concludes with recommendations for DMAs, including DEQ, to consider so that, working together over the next five years, basin partners may evaluate not only the number of plans and reports submitted, but the adequacy of the strategies contained in those plans to reduce pollutant inputs and restore water quality.

### ***Intended use of this Report***

DEQ intends that data and information contained in this report be used to evaluate the overall progress of urban DMAs in implementing practices that will reduce non-point source pollutant loads to surface water in the Willamette River Basin. This report does not evaluate or establish compliance with permits or TMDL orders.

## **What are TMDLs and under what authority are they developed?**

Water pollution has been identified in many streams in the Willamette Basin. Under the Federal Clean Water Act, the delegated authority (in Oregon, the Department of Environmental Quality), must develop a water pollution control plan to reverse the pollution. These water pollution plans are known as Total Maximum Daily Loads (TMDLs), a name derived from the Clean Water Act requirement to set an allowable daily load of pollutant for each source that contributes to the waterbody. Development of TMDLs is an important step toward restoring the state's waters to their designated uses. In order to achieve the water quality benefits intended by the CWA, it is critical that TMDLs, once developed, be implemented as soon as possible.

Oregon Administrative Rule OAR 340-042 sets forth the process for developing and implementing TMDLs.

Oregon's history for developing and implementing TMDLs spans 25 years, and Oregon's TMDL implementation program has evolved over that time frame, as well. In 2002, Oregon adopted rules concerning the development and implementation of TMDLs (OAR Chapter 340 Division 42). These rules outline the major requirements for both TMDL content and their implementation. Despite changes in the TMDL program over time, TMDLs and their implementation have maintained basic elements. TMDLs identify pollution sources and define load (pollution from non-point sources) and wasteload (pollution from point sources) allocations, or limits, for those sources.

TMDLs have commonly identified designated management agencies and responsible parties. A DMA is an entity with legal authority over a sector or source of water quality pollutants. When a TMDL identifies DMAs, DEQ must notify those parties within 20 days of the issuance of the TMDL. DEQ is itself a DMA based on its authority to implement several water quality programs, including the National Pollution Discharge Elimination Program that controls the discharge of pollution through point sources. City and county governments are commonly identified as DMAs for both their ability to adopt ordinances, and for land ownership responsibilities. Other state and federal agencies are commonly identified as DMAs based on their land ownership or management responsibilities, or for their administration of permit programs that affect water quality.

### **What are the reporting requirements for TMDL implementation?**

As DEQ's approach to writing water quality management plans has evolved over the past 15 years, reporting requirements for TMDL implementation have become more explicit. Under TMDLs developed since approximately 2005, DMAs have been required to submit TMDL implementation plans for DEQ approval, and to submit annual progress reports. The TMDL is a department order and provides sufficient authority for DEQ to require DMAs to develop and submit an implementation plan. The due dates for these plans range between 12 to 18 months after the TMDL is issued, and each TMDL indicates the specific time requirement. Implementation plans should include a description of each TMDL pollutant source and the actions that will be taken to reduce pollution from that source, as appropriate. Requirements for these implementation plans are presented in DEQ's guidance<sup>1</sup>. The required components of a TMDL implementation plan are described in OAR 340-042-0080(4). They are:

- The management strategies the DMA will use to achieve load allocations and reduce pollutant loading
- A timeline for implementing management strategies and a schedule for completing milestones
- Performance monitoring with a plan for periodic review and revision of the implementation plan
- Evidence of compliance with land use requirements.
- Any other analyses or information specified in the Water Quality Management Plan (that accompanies a TMDL, usually as the final chapter)

This report focuses on urban and county DMAs named in the Willamette Basin 2006 TMDL. Nonpoint source TMDL implementation plans are critical for improving water quality in the Willamette Basin, as the 2006 TMDL found that a large portion of pollutant load is attributable to nonpoint sources. The Willamette Basin 2006 TMDL required the development and submission of TMDL implementation plans by April 2008, and required annual implementation reports over the course of 2008-2013, as well as 5-year review reports in 2013.

### **What is the Effect of Temperature and TMDL Litigation?**

DEQ has received many questions from DMAs about the on-going litigation regarding DEQ's temperature standard, EPA's recent disapproval of Oregon's natural conditions criteria, and the effect of these events on TMDL implementation. In 2005, Northwest Environmental Advocates (NWEA) challenged EPA's approval of Oregon's temperature standard. On February 28, 2012, Federal Magistrate Judge Acosta issued a ruling which upheld EPA's approval of the Oregon

DEQ's numeric temperature water quality criteria, while rejecting certain narrative criteria, including the "natural conditions" criterion. DEQ discontinued issuing temperature TMDLs when the court issued its ruling in February 2012 and on August 8, 2013, EPA disapproved the natural conditions criterion. DEQ cannot issue a TMDL based on the biologically-based numeric criteria plus the human use allowance unless its analysis demonstrates that the waterbody will actually attain these standards. Natural conditions, such as solar radiation, absence of streamside vegetation, actual stream flow or air temperature, can make it impossible for the water bodies to meet the standards. DEQ can continue to develop and issue TMDLs for water bodies where it demonstrates that the TMDL will lead to attainment of the biologically-based numeric criteria plus the human use allowance. DEQ can also work with state and local agencies to develop water quality management plans, which identify the load reductions and measures needed to reduce nonpoint source loads to the maximum extent practicable. How EPA's disapproval of the natural conditions criteria will legally affect existing TMDLs remains unclear at this time.

In another lawsuit, NWEA challenged EPA's approval of every temperature TMDL where DEQ determined that the natural conditions criterion was applicable. NWEA also challenged the mercury TMDL for the Willamette Basin as incomplete, failing to adhere to the state's water quality standard, and not protecting beneficial uses such as wildlife, fish and human safety.

Pertaining to implementation of existing TMDLs, DEQ continues to follow, and expect DMAs to follow, DEQ-issued orders for nonpoint source TMDL implementation plans. DEQ will prioritize its TMDL resources to assist DMAs with continuing to identify and reduce non-point source pollutant loading, including temperature, bacteria, and other water quality impairments. DEQ intends to use public resources responsibly and conduct work with the greatest potential to benefit the environment.

### **What TMDLs have been developed in the Willamette Basin?**

Oregon's Willamette River is the 13th largest river in the lower 48 states in terms of stream flow, and encompasses 11,478 square miles in western Oregon. The Willamette Valley is currently home to 70% of Oregon's population. The mainstem Willamette River begins where the Coast Fork and Middle Fork Willamette meet. It flows north to the Columbia River, adding stream flows of 12 subbasins that together make up the Willamette Basin (Figure 1). Over the course of 20 years, Oregon has developed TMDLs for the Willamette Subbasins at different times. The Willamette Basin TMDL found that nonpoint source pollution is the largest contributing factor to water quality impairment from temperature, bacteria and mercury.

#### ***Willamette Basin TMDL***

TMDLs to address bacteria, mercury, and temperature for nine of the Willamette River Subbasins were adopted in September 2006. The nine subbasins are: Clackamas; Coast Fork; Lower Willamette; McKenzie; Middle Fork; Middle Willamette; North Santiam; South Santiam; and Upper Willamette. Stream specific TMDLs for dissolved oxygen and turbidity were also established in the Upper Willamette in 2006. TMDLs for the legacy pesticides, DDT and dieldrin, were also established for the Lower Willamette. Since the 2006 TMDL, data collection has identified additional water quality concerns in these nine subbasins, indicated by such conditions as low dissolved oxygen, harmful algae blooms, and biological impairment. DEQ will need to address these impairments with additional TMDLs or management plans over the next several years.

### ***Molalla-Pudding***

TMDLs for temperature, bacteria, pesticides, nitrates, and iron were adopted for the Molalla-Pudding subbasin in 2008. Upon completion of the 2008 TMDL, Molalla-Pudding DMAs also adopted the mercury requirements from the 2006 Willamette Basin TMDL for erosion control strategy implementation.

### ***Tualatin***

The first TMDLs in the Willamette Basin were completed for the Tualatin Subbasin in 1988. The TMDL for dissolved oxygen was adopted to improve dissolved oxygen conditions in the Tualatin River. The TMDL for total phosphorus was adopted to address severe algal blooms and related high pH values observed in the lower river. Water quality improved under both TMDLs. Both TMDLs were revised in 2001, and new TMDLs for temperature and bacteria were adopted at that time, as well. DEQ amended the phosphorus and ammonia TMDLs, and revised the Water Quality Management Plan in 2012.

### ***Yamhill***

As a result of pH and chlorophyll a water quality standards violations, a phosphorous TMDL was issued in 1998 for the Yamhill River and the South and North Yamhill Rivers. The phosphorous TMDL has been implemented primarily through the DEQ National Pollutant Discharge Elimination point source program for municipal wastewater treatment plants and did not trigger any formal nonpoint source TMDL implementation planning for urban cities. While the footprints of the Newberg and Dundee wastewater treatment plants and portions of the Newberg and Dundee city limits are within the Yamhill Subbasin, the municipal wastewater and stormwater discharge to the Middle Willamette River. For that reason, the cities of Dundee and Newberg were named as DMAs in the 2006 Willamette TMDL, but not the earlier Yamhill TMDL.

The TMDL process also established an allocation for the load of phosphorus entering streams through agricultural activities and other sources, which is acknowledged in the Oregon Department of Agriculture Water Quality Management Plan for the Yamhill Subbasin. Additional streams in the Yamhill subbasin are water quality limited, and parameter specific TMDLs are required for temperature, bacteria, pesticides, and biological criteria. Through 2015, DEQ TMDL resources are focused on other basins and will not be available to work on Yamhill Basin TMDL development, which includes assigning associated reporting requirements for urban DMAs. Still, DEQ basin coordinators are available to assist DMAs with planning and programs related to water quality improvements.

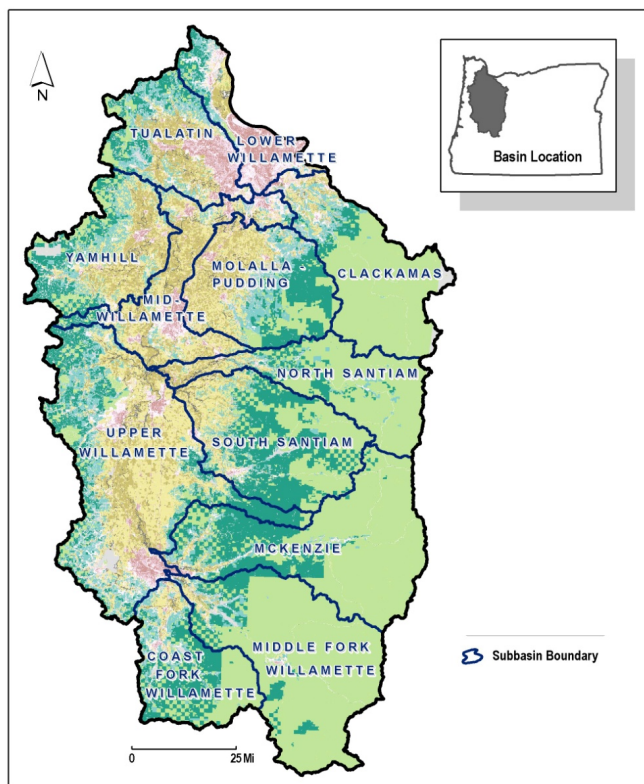


Figure 1: Willamette River Basin with subbasin boundaries

### What are the TMDL Parameters Addressed by the Willamette River Basin 2006 TMDL?

The Willamette River and numerous tributaries do not currently meet one or more water quality criteria for the following three parameters:

1. Temperature
2. Mercury
3. Bacteria

The 2006 Willamette Basin TMDL established load and wasteload allocations for these three parameters as well as stream specific TMDLs for dissolved oxygen and turbidity in the Upper Willamette and toxics in the Lower Willamette. DEQ's and other's data, referenced in the Draft 2012 Integrated Report Assessment Database,<sup>2</sup> indicates that additional factors may limit water quality (e.g. turbidity and toxics in the upper and middle Willamette Basin), but TMDLs have not been developed for these parameters. Table 1 summarizes the 2006 Willamette TMDL parameters, associated beneficial uses, and water quality importance. Both human and aquatic health can be affected when criteria associated with these parameters are not met.

The Willamette TMDL also established pollutant allocations for point sources and pollutant load reduction targets for non-point sources. Table 2 summarizes the nonpoint source urban/rural load reductions that are needed to achieve water quality standards. Allocations require reducing bacteria by at least 80% and mercury by 27%. Ninety-one percent of the thermal load is from non-



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point sources (i.e. lack of effective shade) and the surrogate measurement of heat load reduction is percent effective shade.

