MULTNOMAH
COUNTY

Multnomah County TMDL Implementation Plan
for the Tualatin, Lower Willamette and Sandy River Basins

Five Year Review Report 2013

June 2013

Water Quality Program
Land Use and Transportation Division
Department of Community Services
Multnomah County

Part I: DMA General Information and Contacts

Please provide the general and contact information below.

General Information:

Designated Management Agency Name: Multnomah County

County: Multnomah

Please check the TMDL Subbasin(s) or Basin(s) within your Jurisdiction:
☐Clackamas ☑ Lower Willamette ☐Middle Willamette ☐Molalla-Pudding
☑ Sandy ☑ Tualatin

Dominant land use within your jurisdiction: Agriculture and private forestry

TMDL Implementation Plan First Due Date (MM/DD/YY): 11/1/10

TMDL Implementation Plan First Approval Date (MM/DD/YY): 03/31/08

Population based on 2010 Census or MS4 Status (Please check appropriate category):

☐<500	☐>=10,000 Stormwater Six Control Measures
☐500 -<1000	☐City MS4 Phase II
☐1,000-<5000	☐County MS4 Phase II
☐5,000-<10,000	☑ City/County MS4 Phase I

TMDL Contact Information:

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Part II: Report Sections and Checklists

1. **TMDL General Sources and Management Strategies Review** - Please review Table 1 below. Table 1 summarizes the general sources that impact water quality and strategies for improving water quality, for each TMDL parameter or group of pollutants.

Table 1: TMDL General Sources and Management Strategies

TMDL Parameter	General Sources	General Strategies/ Best Management Practices(BMPs)
Bacteria	Bacteria are carried to waterways in stormwater, overland flow, and pipes systems.	Reduce inputs of bacteria by various means including riparian protection, erosion control and stormwater control and treatment, low impact development, septic maintenance and various domestic and agricultural practices.
Dissolved Oxygen	In-stream sediment from runoff and stream bank erosion and high nutrient loads. Wastewater or stormwater effluent.	Reduce sediment delivered to streams by various means including riparian protection, soil erosion control and storm/wastewater control and treatment, low impact development and reduce nutrient loads.
Mercury and Toxics	In-stream sediment from runoff and stream bank erosion; air deposition. Legacy sources (mercury, DDT, etc.)	Reduce sediment delivered to streams by various means including riparian protection, soil erosion control and stormwater control and treatment, low impact development.
Phosphorus and chlorophyll	In-stream sediment from runoff and stream bank erosion; delivery of excess nutrients to surface water; wastewater discharges	Reduce sediment delivered to streams by various means including riparian protection, soil erosion control and stormwater control and treatment, low impact development and reduce nutrient loads. Manage fertilization and irrigation to reduce nutrient runoff.
Temperature	Removal of trees and other shade-producing woody vegetation from stream banks; reduced flow or altered hydrology; wastewater discharges.	Increase effective shade through restoration and protections; Restore natural stream hydrology and cool water refuges and wetlands; Increase natural stream flow.

Part II: Report Sections and Checklists Continued

2) TMDL Load Allocation Acknowledgment

Please review Table 2 below. Table 2 summarizes the nonpoint source TMDL load allocations for the subbasins, or specific streams. Load allocations are the percent reductions or targets needed to meet water quality standards. Acknowledge, by checking, the percent reductions in Table 2 that apply to the subbasin(s), or specific streams, within your jurisdictional boundaries for improving water quality.

Table 2: Nonpoint Source Urban/Rural TMDL Reductions and Targets

Subbasin	Parameter Reductions
Tualatin Lower Willamette Middle Willamette Clackamas Molalla	**Mercury:** ☑ 27% Reduction: Willamette Basin-wide-All Subbasins **Temperature:** ☐ Surrogate measure is percent effective shade targets (system potential) and a heat load equivalent of 0.05 °C of the Human Use Allowance. Attainment and preservation of effective shade targets on tributaries will address most of the non-point source anthropogenic heat load. Other important measures— preserving and restoring cool water refuges for fish rearing and migration; restoring in-stream flow quantity.
Clackamas	**Bacteria:** ☐ 78% Reduction year-round
Molalla	**Bacteria:** ☐ 81% Reduction fall-winter-spring
Tualatin	**Bacteria:** ☑ Load Allocations vary by season and source, see 2001 TMDL for details **Dissolved Oxygen** ☑ Load Allocations vary by location, see 2001 TMDL for details **Total Phosphorus and Chlorophyll** ☑ Load Allocations for runoff vary across the basin, see 2001 TMDL for specifics
Johnson Creek Fairview Creek Springbrook Creek	**Bacteria:** ☑ 78% (Johnson Cr). ☑ 66% (Fairview Cr.) ☑ 80% (Springbrook Cr.) **Toxics** ☑ DDT/Dieldrin/ TSS as surrogate 77% MS4 & 94% Non-point sources (Johnson Cr.)
Columbia Slough	**Bacteria:** ☑ 80% to 94% **Chlorophyll a, Dissolved Oxygen, DDT, Dieldrin, Dioxin, Lead, pH, Phosphorus, PCBs** ☑See 1998 TMDL specifics
Sandy	**Bacteria:** ☑ 86% Reduction year-round **Temperature** ☑ Surrogate measure is percent effective shade targets (system potential) and a heat load equivalent of 0.05 °C of the Human Use Allowance. Attainment and preservation of effective shade targets on tributaries (e.g. Salmon, Zig Zag, Little Sandy) will address most of the non-point source anthropogenic heat load. Lower Bull Run River target is Little Sandy River temperature, plus 1°C between Aug. 16 and Oct. 15.