**Table 1:** Parameters and Associated Beneficial Uses.

Parameter	Beneficial Use	Water Quality Importance
Bacteria - <i>E. coli</i>	Water Contact Recreation; Drinking Water	Certain bacteria and other organisms cause human illnesses that range from typhoid and dysentery to minor respiratory and skin diseases.
Dissolved Oxygen	Resident Fish and Aquatic Life, Salmonid Fish Spawning and Rearing	Dissolved oxygen is a basic requirement for a healthy aquatic ecosystem. Most fish and beneficial aquatic insects "breathe" oxygen dissolved in water. Although oxygen concentrations fluctuate under natural conditions, human activities can result in severe oxygen depletion.
Turbidity	Fish and other aquatic animals, invertebrates, plants/other; water supply and aesthetics, water contact recreation	Growth, survival, reproduction and ecological integrity; aesthetic quality and treatment cost; hazard identification and safety
Temperature	Resident Fish and Aquatic Life, Salmon Fish Spawning and Rearing	Aquatic life is temperature-sensitive and requires water that is within certain temperature ranges. When temperature exceeds tolerance levels, cold-water organisms such as salmonids become physically stressed and have difficulty obtaining enough oxygen. Prolonged exposure to temperatures outside tolerance ranges will cause death.
Toxic Substances: Legacy Pesticides - DDT, Dieldrin	Resident Fish and Aquatic Life, Drinking Water	Toxic substances may be harmful, some may undergo chemical changes to become harmful, and some may accumulate in sediments or throughout the food chain to levels that adversely affect public health, aquatic life, or wildlife. Long term ingestion of drinking water with toxics may cause chronic or acute illnesses.
Toxic Substance: Mercury	Resident Fish and Aquatic Life, Fishing and Fish Consumption	Mercury may accumulate in sediments or throughout the food chain to levels that adversely affect public health, aquatic life, or wildlife. Willamette Basin Mainstem has fish consumption advisories because of high mercury levels in resident fish. This advisory does not relate to migrating ocean fish such as salmon, steelhead, shad or lampreys. Ingestion of high mercury levels may developmental defects and neurological problems in children of some fish-consuming parents.

**Table 2:** Nonpoint Source Urban/Rural TMDL Reductions

Subbasin	Parameter Load Reductions
Clackamas Coast Fork Lower Willamette McKenzie Middle Fork Middle Willamette North Santiam Pudding South Santiam Upper Willamette	<p><b>Bacteria:</b> 80% to 94% average reduction for all subbasins.</p> <p><b>Mercury:</b> 27% reduction in Willamette Basinwide - Applies to all subbasins.</p> <p><b>Temperature:</b> Attainment and preservation of effective shade levels on smaller tributaries associated with system potential vegetation will eliminate most anthropogenic nonpoint source heat loads. 91% thermal pollution is from nonpoint sources. Surrogate measure is percent effective shade targets and a heat load equivalent of 0.05 °C of the Human Use Allowance. Other important measures—preserving and restoring cool water refuges where salmonids rear and migrate to when the river warms up in the summer; restore instream flow quantity.</p>
Upper Willamette	<p><b>Dissolved Oxygen:</b> Amazon Creek and Diversion Canal: 40% reduction in sediment oxygen demand, Biological Oxygen Demand and nutrients</p> <p>Coyote Creek below Spencer Creek and Spencer Creek: 20% reduction in sediment oxygen demand, Biological Oxygen Demand and nutrients</p> <p><b>Turbidity</b> (Load reduction depends on flow category. See Table 10.71 in Upper Willamette TMDL, 2006) Amazon Creek 27-41% from median to high flow category.</p> <p>Coyote Creek 17-30% from median to high flow</p>
Lower Willamette	<p><b>Toxics:</b> DDT and Dieldrin Johnson Creek urban municipal storm sewer: DDT 77% reduction. All land use categories and sources total suspended solids: 15 mg/l for 94% reduction DDT. Reductions for DDT supportive of dieldrin reductions.</p>

### What are the primary pollutant sources from urban and rural areas in the Willamette Basin?

Stormwater runoff, hydromodification, and alteration of riparian zone function are the primary urban and rural pollutant sources. Stormwater runoff volume usually increases, and occurs at lower rainfall amounts, in urban environments as impervious surface area increases. Impervious surfaces prevent runoff from seeping into the ground, which instead may flow rapidly to streams and lakes. This rapid delivery can greatly alter stream channels with bank erosion and channel downcutting, and increases the incidence of flooding. Pollutants potentially carried in stormwater include bacteria and mercury, each having required load reductions in the Willamette TMDL, as well as pesticides, metals, and nutrients.

Stormwater may also be a pollutant source in suburban and rural areas, though the conveyance and pollutants may differ from an urban setting. Stormwater conveyance is more likely to be via roadside ditches than pipes and storm drains, and ordinances requiring stormwater treatment with bioswales and other infiltration or velocity-slowng mechanisms typically do not apply outside of urban areas. Rural and suburban area stormwater may carry lesser concentrations

of metals than urban stormwater, but a higher incidence of sediment, pesticides and nutrients, from a combination of lawn care, roadside ditch maintenance and runoff from nearby agricultural land use.

Degradation of riparian zones includes channel modifications (e.g. widening, deepening, hardening), bank destabilization, and vegetation removal, or other activities that impair the functions of streamside areas. Shade producing vegetation provides for healthy riparian function, not only by regulating stream temperatures, but by stabilizing stream banks and providing at least rudimentary filtration of stormwater and runoff.

The 2006 Willamette Basin TMDL Water Quality Management Plan identifies the following actions to address nonpoint source pollution: stormwater management control measures for reducing bacteria and mercury, and active preservation and restoration for riparian corridors for temperature, bacteria and mercury. DEQ expects that DMA's TMDL implementation plans will include not only strategies in these two areas, but timelines for achieving improvements, and milestones to mark progress along the way. Table 3 lists general strategies to reduce TMDL and other pollutants in the Willamette Basin.

**Table 3: TMDL General Sources and Management Strategies**

<b>TMDL</b>	<b>General Sources</b>	<b>General Strategies/Best Management Practices(BMPs)</b>
Bacteria	Bacteria are carried to waterways in stormwater, overland flow, and pipes systems.	Reduce inputs of bacteria by various means including riparian protection & restoration, erosion control and stormwater control and treatment, low impact development, septic maintenance and various domestic and agricultural practices.
Dissolved Oxygen Turbidity	In-stream sediment from runoff and stream bank erosion and high nutrient loads.	Reduce sediment delivered to streams by various means including riparian protection & restoration, erosion control and stormwater control and treatment, low impact development and reduce nutrient loads.
Temperature	Removal of trees and other shade-producing woody vegetation from stream banks.	Increase effective shade through restoration and protections; Restore natural stream hydrology and cool water refuges; Increase natural stream flow; Establish measures to protect riparian vegetation.
Toxics: - Mercury - DDT - Dieldrin	In-stream sediment from runoff and stream bank erosion; air deposition.	Reduce sediment delivered to streams by various means including riparian protection and restoration, erosion control and stormwater control and treatment, low impact development.

### **How are TMDL requirements implemented in urban land use areas?**

DMA's in urban areas implement TMDLs primarily through stormwater management and riparian protection. Under the Clean Water Act and the provisions of the Willamette Basin TMDLs, each watershed should regulate the stormwater discharge from urban areas to protect human health and safety, and to protect the public's interest in healthy watersheds. The TMDL spells out specific pollutants that must be addressed, but DEQ encourages every urban area to have a stormwater management program appropriate to the size and potential pollutant contribution from the community.

Urban areas with populations exceeding 50,000 and those having a municipal separate stormwater sewer system, which consist of drainage systems, streets, storm drains, catch basins, curbs, gutters, and manmade channels, are required to obtain National Discharge Pollution Elimination Systems (NPDES) permits from DEQ. These permits are called MS4 permits and they require a municipality to develop a storm water management plan that

addresses a number of control measures as specified in the permit. An MS4 permit also requires the municipality to establish pollution load reduction benchmarks for relevant TMDL pollutants and collect water quality data to evaluate progress toward meeting those benchmarks.

Sources that need to obtain an MS4 permit are classified as either Phase I or Phase II. Phase I MS4s are those with populations greater than 100,000, while regulated Phase II MS4s serve populations less than 100,000 located within Census Bureau-defined urbanized areas. Federal regulations also provide EPA and the states the discretion to require other MS4s outside of urbanized areas to apply for a permit.

With the exception of temperature, stormwater permits are expected to address urban, industrial and construction related sources of TMDL pollutants. DMAs that hold stormwater permits are required to have additional programs to implement stream temperature reducing strategies, but stormwater permit activities will usually encompass other TMDL pollutants such as bacteria, mercury and phosphorus. Municipalities and counties identified as designated management agencies, but not covered by municipal stormwater permits, must address stormwater pollution in their TMDL implementation plans, and must report their progress. DEQ encourages even small-city DMAs (populations under 10,000) to consider implementing storm water control measures required in Phase II MS4 permits, for more dense urban areas.

Stormwater permits are also required for industrial and construction activities. These may be issued by DEQ, or one of its delegated agents (cities, county or special district), depending on the location of the activity.

DEQ expects DMAs covered by an MS4 permit to demonstrate that they will address temperature and nonpoint sources of TMDL pollutants not addressed by the MS4 storm water management plan. For any storm water management plan that covers all TMDL parameters (including temperature), the storm water management plan would suffice as an implementation plan.

To address streamside urban and suburban development that compromises many riparian functions and processes, urban DMAs typically enact ordinances or implement voluntary set-aside programs intended to protect riparian areas. Two urban DMAs in Oregon have engaged in trading with upstream property owners, whereby urban temperature inputs are offset by planting streamside vegetation further up in the watershed.

### **How are TMDL requirements implemented in rural areas?**

Rural areas are more challenging for TMDL implementation because of occasionally unclear jurisdiction – in other words, which agency is responsible for a particular practice within a particular land use. Jurisdiction may be confusing because several DMAs have land and water management responsibilities in rural areas, including the Oregon Departments of Agriculture and Forestry, counties, Department of Transportation, DEQ or federal agencies such as the Forest Service or Bureau of Land Management. Other organizations and agencies have also been named DMAs in some TMDLs, both within (e.g. Molalla-Pudding, Tualatin Subbasins) and outside of the Willamette Basin (e.g. Rogue Basin) such as Department of State Lands, irrigation districts, and water control districts.

Land use practices that are potential pollutant sources in rural areas are generally those that disturb soil and allow sediment to enter waterways, add nutrients or pesticides beyond what can be taken up by plants or broken down, alter surface or groundwater hydrology, or degrade the

filtering, bank stability and shade producing functions of riparian vegetation. Such practices may include timber harvest; building and maintaining forest roads; planting and harvesting agricultural crops; livestock grazing and manure management; road and bridge construction and maintenance; road ditch maintenance; water withdrawal, storage and conveyance; and inadequate maintenance of septic systems.

For rural areas, unless stream-specific data is available, DEQ has typically assigned non-point source pollutant reductions by land use and season, rather than by DMA. For example, in the 2006 Willamette TMDL, the targets for bacteria reduction in the Middle Willamette Subbasin on agricultural land are 95% in the summer and 61% in the winter; for urban land use they are 88% in the summer and 75% in the winter.

This report focuses on the efforts of city and county DMAs to implement TMDLs. Counties' jurisdiction often extends into rural areas, generally through road maintenance, issuing construction stormwater permits and on-site septic system permits, and enforcement of environmental protection and development codes. Counties are also involved in TMDL implementation in rural areas through their land use planning processes.

For other DMAs with TMDL implementation responsibilities in rural areas, existing rules and inter-agency agreements regulate activities that may contribute to water quality impairments. ODA's Water Quality Management Program is responsible for developing and implementing agricultural pollution prevention and control programs to meet water quality standards and TMDL allocations. ODA and Local Advisory Committees review and update Area Plans biennially, and during those review periods, DEQ evaluates the sufficiency of the actions described in the plans and the Area Rules to meet the TMDL load allocations assigned to agriculture. ODA is also responsible for implementing Groundwater Management Area (GWMA) action plans affected by agricultural lands. DEQ has a Memorandum of Agreement (MOA) with ODA to ensure water quality standards, TMDLs, GWMA, and other water quality goals are met on agricultural lands.

The Oregon Forest Practices Act (FPA) regulates activities on state and private forest land. State forests are operated under State Forest Management Plans that are more protective than the FPA. ODF, DEQ and other stakeholders periodically review FPA's requirements for sufficiency to meet water quality standards and TMDLs, but no implementation reports are required. *The 2002 ODF/DEQ Sufficiency Analysis: A Statewide Evaluation of FPA Effectiveness in Protecting Water Quality* identified 12 recommendations that included improvements to the implementing rules or guidance of the FPA and other recommendations under the Oregon Plan for Salmon and Watersheds.

The Northwest Forest Plan governs forestry activities on federal lands on the west side of the Cascade Range. Federal agencies are required to develop Water Quality Restoration Plans. DEQ has a Memorandum of Understanding (MOU) with the Bureau of Land Management (BLM) and a Memorandum of Agreement (MOA) with the US Forest Service to ensure water quality standards, TMDLs, and drinking water rules and regulations are met. Every five years federal agencies and DEQ assess watershed restoration progress and adequacy of current regulations.

### What are the city and county reporting requirements for Willamette Basin TMDL implementation?

TMDLs within the Willamette Basin have differing requirements for periodic review and revision of TMDL implementation activities and plans, summarized in Table 4. The 2006 Willamette Basin TMDL required DMAs to submit implementation plans by April 2008, annual progress reports following implementation plan submittal, and required a summary of TMDL implementation activities every five years. To encourage adaptive management, the Willamette TMDL also requires DMAs to revise their implementation plans every five years, if needed, based on the 5-year review.

The first set of 5-year reviews for 50 of the city and county Willamette Basin DMAs was due between April and June 2013. The data from those reviews, submitted by 44 of those DMAs, provide the data for this report on TMDL implementation progress. DEQ provided a template so DMAs could readily enter information about implementation progress over the preceding five years. The template also allowed DMAs to record particular successes and impediments, to aid in revising the implementation plans for the next five years. About 90% of the Willamette DMAs with reports due submitted five-year reviews by the end of June 2013, making the data contained in this report reasonably representative of basinwide progress.

DMAs with point and non-point source discharges in the Tualatin, Molalla-Pudding and Yamhill Subbasins have different reporting schedules than DMAs in the rest of the Willamette Basin. The 2001 Tualatin TMDL revision did not require DMAs to revise their implementation plans every 5 years, but revisions in the 2012 TMDL amendment do require the 5 year review, with implementation plans due in 2014.

The Molalla-Pudding TMDL requires a five-year review of TMDL implementation plans; having been adopted more recently than the Willamette TMDL, the Molalla-Pudding five-year review is due in June 2015. Since Yamhill Basin TMDLs, beyond those completed in 1998, have not been developed, DMAs in this basin do not currently have implementation plan or reporting requirements.

**Table 4:** 5 Year Review and TMDL dates

Subbasin	5 year Review Due Date	Bacteria	Dissolved Oxygen	Mercury	Phosphorus pH, chlorophyll a	Temp.	Legacy Pesticides, Nitrates, Iron
2006 Willamette TMDL	2013	2006	2006 stream specific Upper Willamette	2006	NA	2006	NA
Tualatin	2019 (revised implementation plans due 2014)	2001	1998, 2001, 2012	2006, Willamette Basin TMDL	1988, 2001, 2012	2001	NA
Molalla-Pudding	2015	2008	NA	2008	No	2008	2008
Yamhill	Unknown	Unknown	Unknown	Unknown	1998	Unknown	Unknown

## Who are the Designated Management Agencies (DMAs) in the Willamette Basin?

Those entities responsible for implementing TMDLs in the Willamette basin include cities, counties, federal agencies, special districts and state agencies. In addition to ODA and ODF, other state and federal agencies that may have TMDL implementation responsibilities include the Oregon Department of Geology and Mineral Industries, Department of State Lands, Department of Transportation, Oregon State Parks, U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers. Although data compiled in this report is exclusive to urban and county DMAs, Table 5 summarizes all the Willamette DMAs, divided into land use categories, including DMAs in subbasins with different reporting schedules than those required by the 2006 Willamette TMDL.

**Table 5:** The number of Designated Management Agencies in each of the Willamette Basin TMDLs

DMA Land Use	DMA category	Willamette 2006	Molalla-Pudding 2008	Tualatin 2001	Tualatin 2012
Urban	City	69	10	3	4
	County	9	2	3	3
	Special District/Agency	2	-	1	3
	State	1	1	1	1
Agricultural	Irrigation and Water Control District	2	1	-	1
	State	1	1	1	1
Forestry	Federal	2	2	-	1
	State	5	5	2	4
Other Landowner/Agency	Federal	2	1	-	1
	Special District/Agency	4			
<b>Total Number of DMAs</b>		<b>97</b>	<b>23</b>	<b>11</b>	<b>19</b>

Seventy-eight city and county DMAs have TMDL implementation responsibilities from the 2006 Willamette Basin TMDL. Fifty of approximately 80 DMAs were required to submit 5 year reviews. Information submitted from these urban DMAs, as more fully described in later sections, forms the basis of this report. Appendix A lists all Willamette Basin DMAs with an indication of which DMAs submitted information for this report.

Phase I MS4 permits are required for cities with populations greater than 100,000. Seven DMAs in the Willamette Basin hold Phase I permits. These include Portland (with Port of Portland), Clean Water Services (a special district encompassing all urban areas in Washington County), Gresham and Fairview, Multnomah County, Clackamas County (and cities within the county), Salem and Eugene. The Clean Water Services Watershed permit and the Clackamas group permit cover more than one urban jurisdiction. The CWS permit encompasses 1 county and 14 cities. The Clackamas group encompasses 1 county, 6 cities and special sanitary districts. The Clackamas MS4 permit area includes portions of the Clackamas, Lower Willamette, and Tualatin subbasins.

MS4 Phase II permits are required for U.S Census areas defined as urbanized areas over 50,000 and less 100,000 in population. Thus, small cities and portions of some counties must obtain Phase II stormwater permits from DEQ. In the Willamette Basin, the Phase II

communities include Corvallis, Keizer, Philomath, Springfield, Wood Village, Troutdale, Turner, Benton County, Marion County, Polk County, and Lane County.

Four DMAs named in the 2006 Willamette TMDL are not covered by an MS4 Permit, but have populations greater than or equal to 10,000 (Albany, Dallas, Newberg, and Lebanon). The Water Quality Management Plan required these mid-sized DMAs to implement the stormwater control measures as outlined in a Phase II MS4 permit. Several DMAs are approaching populations of 10,000 (Appendix A) and their revised TMDL implementation plans for the next five years should describe how they will implement stormwater control measures such as those in a Phase II MS4 permit.

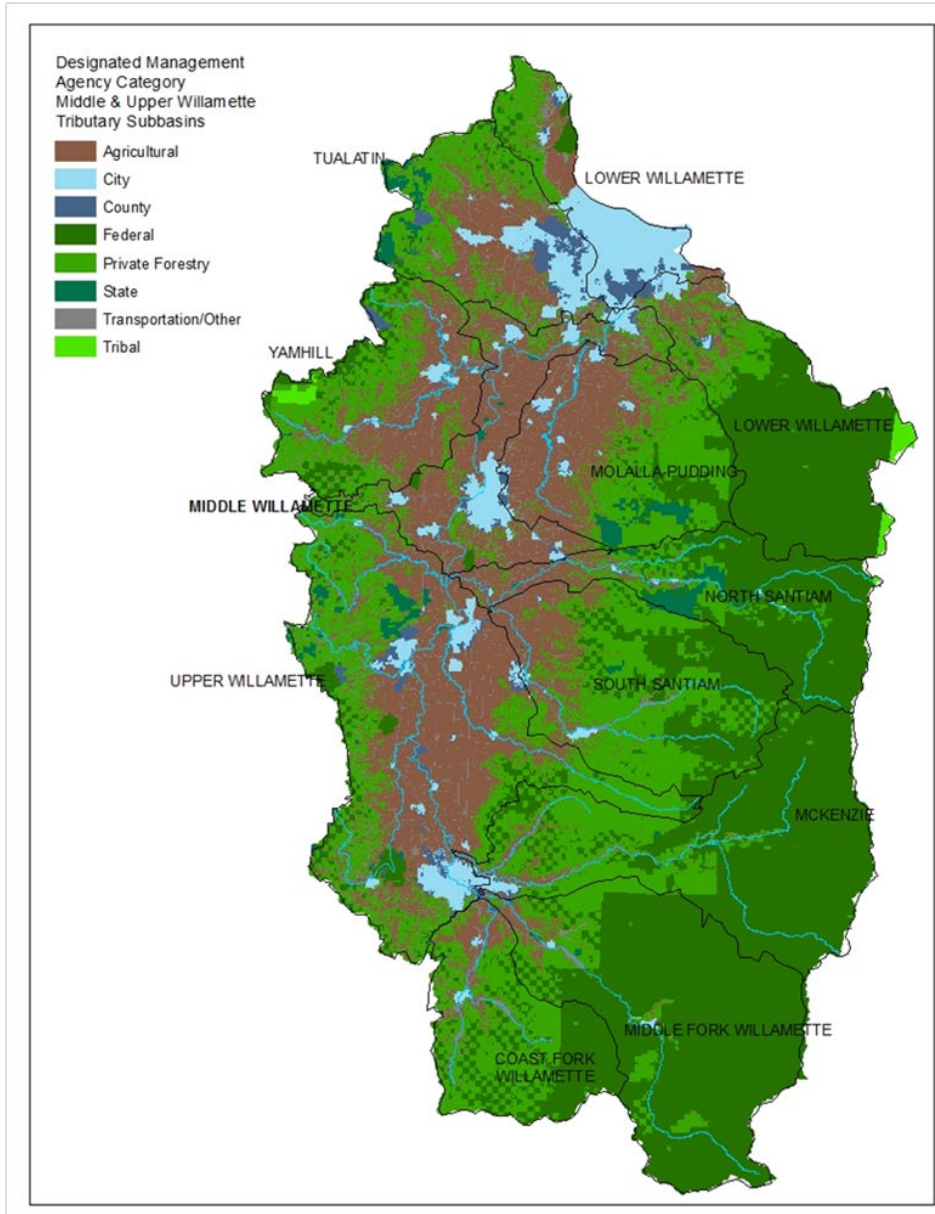
Figure 2 presents an overview of all Willamette DMAs, showing the approximate areal distribution of lands on which they are responsible for managing water quality. The categorization illustrated in Figure 2 is based on designations used in DEQ's March 2010 report titled, "Cost Estimate to Restore Riparian Forest Buffers and Improve Stream Habitat in the Willamette Basin, Oregon"<sup>3</sup>. The areal coverage for which each DMA is responsible is an estimate because in each geographic area, outside of city boundaries, more than one DMA is likely responsible for TMDL Implementation. For example, on unincorporated land, water quality management associated with roads, construction stormwater and on-site septic programs may be a county responsibility. In the same geographic area, ODA and ODF would be responsible for implementing pollutant reductions on agricultural and private forestry lands. The simplified categorization provided in Figure 2 probably underestimates geographic areas falling under county responsibility, and overestimates the areal responsibility of agriculture and private forestry in some counties due to different zoning codes. In addition, the area assigned to "Transportation/Other" would likely be split between county jurisdiction and ODOT.

Figure 3 represents the approximate riparian miles each DMA category has within its area of responsibility. This compiled information suggests that city and county DMAs are responsible for about 198 riparian miles in the Willamette Basin, compared to 642 riparian miles under state and federal forestry's jurisdiction and 330 riparian miles in the jurisdiction of the Department of Agriculture. As in Figure 2, county responsibilities are likely underrepresented because the four DMA categories (city, private forest, federal forest and agriculture) would include county TMDL implementation responsibilities, as well.

The bar chart in Figure 4 represents riparian condition by quantifying the extent to which the area adjacent to the stream is vegetated enough to produce shade. The estimate does not provide an assessment of bank condition, stability or filtration capability. Riparian area shade was assessed in four categories of shade needed to attain 100% effective shade: 0 – 25% shade needed, 26 – 50% shade needed, 51 – 75% shade needed, and more than 75% shade needed. Figure 5 shows a geographic distribution of those riparian shade categories across the Willamette Basin. The Willamette Valley floor has poor riparian shade compared to the uplands. Data indicate conservation and restoration of functioning riparian areas on the valley floor would have the highest value for improving stream temperatures. A comparison of Figure 2 and Figure 5 suggest that the cities (pale blue) have a wide range of percent shade but for most cities and agricultural land, shade is much lower than effective shade targets in the TMDL.



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**Figure 2:** Estimated areal coverage of Designated Management Agency water quality and TMDL implementation responsibilities in the Willamette Basin.

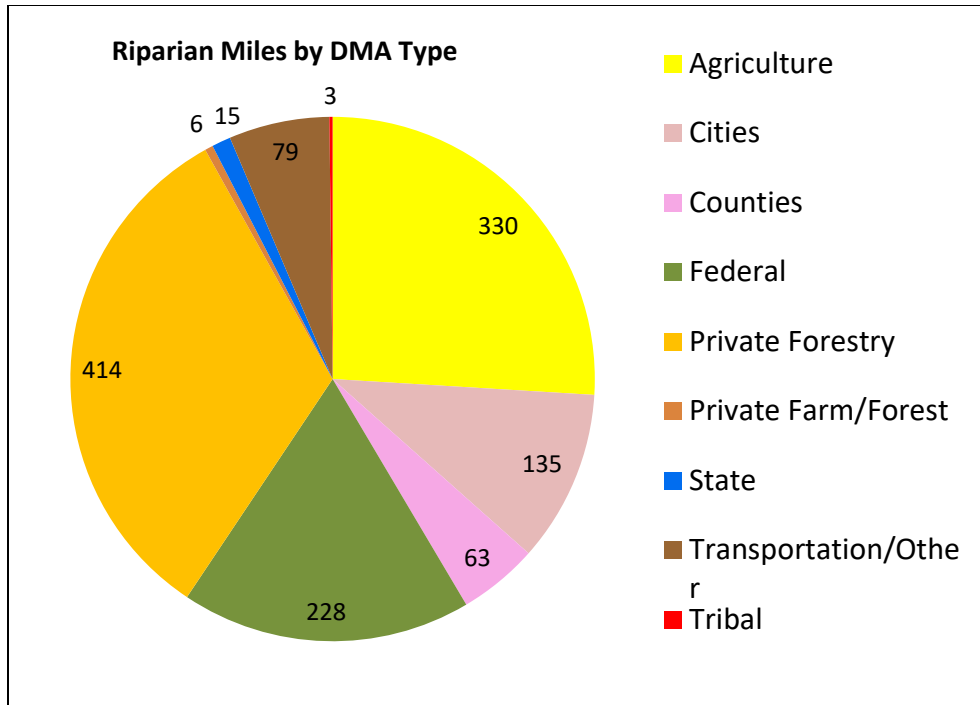


Figure 3: Estimate of riparian miles within each of several DMA categories.

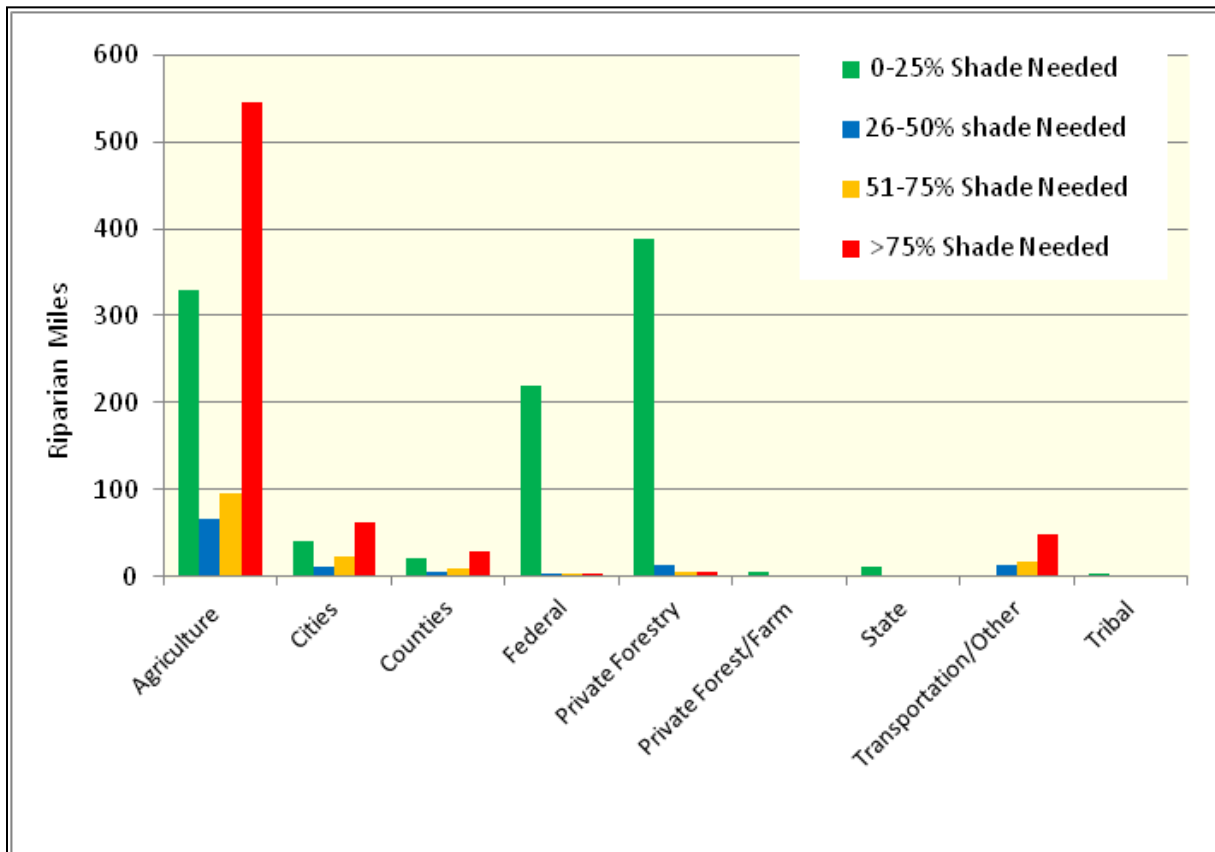
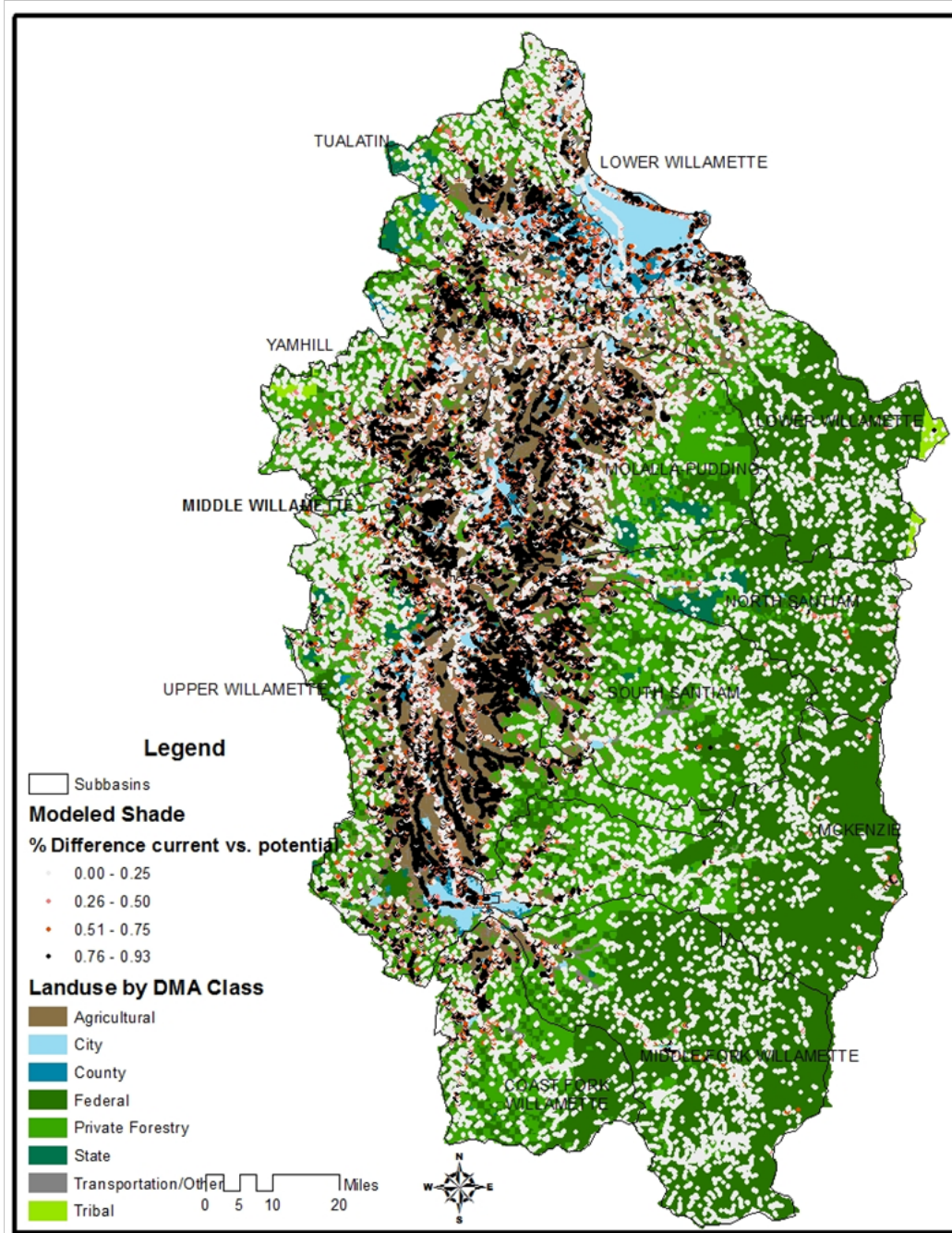


Figure 4: Representation of riparian shade conditions within each DMA category.



**Figure 5:** Geographic distribution of needed riparian shade across the Willamette Basin with land use indicated. White dots indicate riparian areas within 25% of system potential shade. Yellow, red, and brown dots indicate riparian areas needing increasingly more restoration to reach system potential shade.

### **Which DMAs reported data for this report?**

For DEQ to be able to draw conclusions about TMDL implementation efforts and progress within the Willamette Basin in the last five years, a representative number of DMAs needed to submit information, preferably in the report template DEQ provided. The template was designed for municipal DMAs in urban areas, and targets riparian protection as well as stormwater management activities. The report template includes a checklist for identifying which practices have been implemented, as well as a structured format for providing summary comments of the accomplishments, impediments and plans for the next five years. The checklist was also designed to help DMAs conduct a gap analysis of those strategies being implemented, so missing strategies could be included in their revised plan for the next five year cycle.

Recall that not all DMAs in the Willamette Basin were required to submit the five year review in 2013 because TMDLs in those subbasins (e.g. Yamhill, Tualatin, Molalla-Pudding) were not completed in 2006. DEQ also allowed some flexibility for Portland area DMAs (ten total, including the City of Portland, and Clackamas County MS4 co-permittees) who had submitted annual MS4 reports; rather than requiring them to complete the report template, DEQ entered information from their annual stormwater reports into the table that compiled other DMA data. The City of Salem and Marion County reporting was aligned with the Molalla-Pudding TMDL in 2010 as a result of overlapping TMDLs. Additionally, approximately 14 DMAs have 5-year reports due between 2014 and 2016. This report, then, summarizes the submitted reports from 44 DMAs, including 35 cities, 5 counties and 4 special districts, including data DEQ entered for ten DMAs.

DMAs with responsibilities for agricultural and forestry practices are not required to submit TMDL implementation plans or annual reports, so implementation activities by these DMAs is not included in this report.

### **What are the successes and impediments DMAs have experienced?**

In the template report DEQ asked Willamette DMAs to complete, DEQ asked three “high level” questions:

1. **Successful Strategies** – a short discussion on the most positive or commendable implementation plan elements.
2. **Implementation Plan Impediments** - a short discussion on any impediments to plan implementation and proposed solutions to overcome these impediments.
3. **Implementation Plan Update Recommendations** – preliminary recommendations for continued strategy implementation and improvements to the DMA's plan for the next five year cycle.

DEQ grouped the narrative responses from the 38 DMAs that completed this section and tallied them to identify themes. Table 6 summarizes the top responses - those cited by at least four DMAs. Common successful strategies and those that DMAs wished to implement in the next five years fell into categories of outreach and education, riparian projects, collaborative partnerships, specific stormwater best management practices and associated fees, staff training, riparian codes and low impact development standards. DMAs have been implementing these strategies in spite of the most common impediment identified (by 36 of 38 DMAs): limited money, resources and/or staff.

**Table 6:** Summary of narrative responses, popular strategies and common impediments (in red).

BMP Category*	BMP/Strategy/Issue**	Successful Strategies report	Implementation Plan Impediments	IP Update recommendations	total
SW/Rip	Limited money (16), Limited staff (11), Limited resources (9)		36		36
SW/Rip	Stormwater/Riparian Outreach and Education (Riparian & SW)	11		14	25
Rip	Watershed restoration program/projects (BMPs, models, plantings, rip/wetland)	16		7	23
SW/Rip	Collaboration/Partnerships (IGA, IJC, Intertwine) Need to establish	12	4	7	23
SW	Street sweeping & Catch basin cleaning	12		4	16
SW	Stormwater fee (Stormwater fees/SWMP not in place)	4	6	5	15
SW/Rip	Staff training or tools (Limited expertise (i.e., lack of training, staff turnover))	3	8	3	14
SW	Stormwater Mgmt Plan (developed, implemented, evaluated)	6		7	13
SW	Erosion control program (projects, builders reducing run-off)	8		5	13
Monitoring	WQ/Riparian/bluegreen Monitoring (photodocumentation)	8		3	11
Rip	Riparian Ordinance (Tree code)	7		4	11
SW	IDDE program (I&I, septic evaluation) (Risk averse policies hindering septic mg)	6	1	4	11
SW	LID standards (developed, implemented)	5		6	11
SW/Rip	BMP gap analysis (riparian & SW)			10	10
SW/Rip	Lack of public education/participation (SW & riparian)		8		8
SW/Rip	Prioritization of strategies (Watershed Approach, tie to Load allocations)			8	8
SW	Stormwater stencils	5		1	6
SW	Stormwater system mapping	3		3	6
SW	LID/retrofit projects (swales, green streets, remove impervious)	4		2	6
Rip	Riparian/wetland inventory (mapping)	2		3	5
Land use	Comprehensive Plan (not updated)	1	2	1	4
SW	Stormwater violations enforced	3		1	4
SW/Rip	Grant activity (get drinking water, pursue in future)	2		2	4
Wastewater	Wastewater treatment activities (compliance, construction)	3		1	4

\*SW=Stormwater, Rip=Riparian. \*\*Strategies or Issues in red denote impediments

### What strategies and practices have been implemented in the Willamette Basin?

The report template included a checklist of key strategies for TMDL Implementation – strategies generally accepted as effective at reducing the Willamette Basin TMDL pollutants of temperature, bacteria, and mercury. These same strategies may also be effective at reducing other pollutants like nutrients, sedimentation, iron and pesticides. DEQ asked DMAs to indicate which strategies they were following and which they intended to follow in the next five years. The checklist was organized into several categories with multiple best management practices or strategies for each category:

1. Riparian and Wetland Protection and Restoration Programs
2. Pollution Prevention in Municipal Operations
3. Pet/Animal waste, Septic Systems, Illicit discharges
4. Drinking Water Protection
5. Erosion and Sediment Control During Construction
6. Stormwater Planning and Programs, Structural Collection and Treatment of Stormwater
7. Education and Outreach, Public Involvement and other General Strategies

The graphs following this section are the tallied responses from the 44 DMAs who reported summed for each of these categories. The graphs display the percent of DMAs implementing a particular strategy or BMP. To simplify the information for graphical display, DEQ grouped the DMAs into three general size categories (Table 7): MS4 Phase I (red), MS4 Phase II and >= 10K (green), and <10,000 population (purple) – the color assignments are continued in the following bar graphs. Note that the MS4 group assignments do not imply that all those DMAs have MS4 responsibility, this assignment was for reporting convenience only.

**Table 7.** Willamette Basin TMDL DMA reporting category summary. Tualatin basin is included in the Willamette totals and separated here to show the DMAs under the 2001 Tualatin TMDL. See Appendix A for a detailed summary of the Willamette DMAs and their reporting status.

MS4 Permit type/population category	Willamette 2006	Tualatin 2001
MS4 Phase I City	9	1
MS4 Phase I County	3	
Special District/Agency	4*	2**
MS4 Phase II City	2	0
MS4 Phase II County	2	0
>=10K (MS4 Phase II city consideration)	3	0
<10K Cities	21	0
<b>Total</b>	<b>44</b>	
*Includes Clean Water Services, Metro, Port of Portland and Oak Lodge Sanitary District.		
**Includes combined jurisdictions: Clean Water Services, municipalities & Washington Co; and Water Environment Services & Clackamas County.		

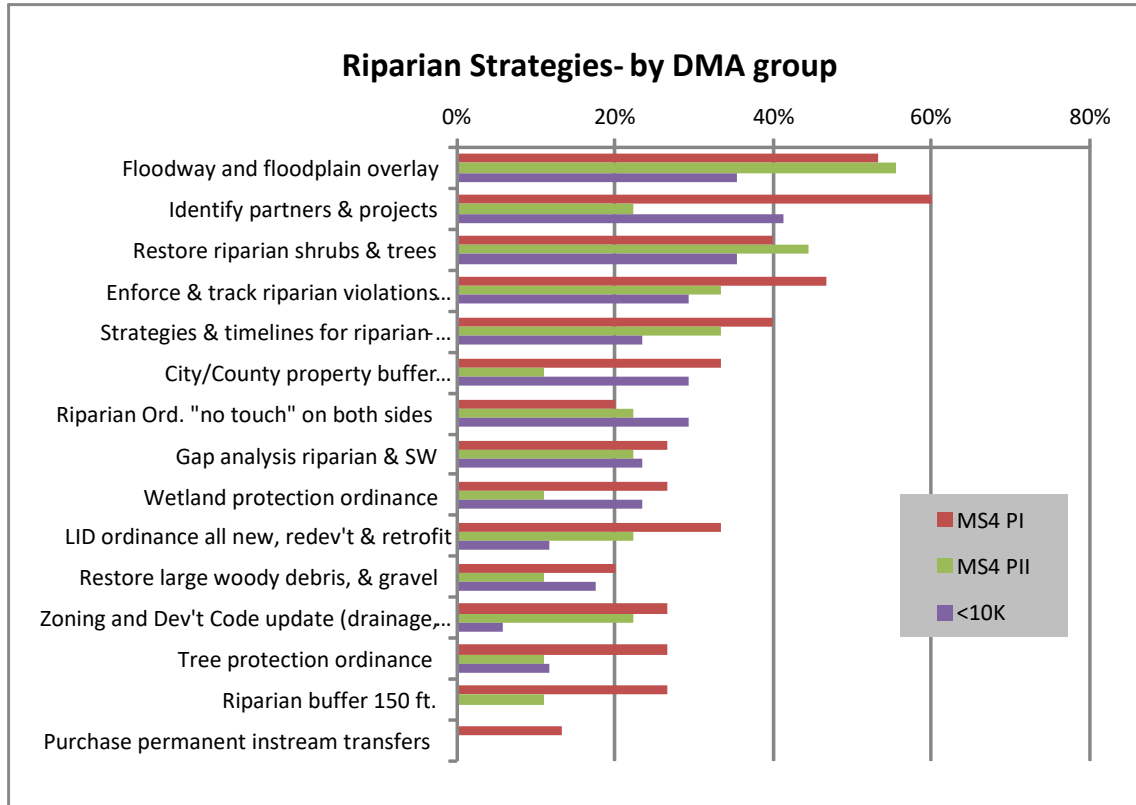
### ***Riparian and Wetland Protection and Restoration Programs***

Leading strategies shown in Figure 6 are mapping the floodplain zone, identification of partners and projects, general riparian restoration actions, enforcement activity and development of strategies and timelines. Riparian (and wetland) ordinances of varying types are also important strategies being adopted.

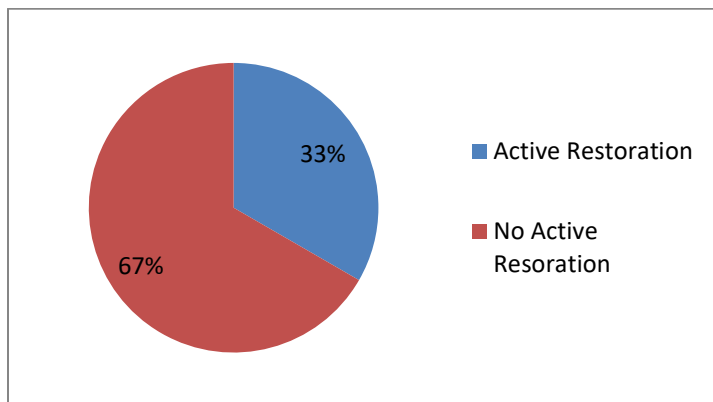
While all of these responses are positive, only approximately 40% of DMAs stated that they are restoring riparian areas, and fewer than 50% of DMAs are actively enforcing and tracking riparian area violations. Figure 7 shows the average percent of DMAs conducting active riparian restoration or planning such restoration in the next five years.

Many DMAs are mapping riparian areas, planning projects, and finding partners, but, for the majority of DMAs, that is not translating into on-the-ground projects. Mapping the floodplain is an obvious need for any community, but it was not clear whether this mapping included an inventory of the riparian or wetland assets for those that did any mapping.

Another important finding of this category of strategies is that it has the lowest percent DMA implementation (generally less than 50%) of all the categories (see the remaining summaries). The low response may due to DEQ’s checklist including too many similar BMPs, or that riparian strategies as a whole need more emphasis. Lower implementation in this category may also result from riparian restoration being more expensive than other measures and the lack of permit requirements.



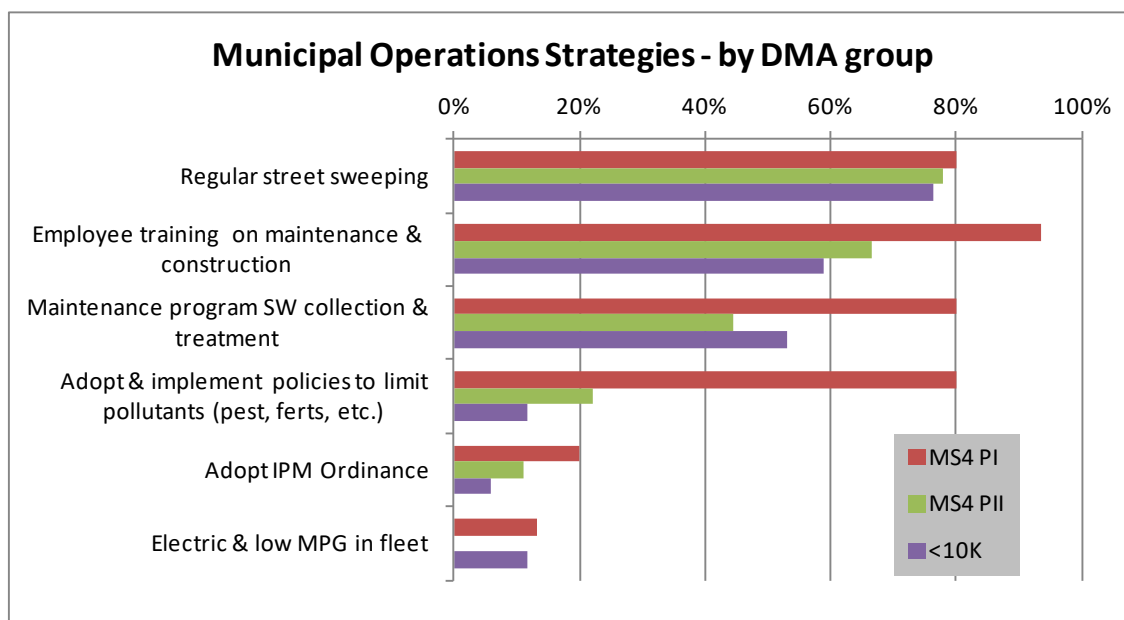
**Figure 6:** Riparian and Wetland Protection and Restoration Programs



**Figure 7:** Percent of DMAs applying or proposing active riparian restoration in the next five years.

**Pollution Prevention in Municipal Operations**

DMA's reported a high level of implementation (80%) of some of the basic municipal operations that help to address pollution in urban environments, in particular preventing pollutants from entering waterways via stormwater (Figure 8). Regular street sweeping, employee training and a stormwater maintenance program for collection and treatment are important BMPs that most cities and counties are utilizing. It is especially encouraging to see non-MS4 communities embracing these activities without the permit to require such practices, as discussed later in this section.



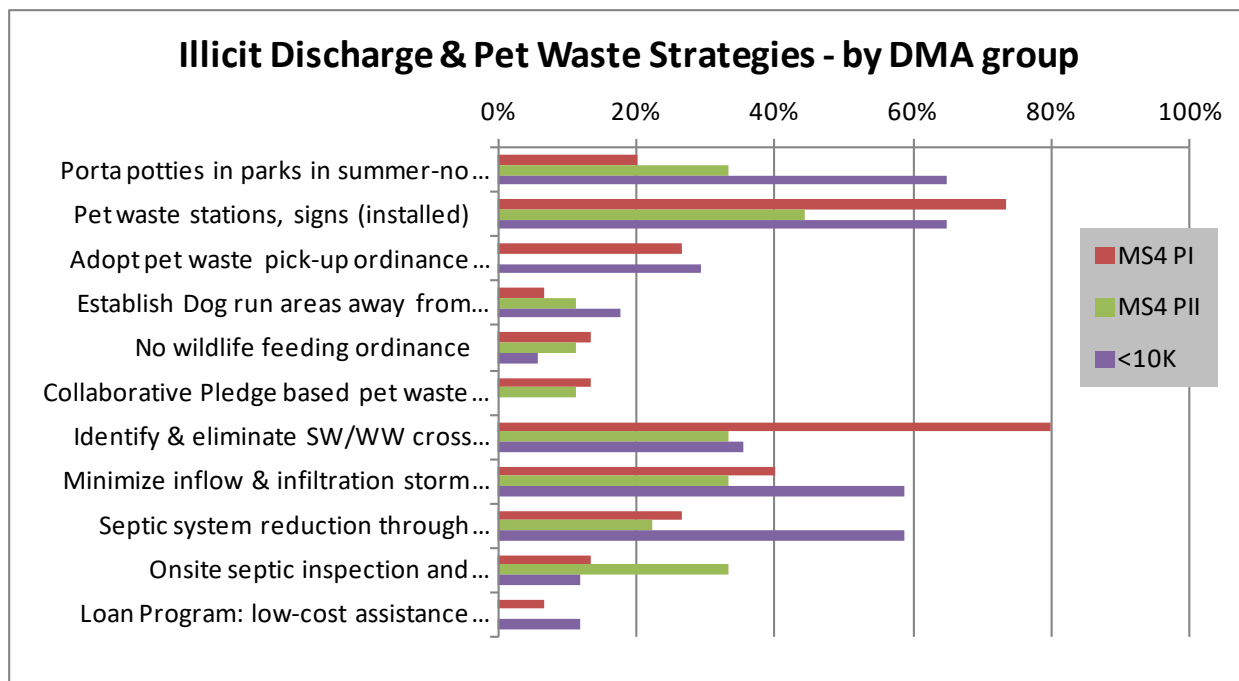
**Figure 8:** Pollution Prevention in Municipal Operations

**Pet/Animal waste, Septic Systems, Illicit discharges**

This list of actions had relatively lower percent implementation than other strategies (Figure 9). While some of these are minimum control measures that are required in a MS4 permit (e.g. illicit discharge detection and elimination – IDDE program) others are typical BMPs (e.g. pet waste program) that could also fall under that program. The low adoption rate reported here may reflect that the checklist included several similar strategies and DMA's did not indicate all the programs they have in place.

While most communities have a pet waste program in place, fewer are implementing illicit discharge and detection programs (IDDE) and their elements (septic system, inflow & infiltration, outfall screening, training, etc.). Still, several small communities stand out in the resources they've invested in addressing infiltration and inflow problems, even though they are not required by permit. Few DMA's have an on-site septic inspection program, and given resource limitations, enhancing this area may require collaboration among DMA's, counties and DEQ technical support.





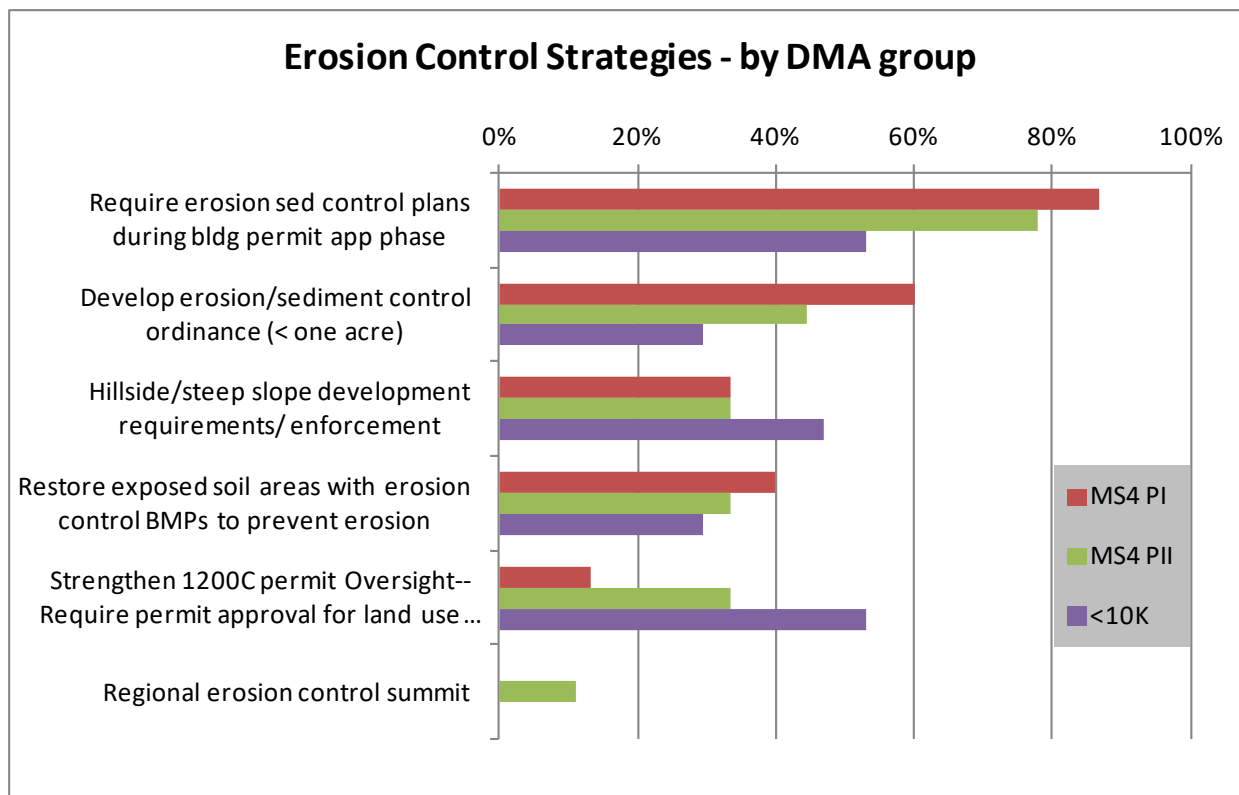
**Figure 9.** Pet/Animal waste, Septic Systems, Illicit discharges

***Drinking Water Protection***

Only 6 DMAs responded to the section of the checklist inquiring about drinking water protection strategies. Of those six, four indicated that they have or are considering the adoption of a drinking water or groundwater ordinance. DEQ is attributing the low response rate to several factors: the strategies checklist did not include sufficient or clearly worded questions about drinking water strategies; many implementation plans did not include drinking water as a TMDL strategy, DMAs opted not to complete the checklist section for additional strategies; and the DMA staff who reported on TMDL implementation (e.g. public works departments) may not be the department responsible for delivering drinking water. Because of the low response rate, there is no figure for this category.

***Erosion and Sediment Control During Construction***

Erosion control programs represent another suite of BMPs that DMAs have generally adopted (Figure 10). Erosion control programs combine required actions, such as issuing construction stormwater permits, with voluntary actions, such as adopting a steep slope development ordinance. While some elements of erosion control are expected for MS4 permit holders, Figure 10 indicates that many small communities have developed erosion control programs beyond required construction stormwater permits. Sediment control plans during the building phase are backed up by having the appropriate code and/or ordinance in place first. This may be an important stormwater program gap. DEQ has model ordinance language available that has not yet been adopted by any DMAs. Some strategies may be underrepresented in this report; DEQ recognized that the checklist did not include other more innovative erosion control program elements such as hydromodification modeling and mitigation. DMAs may have neglected to add such strategies to the checklist.

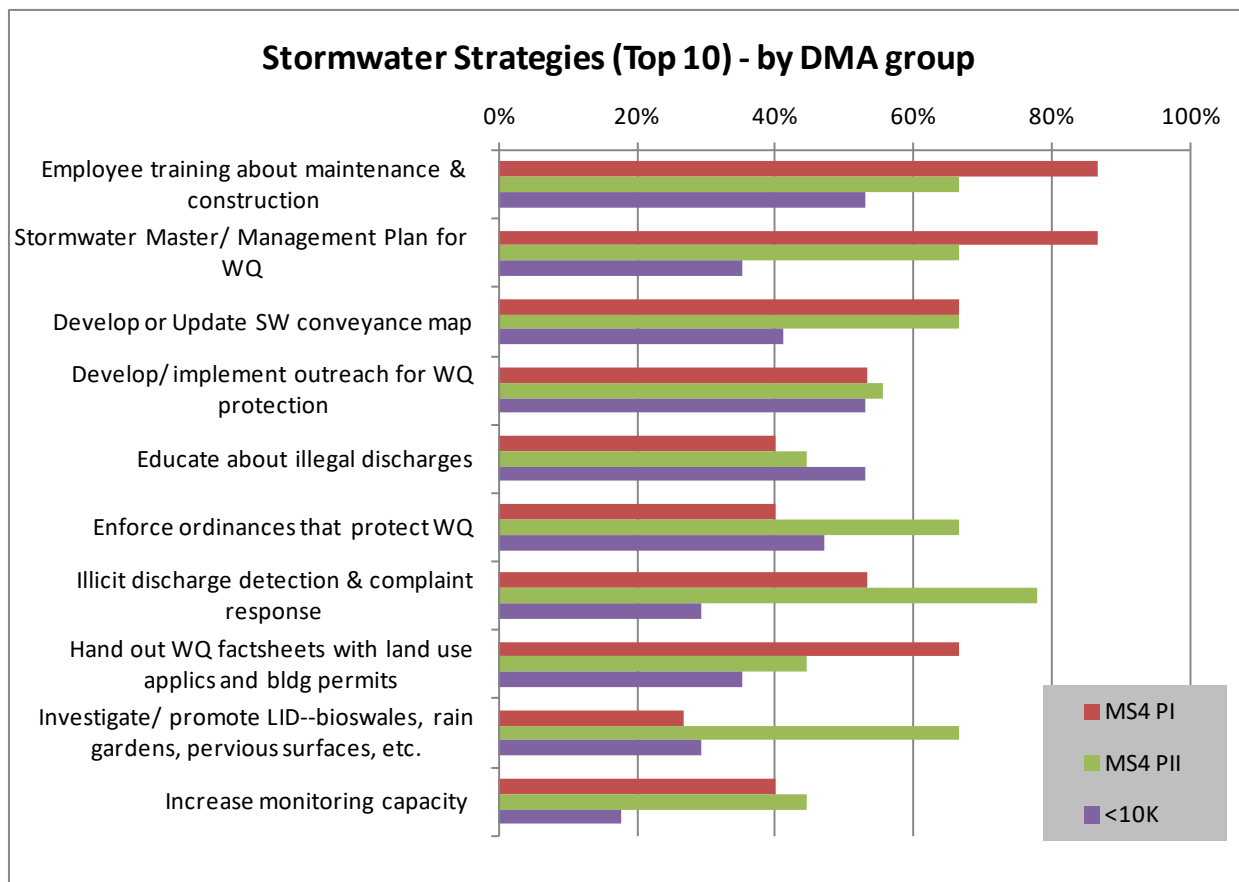


**Figure 10:** Erosion and Sediment Control During Construction

**Stormwater Planning and Programs**

This set of strategies captures a wide spectrum of core stormwater program elements, some of which are MS4 Phase I or Phase II permit requirements (Figure 11). DEQ expected all the DMAs holding MS4 permits to report they had required permit elements in place, such as a stormwater master/management plan, conveyance mapping, employee training, outreach and education, an illicit discharge program, enforcement, and monitoring. Information submitted for this report indicates that more than 80% of the permit-holding DMAs have these programs in place, although determining permit compliance is not the purpose or intent of this report.

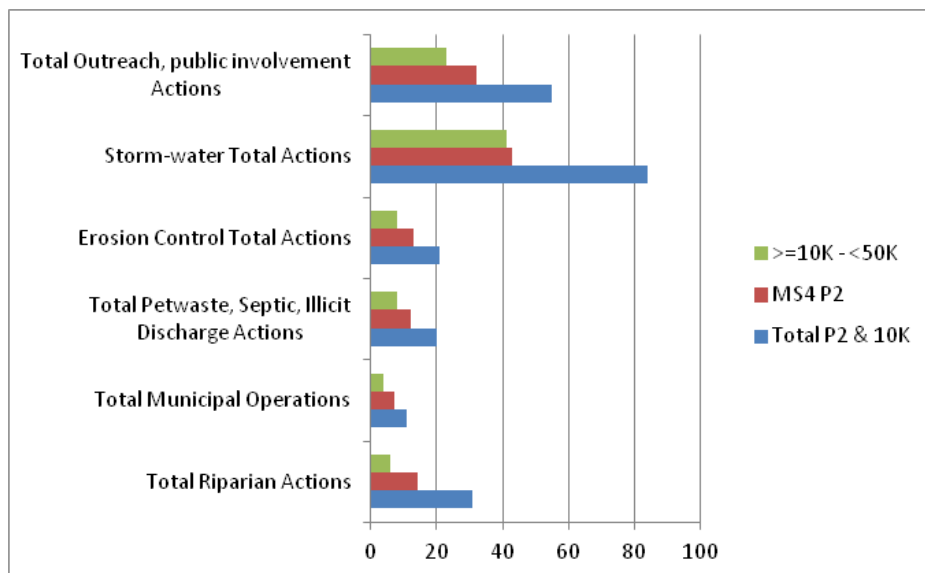
DEQ’s checklist in the template may be at fault for including too many similar-sounding strategies, leading to underrepresentation in some categories. Still, the requirements of the MS4 permits result in a relatively high rate of implementation, with seven strategies implemented by more than 60% of permit-holding DMAs.



**Figure 11:** Stormwater Planning and Programs, Structural Collection and Treatment of Stormwater

***Are the smaller DMAs, not covered by MS4 permits also implementing stormwater strategies?***

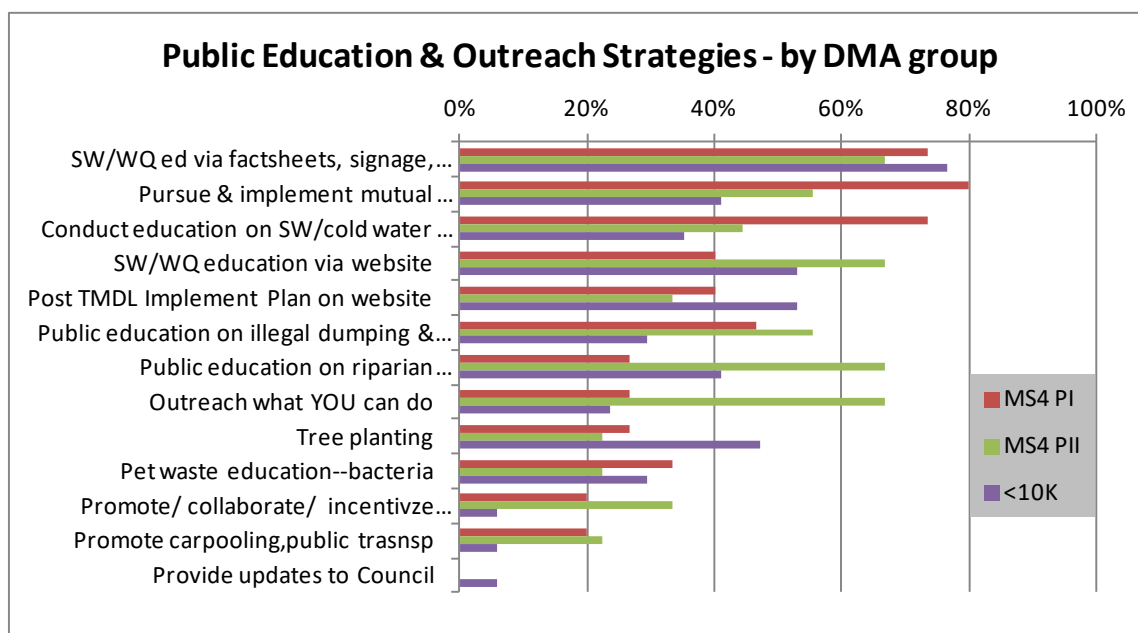
As mentioned earlier in this report, four DMAs in the middle and upper Willamette Basin, were required in the 2006 TMDL to implement the stormwater control measures of a Phase II MS4 permit, even though their populations did not exceed 50,000 (populations are  $\geq 10,000$ ). Albany, Dallas, Newberg, and Lebanon fell under this requirement, although Lebanon is not required to submit a five year review until 2016. These four DMAs are represented in Figure 12 in green, designated as “ $\geq 10K - <50K$ .” A comparison of these cities with MS4 Phase 2 cities and counties (in red), indicates that these smaller cities are implementing stormwater control measures at a rate comparable with their larger peers.



**Figure 12:** Comparison of total number of reported actions related to the six elements of Phase II stormwater permit requirements among small and mid-sized DMAs.

**Education and Outreach, Public Involvement and other General Strategies**

This group of strategies represents several common elements of Outreach and Education programs (Figure 13). Outreach and Education programs are quite scalable – a small community can employ the same techniques and use the same tools as a larger community, but apply them to a smaller area. DEQ expects that every DMA will have an Outreach and Education program, including ways to promote public involvement (e.g., allowing public access and review of stormwater plans). DEQ encourages DMAs to educate its citizens about the importance of watershed management on a scale of individual households, behaviors and action.



**Figure 13:** Education and Outreach, Public Involvement and other General Strategies

## What are the Up & Coming Strategies?

The survey asked respondents to indicate which strategies they plan to continue or begin to implement in the next five years. The top “up and coming” strategies are summarized in Figure 14. Several forward thinking and innovative approaches are part of DMAs plans, such as stormwater ordinances that set the goal of adopting strategies that mimic natural flows, adopting or increasing stormwater system development fees, addressing aging septic systems, adopting riparian protection ordinance(s), and adopting/improving outreach and education program(s) for both stormwater and water quality.

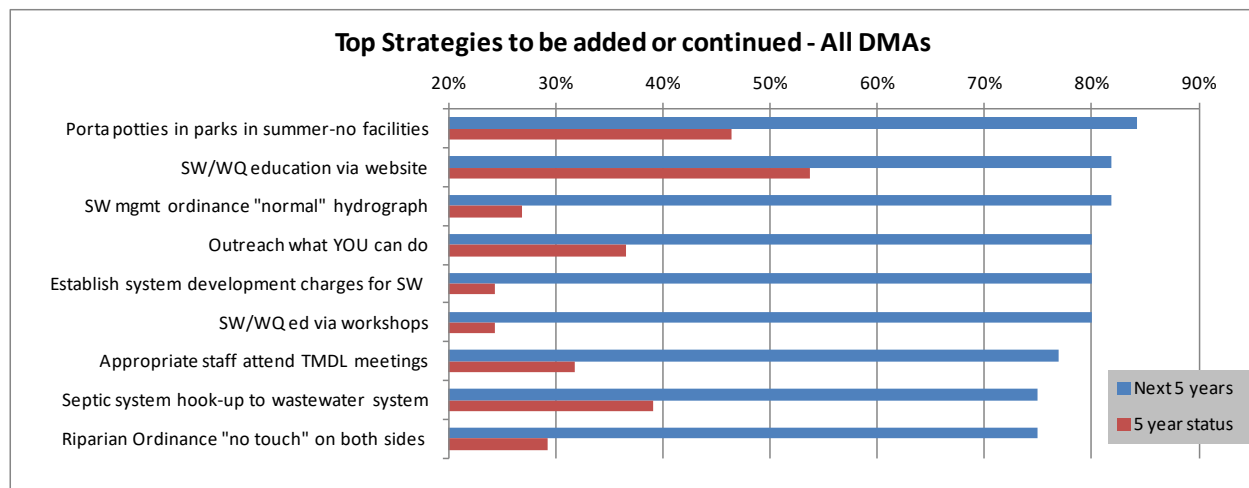


Figure 14: Strategies that DMAs will begin or continue for next five years.

## What are DEQ’s conclusions and recommendations?

DEQ concludes that a large majority, though not all, DMAs are complying with TMDL implementation reporting requirements and are implementing pollution reduction strategies. The quantitative data provides a representative sample of DMA activities underway to reduce their pollutant loads, particularly temperature, bacteria, and mercury. DMA comments about successful strategies and impediments to TMDL implementation help DEQ understand how to better provide targeted technical and financial assistance. During the process of communicating five-year review requirements to DMAs, DEQ also learned that improving internal coordination, particularly between TMDL and stormwater programs, can help DMAs achieve a higher level of compliance with TMDL reporting.

DEQ also made additional conclusions from reviewing and analyzing the information DMAs provided:

- Permitting and associated requirements lead to successful implementation of pollution reduction strategies. Clear expectations from DEQ for pollution reduction targets and reporting those reductions will help DMAs explain the need to their city councils or county commissions for dedicated funding, or increased funding, to implement programs.

- Implementation areas without clear requirements, such as riparian restoration, are more likely to be successful with incentives, such as grant funding (i.e. EPA 319 and other programs) and DEQ technical assistance, as well as partnerships with other DMAs and stakeholders.
- The most common impediments to DMAs fully implementing their TMDL implementation programs are limited or inadequate funding, resources and staff. DEQ can assist by providing guidance for strategies and monitoring, focusing our technical assistance, and targeting non-point source funding.
- DMAs also identified impediments in the areas of collaboration (with other DMAs), staff training, and public education/outreach. DEQ can provide targeted assistance with workshops and convening meetings with key partners.
- Nearly 80% of the DMAs plan to initiate or improve programs in the next five years in challenging areas, for example seeking increases in funding and dedicated staff, establishing ordinances, managing stormwater to mimic natural hydrographs, addressing aging septic systems.
- County governments generally do not have a geographic jurisdiction which can be readily represented on a map and may not have a good understanding of their TMDL implementation responsibilities, particularly those beyond MS4 permit areas.
- DMAs, DEQ, and other stakeholders need more information to evaluate effectiveness of strategies, cumulative and individual, on meeting TMDL allocations (e.g. biological assessments, physical stream assessments, stream sampling and analysis, impervious surface analysis).

Based on those conclusions, DEQ has the following recommendations for DMAs as well as internal recommendations pertaining to DEQ's operations, processes and priorities.

### ***Recommendations to DMAs for TMDL Implementation***

#### **Coordinate MS4 and TMDL Tasks**

- For DMAs who are MS4 permit holders, tailor monitoring and reporting in permit requirements to TMDL allocation targets, as well. Starting in 2014, when combining MS4 and TMDL implementation reporting, submit reports to the MS4 Stormwater Coordinator and send a copy to the appropriate regional Basin Coordinator (electronic version preferred).
- Refer to DEQ's guidance (see DEQ internal recommendations) to implement similar assessment, prioritization and monitoring efforts for TMDL parameters that are not addressed by the MS4, or other stormwater program, such as temperature or dissolved oxygen.
- For non-MS4 permittees, in the next implementation plan, identify gaps in their stormwater program based on the six minimum measures required for Phase II MS4 permit holders (e.g. program elements such as an illicit detection system, post construction stormwater control). Describe an approach to address these over the coming 5 year TMDL implementation period.

Increase Riparian Restoration Efforts

Over the next 5 years of TMDL implementation:

- Enforce existing riparian ordinances and track code variances.
- Require building setbacks and protection of existing riparian vegetation in urban boundary expansions; Considering that most jurisdictions are expanding their urban growth boundaries, the best way to maintain existing shade is for new development to require protection for riparian vegetation.
- Establish or enhance riparian conservation, management and restoration programs, conduct stream and wetland mapping, and develop and adopt protection ordinances/codes (especially for undeveloped lots).
- Identify resources and funding, and prioritize restoration areas and projects to promote collaborative on-the-ground actions.

Integrate watershed processes and coordinate Water Quality strategies

- Design and implement programs with a goal to restore watershed processes and functions (e.g. hydrology, riparian condition). Use existing land use measures, and adopt new measures as needed. For example, consider practices in the following table as well strategies summarized at the Oregon State Extension website.

<b>Land Use Management Strategy</b>	<b>Contribution to watershed protection</b>
Compact urban development patterns	Reduces the volume of stormwater per capita.
Riparian protection	Preserves or enables riparian vegetation, which provides shade and bank stability. Can support riparian restoration efforts.
Wetland protection	Preserves the natural hydrology and water quality of the watershed.
Development restrictions on steep slopes, highly erodible areas, and landslide prone areas	Reduces risk of chronic erosion and episodic events, like landslides, from contributing sediment to streams, lakes and estuaries.
Development restrictions in floodplains and channel migration zones	Preserves the natural hydrology of the watershed allows the natural processes that create diversity in stream channels

- When planning, factor in the potential cumulative effects of multiple small sources such as Underground Injection Controls, anticipated need for Army Corps of Engineers 404 permits (and associated DEQ 401 certifications) and Department of State lands Removal Fill permits.

- Coordinate among county departments (e.g. Roads, Parks, Forestry, Planning, Development, Stormwater) that have water quality management responsibilities, including shared data collection responsibilities, compiling information, and reporting. Ensure that county roads and illicit discharges outside of county MS4 permit boundaries are addressed as pollutant sources in revised TMDL implementation plans, annual reports. Ensure that planning and development issues like floodplain management, comprehensive planning, and septic inspection and permitting are addressed in revised TMDL implementation plans and annual reports.
- Coordinate data collection and information sharing with departments responsible for providing drinking water, and include drinking water protection programs that also relate to TMDL implementation in revised TMDL implementation plans.
- For DMAs that have not yet done so, complete the five year review using the template DEQ provided (e.g. the 10% of the Willamette 2006 DMAs who did not submit their five year reports and, at the appropriate time, the remaining Willamette DMAs with reports due between 2014 and 2016). DEQ will use this information to assist DMAs when developing their updated TMDL implementation plans.

### ***Recommendations for DEQ to assist DMAs with increasing their TMDL Implementation Activities***

Some recommendations can be implemented immediately, for example the first quarter of 2014. Others will require coordination among various programs and DEQ will strive to implement these recommendations within the year. Longer-term recommendations may need further assessment because they will likely require prioritizing existing resources within the state-wide TMDL program; while DEQ does not have specific timelines for implementing these recommendations, basin coordinators will work closely with DMAs to inform them of DEQ's progress.

#### **Immediate**

- When reviewing TMDL implementation plans and annual reports, Basin Coordinators confer with programs involving stormwater (industrial, construction, MS4, 401 certification, UIC) to become aware of other requirements the DMA must meet that may also serve as TMDL implementation.
- Offer more guidance and support to DMAs (e.g. grant funding, State Revolving Fund loans) for on-site septic inspection, source identification and monitoring programs. In particular, local community SRF loans, or an SRF sponsorship option, associated with a wastewater treatment project could assist municipalities, counties, or a sewer district.
- Acknowledge receipt of all TMDL implementation plans and reports, in writing, within two weeks of receipt. Provide approval or request for modified plan/report within 90 days of receipt.
- Seek partnerships with DMAs and others (e.g. ACWA) to provide technical assistance and increase funding for effectiveness monitoring of implemented pollution reduction strategies (e.g. upstream/downstream of DMA area, before and after implementation).



#### Near-Term

- Provide at least one technical-assistance workshop per year by region or DMA category to promote cooperation and idea sharing to address specific DMA needs. This would also be an opportunity for Basin Coordinators and other DEQ TMDL Implementation staff to work with groups of DMAs who have similar issues or barriers to TMDL implementation.
- Establish clear expectations and guidance for stormwater programs to achieve clear reduction targets for those DMAs not covered by an MS4 permit. Provide those criteria to DMAs for inclusion in their revised TMDL implementation plan and subsequent annual reports.
- Increase technical assistance to and oversight of municipalities' implementation of 1200C stormwater construction permits, especially those communities with limited technical resources.
- In conjunction with the MS4 Phase 2 renewal timeline, develop and make available to interested DMAs, an annual reporting form for simultaneous MS4 and TMDL Annual reports (e.g. Washington Ecology streamlined reporting).
- In first quarter 2014, review effectiveness monitoring data already collected by ACWA, watershed councils, MS4 communities, etc. and use for input and recommendations to revised TMDL implementation plans.
- Explore ways to determine effectiveness of outreach and education programs for TMDL implementation.

#### Longer-Term

- Develop a list of strategies and actions that should be in every TMDL implementation plan (e.g. riparian inventory, map of stormwater outfalls) to ensure that the basic elements of an adequate program are in place.
- Review DMA status for very small DMAs (e.g. cities with populations <1,000 and dense rural areas with negligible TMDL impact) considering ecological footprint, and technical assistance and review time needed. Coordinate internally to document process for reconsidering DMA status or changing reporting requirements.
- Review and adjust DMA assignments and total FTE for Basin Coordinators with TMDL implementation responsibility to achieve equitable workload across regions and basins.
- Establish criteria for elements of riparian management programs that could be expected to meet TMDL load allocations; these should be scalable to the riparian area and condition within a DMA's jurisdiction. Provide those criteria to DMAs for inclusion in their revised TMDL implementation plan and subsequent annual reports.

**Appendix A**

Willamette Basin Designated Management Agencies.

Five Year DMA Report – Willamette Basin TMDL Implementation  
February 2014

DEQ Region	DMA NAME	2010 Population	MS4/ Population Category	Date TMDL Plan Adopted	Date of 5 Year Review	Completed 5 yr review*	Data used for Report?	Report Group assignment	Comment	DMA Category	Land Use
WR	Adair Village	840	<10K	Oct-09	Nov-14	Not due yet	no	NA	DMA not covered in this report	City	Urban
WR	Albany	43,600	>10K 6 measures	May-08	Apr-13	YesQC	yes	>10K	Phase 2 next cycle	City	Urban
NWR/WR	Army Corps of Engineers	NA	NA	Oct-10	Oct-16	NA	no	NA	DMA not covered in this report	Federal	Other
WR	Aumsville	3,700	<10K	Oct-08	Apr-13	YesQC	yes	<10K		City	Urban
WR	Aurora	660	<10K	Sep-10	Sep-15	Not due yet	no	<10K	DMA not covered in this report	City	Urban
NWR	Barlow	135	<10K	NA	Jun-15	Not due yet	no	<10K	DMA not covered in this report	City	Urban
WR	Benton County	80,500	MS4 P2	Jun-08	Jun-13	YesQC	yes	MS4 PII		County	Urban
NWR/WR	BLM	NA	NA	NA	NA	NA	no	NA	DMA not covered in this report	Federal	Forestry
WR	Brownsville	1,500	<10K	Feb-09	Feb-14	Not due yet	no	<10K	DMA not covered in this report	City	Urban

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DEQ Region	DMA NAME	2010 Population	MS4/ Population Category	Date TMDL Plan Adopted	Date of 5 Year Review	Completed 5 yr review*	Data used for Report?	Report Group assignment	Comment	DMA Category	Land Use
NWR	Canby	15,829	NA	Jun-10	Jun-15	Not due yet	no	NA	DMA not covered in this report	City	Urban
NWR	Clackamas County_Clack	375,992	MS4 P1	Jun-09	Jun-13	YesC	yes	MS4 PI	Includes WES= CCSD#1 (+Happy Valley) and SWMACC (+Rivergrove)	County	Urban
NWR	Clackamas County_Molalla	375,992	MS4 P1	Feb-12	Jun-15	Not due yet	no	NA	DMA not covered in this report	County	Urban
NWR	Clean Water Services	NA	MS4 P1	Apr-08	Mar-14	YesC	yes	MS4 PI	MS4 Phase I thru CWS	Special District	Urban
NWR	Coburg + GWMA	1,050	<10K	Jun-08	Jun-13	YesQC	yes	<10K		City	Urban
WR	Corvallis	52,950	MS4 P2	Jan-09	Jan-14	Not due yet	no	MS4 PII	DMA not covered in this report	City	Urban
WR	Cottage Grove	8,910	<10K	Mar-08	Mar-13	YesQ	yes	<10K		City	Urban
WR	Creswell	3,990	<10K	Mar-08	Mar-13	YesQ	yes	<10K		City	Urban
WR	Dallas	13,270	>10K 6 measures	Jun-08	Jun-13	YesQC	yes	MS4 PII		City	Urban

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DEQ Region	DMA NAME	2010 Population	MS4/ Population Category	Date TMDL Plan Adopted	Date of 5 Year Review	Completed 5 yr review*	Data used for Report?	Report Group assignment	Comment	DMA Category	Land Use
NWR	Damascus	10,539	>10K 6 measures	Jun-09	Jun-13	YesQC	yes	<10K		City	Urban
NWR/WR	OR Dept. Geology & Mineral Industries	NA	NA	NA	NA	NA	no	NA	DMA not covered in this report	State	Other
WR	Detroit	250	<10K	Feb-09	Apr-13	YesQC	yes	<10K		City	Urban
WR	Donald	640	<10K	Nov-10	Nov-15	Not due yet	no	<10K	DMA not covered in this report	City	Urban
NWR	Dundee	2,860	<10K	Jan-09	Apr-13	No	no	NA	DMA not covered in this report	City	Urban
NWR	Estacada	2,695	<10K	May-09	Jun-13	YesQC	yes	<10K		City	Urban
WR	Eugene	143,910	MS4 P1	Dec-08	Dec-13	Not due yet	no	MS4 PI	DMA not covered in this report	City	Urban
WR	EWEB	NA	NA	NA	NA	NA	no	NA	DMA not covered in this report	Special District	Other
NWR	Fairview	8,920	MS4 P1	Sep-08	Jun-13	YesQC	yes	MS4 PI		City	Urban

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DEQ Region	DMA NAME	2010 Population	MS4/ Population Category	Date TMDL Plan Adopted	Date of 5 Year Review	Completed 5 yr review*	Data used for Report?	Report Group assignment	Comment	DMA Category	Land Use
WR	Falls City	960	<10K	Dec-09	Apr-13	YesQC	yes	<10K		City	Urban
WR	Gates	490	<10K	Oct-08	Apr-13	YesQC	yes	<10K		City	Urban
WR	Gervais	2,110	<10K	Sep-10	Sep-15	Not due yet	no	<10K	DMA not covered in this report	City	Urban
NWR	Gladstone	11497	MS4 P1	Jun-09	Aug-13	YesC	yes	MS4 PI		City	Urban
NWR	Gresham	105,594	MS4 P1	Mar-09	Jun-13	YesQC	yes	MS4 PI		City	Urban
WR	Halsey	740	<10K	Apr-09	Apr-14	Not due yet	no	NA	DMA not covered in this report	City	Urban
WR	Harrisburg + GWMA	2,930	<10K	Jan-09	Jan-14	Not due yet	no	NA	DMA not covered in this report	City	Urban
WR	Hubbard	2,700	<10K	Sep-10	Sep-15	Not due yet	no	NA	DMA not covered in this report	City	Urban
WR	Idanha	230	<10K	Oct-08	Apr-13	YesQC	yes	<10K		City	Urban

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DEQ Region	DMA NAME	2010 Population	MS4/ Population Category	Date TMDL Plan Adopted	Date of 5 Year Review	Completed 5 yr review*	Data used for Report?	Report Group assignment	Comment	DMA Category	Land Use
WR	Independence	6,850	<10K	Jan-09	Apr-13	YesQC	yes	<10K		City	Urban
WR	Jefferson	2,480	<10K	Dec-08	Apr-13	YesQC	yes	<10K	maybe Phase 2 next permit cycle	City	Urban
WR	Junction City + GWMA	4,870	<10K	Jul-10	Jul-15	Not due yet	no	<10K	DMA not covered in this report	City	Urban
WR	Keizer	34,010	MS4 P2	Apr-08	Apr-13	YesQC	yes	MS4 PII		City	Urban
WR	Labish Water Control District	NA	NA	Sep-10	Sep-15	Not due yet	no	NA	DMA not covered in this report	Irrigation District	Agriculture
NWR	Lake Oswego	36619	MS4 P1	Jun-08	Aug-13	YesC	yes	MS4 PI		City	Urban
WR	Lane County	329,400	MS4 P2	Jun-08	Jun-13	Not due yet	no	MS4 PII	DMA not covered in this report	County	Urban
WR	Lebanon	13,140	>10K 6 measures	Jan-11	Jan-16	Not due yet	no	MS4 PII	Phase 2 waived, DMA not covered in this report	City	Urban
WR	Linn County	104,900	NA	May-10	May-15	Not due yet	no	NA	maybe Phase 2 next permit cycle, DMA not covered in this report	County	Urban

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DEQ Region	DMA NAME	2010 Population	MS4/ Population Category	Date TMDL Plan Adopted	Date of 5 Year Review	Completed 5 yr review*	Data used for Report?	Report Group assignment	Comment	DMA Category	Land Use
WR	Lowell	890	<10K	Apr-08	Apr-13	YesQC	yes	<10K		City	Urban
WR	Lyons	1,060	<10K	Feb-08	Apr-13	YesQC	yes	<10K		City	Urban
WR	Marion County	315,335	MS4 P2	Aug-09	Aug-15	Not due yet	no	MS4 PII	DMA not covered in this report	County	Urban
NWR	Maywood	752	<10K	NA	NA	No	no	NA	DMA not covered in this report	City	Urban
NWR	Metro	NA	NA	Apr-09	Jun-13	YesQC	yes	MS4 PI	Not an MS4 permittee	Special District	Other
WR	Mill City	1,530	<10K	May-09	Sep-13	Yes	no	<10K	DMA not covered in this report	City	Urban
WR	Millersburg	720	<10K	Feb-09	Feb-14	Not due yet	no	NA	DMA not covered in this report	City	Urban
NWR	Milwaukie	20291	MS4 P1	Jul-09	Aug-13	YesC	yes	MS4 PI		City	Urban
NWR	Molalla	8,108	<10K	Dec-11	Jun-15	Not due yet	no	NA	DMA not covered in this report	City	Urban



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DEQ Region	DMA NAME	2010 Population	MS4/ Population Category	Date TMDL Plan Adopted	Date of 5 Year Review	Completed 5 yr review*	Data used for Report?	Report Group assignment	Comment	DMA Category	Land Use
WR	Monmouth	8,793	<10K	Feb-09	Apr-13	YesQC	yes	<10K		City	Urban
WR	Monroe + GWMA	610	<10K	Jan-09	Jan-14	Not due yet	no	NA	DMA not covered in this report	City	Urban
WR	Mt. Angel	3,700	<10K	Nov-10	Nov-15	Not due yet	no	<10K	DMA not covered in this report	City	Urban
NWR	Multnomah Co	735,334	MS4 P1	Mar-08	Jun-13	YesQC	yes	MS4 PI		County	Urban
WR	Newberg	19,530	>10K 6 measures	Oct-08	Apr-13	YesQC	yes	MS4 PII		City	Urban
NWR	Oak Lodge SD	NA	MS4 P1	Jun-09	Aug-13	YesC	yes	MS4 PI	MS4 Phase I thru Clackamas Co	Special District	Urban
WR	Oakridge	3,680	<10K	Jan-11	Aug-13	YesQC	yes	<10K		City	Urban
NWR	Oregon City	31,859	MS4 P1	May-09	Jun-13	YesQ	yes	MS4 PI		City	Urban
NWR/WR	Oregon Dept. of Ag	NA	NA	NA	NA	NA	no	NA	DMA not covered in this report	State	Agriculture

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DEQ Region	DMA NAME	2010 Population	MS4/ Population Category	Date TMDL Plan Adopted	Date of 5 Year Review	Completed 5 yr review*	Data used for Report?	Report Group assignment	Comment	DMA Category	Land Use
NWR/WR	Oregon Dept. of Forestry	NA	NA	NA	NA	NA	no	NA	DMA not covered in this report	State	Forestry
NWR/WR	Oregon Dept. of Transportation	NA	MS4 P1	NA	NA	NA	no	NA	DMA not covered in this report	State	Other
NWR/WR	Oregon Dept. State Lands	NA	NA	NA	NA	NA	no	NA	DMA not covered in this report	State	Other
NWR/WR	Oregon Marine Board	NA	NA	NA	NA	NA	no	NA	DMA not covered in this report	State	Other
NWR/WR	Oregon State Parks	NA	NA	NA	NA	NA	no	NA	DMA not covered in this report	State	Other
NWR	PGE	NA	NA	NA	NA	NA	no	NA	DMA not covered in this report	Special District	Other
WR	Philomath	4,310	MS4 P2	Apr-09	Apr-14	Not due yet	no	MS4 PII	DMA not covered in this report	City	Urban
WR	Polk County	75,403	MS4 P2	Jan-09	Apr-13	YesQC	yes	MS4 PII		County	Urban
NWR	Port of Portland	NA	MS4 P1	Jan-09	Jun-13	YesQC	yes	MS4 PI		Special District	Other

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DEQ Region	DMA NAME	2010 Population	MS4/ Population Category	Date TMDL Plan Adopted	Date of 5 Year Review	Completed 5 yr review*	Data used for Report?	Report Group assignment	Comment	DMA Category	Land Use
NWR	Portland	583,776	MS4 P1	Mar-08	Jun-13	YesQC	yes	MS4 PI		City	Urban
WR	Salem	142,940	MS4 P1	Aug-09	Aug-15	Not due yet	no	MS4 PI	DMA not covered in this report	City	Urban
NWR	Sandy	9,570	<10K	May-09	Jun-13	YesQC	yes	<10K		City	Urban
WR	Scio	710	<10K	Apr-08	Apr-13	No	no	<10K	DMA not covered in this report	City	Urban
WR	Scotts Mills	300	<10K	Sep-10	Sep-15	Not due yet	no	<10K	DMA not covered in this report	City	Urban
WR	Silverton	7,980	<10K	Sep-10	Sep-15	Not due yet	no	<10K	DMA not covered in this report	City	Urban
WR	Sodaville	290	<10K	May-08	May-13	No	no	NA	DMA not covered in this report	City	Urban
WR	Springfield	54,720	MS4 P2	Apr-09	Apr-14	Not due yet	no	MS4 PII	DMA not covered in this report	City	Urban
WR	St Paul	400	<10K	Mar-08	Apr-13	YesQC	yes	<10K		City	Urban

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DEQ Region	DMA NAME	2010 Population	MS4/ Population Category	Date TMDL Plan Adopted	Date of 5 Year Review	Completed 5 yr review*	Data used for Report?	Report Group assignment	Comment	DMA Category	Land Use
WR	Stayton	7,300	<10K	Jan-09	Sep-13	Yes	no	<10K	DMA not covered in this report	City	Urban
WR	Sublimity	2,160	<10K	Mar-08	Apr-13	YesQC	yes	<10K		City	Urban
WR	Sweet Home	8,330	<10K	May-08	May-13	YesQ	yes	<10K		City	Urban
WR	Tangent	920	<10K	Jun-08	Jun-13	No	no	NA	DMA not covered in this report	City	Urban
WR	Turner	1,480	MS4 P2	Feb-08	May-13	YesQC	no	MS4 PII	Info received not included in summary	City	Urban
NWR/WR	US Fish & Wildlife Service	NA	NA	NA	NA	NA	no	NA	DMA not covered in this report	Federal	Forestry
NWR/WR	US Forest Service	NA	NA	NA	NA	NA	no	NA	DMA not covered in this report	Federal	Forestry
WR	Veneta	3,480	<10K	Apr-08	Apr-13	YesQC	yes	<10K		City	Urban
NWR	Washington County	529,710	MS4 P1	2008	Mar-14	YesQC	yes	MS4 PI	MS4 Phase I thru CWS	County	Urban

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DEQ Region	DMA NAME	2010 Population	MS4/ Population Category	Date TMDL Plan Adopted	Date of 5 Year Review	Completed 5 yr review*	Data used for Report?	Report Group assignment	Comment	DMA Category	Land Use
WR	Waterloo	240	<10K	May-08	May-13	No	no	<10K	DMA not covered in this report	City	Urban
WR	West Labish Water Control District	NA	NA	Sep-10	Sep-15	Not due yet	no	NA	DMA not covered in this report	Irrigation District	Agriculture
NWR	West Linn	25109	MS4 P1	NA	Aug-13	YesC	yes	MS4 PI		City	Urban
WR	Westfir	330	<10K	Apr-07	Apr-12	No	no	<10K	DMA not covered in this report	City	Urban
NWR	Wilsonville	19,509	MS4 P1	Jun-09	Jun-13	YesQ	yes	MS4 PI		City	Urban
NWR	Wood Village	3,878	MS4 P2	Jun-09	Aug-13	YesC	yes	MS4 PII		City	Urban
WR	Woodburn	21,560	>10K 6 measures	Sep-10	Sep-15	Not due yet	no	MS4 PII	DMA not covered in this report	City	Urban

\* YesQ = DMA answered 3 Template essay questions, YesC = DMA or DEQ filled out Template checklist.