Part II: Report Sections and Checklists Continued

3) **Successful Strategies Report** - Please provide a short discussion on the most positive or commendable implementation plan elements. Please limit your discussion to ten sentences or less. More details pertaining to specific TMDL strategy implementation will be requested in the sections that follow.

The most successful part of the County TMDL program was the result of the coordination of TMDL monitoring and implementation through the Inter-Jurisdictional Committee of Johnson Creek. I chaired this technical workgroup of DMAs and NGOs from December 2009 – June 2012, and during that time we produced analyses of watershed-wide temperature and macroinvertebrate diversity, as well as beginning studies of bacteria source control and shade modeling. IJC-led monitoring data formed the basis of the State of the Watershed Report published by the Johnson Creek Watershed Council in 2011. The IJC members also formed informal sediment and toxics source networks, where calls were routed between members to identify spills and sediment sources.

The IJC studies and discussions have been critical to the beginnings of a watershed-wide strategy that addresses priorities at the scale where improvements can be measured. This work begins to better define problems and identify the sources of those problems. In some ways, the most productive elements of the County program are the intangible cooperative relationships that come from working together, not a particular set of BMPs. The most tangible results (i.e., strategies) came from working across jurisdictional boundaries.

Note: *Some examples of positive and commendable elements for discussion: implemented strategies "above and beyond" proposed plan; high percentage of measures completed and implemented; square acres of riparian restoration; gap analysis and code revisions and ordinance adoption; prioritized work plan development; water quality monitoring , evaluation and progress results; interagency collaboration on key projects such as fish passage and riparian restoration.*

4) **Implementation Plan Impediments** - Please provide a short discussion on any impediments to plan implementation and proposed solutions for the next four year cycle to overcome these impediments. Please limit your discussion to ten sentences or less. More details pertaining to TMDL Implementation timelines, progress, and plan adaptation will be requested in the sections that follow.

There is an expectation that environmental conditions can be readily improved with a regulatory process and a set of BMPs. However, I believe this is a bit of a false expectation. Success relies a lot on people issues (i.e., landowner responsibility, private land access, volunteer help, voluntary coordination among DMAs and NGOs). There significant benefits to scale down to priority areas and stream reaches, (and the goals that go with them both in scope and time), in order to effectively measure changes in the land and water quality. Short term goals, however, are difficult to develop because they require a considerable amount of new data. This includes knowledge of the landscape and the distribution of key aquatic organisms and their needs. It also requires an understanding of the limitations of resources.

While the IJC has been working towards short term goals at the subbasin scale, we've only just begun to fill the data gaps needed to establish goals and measure progress. The IJC is a great model of coordinated monitoring, but it requires the right people and right leadership to make it a success. Each jurisdiction has its own priorities, and having shared goals between jurisdictions is challenging. The Johnson Creek Watershed Council's Watershed Action Plan and Scientific Framework may come close to a shared plan, but it's not a truly coordinated watershed plan that we each take part in.

Note: *Some examples of impediments to consider for discussion: Lack of resources; Lack of partners; Unclear geographic priorities; Limited public support on ordinances; Inadequate staff training; No clear examples or showcase of strategies implemented.*

5) **Implementation Plan Strategy Review Checklist (Appendix A)**
Please refer to Appendix A of this document and check the strategies, under the column category "1st 5 year cycle" that have been ongoing, implemented, or partially implemented over the preceding four years under your TMDL implementation plan. If you are an MS4 Permittee, please also check "MS4 City or Countywide" or "MS4 Permit Boundaries Only" for a strategy when it applies.

For additional information, DEQ identified many key TMDL implementation strategies in the Water Quality Management Plan of the TMDL document. TMDL documents are on line at: http://www.deq.state.or.us/WQ/TMDLs/basinlist.htm

Note: *Do not fill in the column, "next 5 year cycle" yet. This column is reserved for Review Section #8 below.*

6) **Implementation Plan Reporting and Matrix Status**
Please indicate the reporting and performance components that were met for monitoring implementation success and the effectiveness of strategies/Best Management Practices (BMPs) in meeting TMDL needed reductions.

Note: *For sections 6.i.b. and 6.ii., utilize the status column in the Matrix included with your DEQ accepted TMDL Implementation Plan, and submit it with the report. Please reference the Appendix B example provided with this document.*

i. Implementation plan reporting (Were the specified management strategies implemented and annual reports submitted?)
   a. **Annual Reports** - Please check yes or no:
      i. Were annual reports submitted?
         Report 1 - ☑ Yes ☐ No
         Report 2 - ☑ Yes ☐ No
         Report 3 - ☑ Yes ☐ No
         Report 4 - ☑ Yes ☐ No
      ii. Did annual reports submitted identify changes, delays, substitutions, etc?
         ☑ Yes ☐ No
      iii. Did DEQ provide an annual report acceptance letter and/or email?
         ☐ Yes ☑ No
      iv. Did you address or discuss with DEQ all comments provided in your annual report acceptance letter and/or email? ☐ Yes ☑ No

   b. **Matrix Strategy Status** - For each strategy, please identify in your **Matrix "status column"** the status that applies to each strategy – Please use the terms in **bold** below, every task must have an identified status (refer to Appendix B example)
      Complete: Strategy has been implemented and is done.
      Ongoing: Strategy has been implemented and is ongoing as expected.
      Incomplete: Strategy implemented, but measures not 100% met.
      Not Implemented: Strategy not started.
      Replacement: Replacement strategy for a strategy not implemented.
      Delayed: Strategy started, and strategy or interim steps still underway because of unanticipated delays.
      Added: Added or supplemental strategy identified and added for implementation.

Note: *Timelines and measures are not intended to be DEQ enforceable compliance points, they were based on your professional judgment to implement and complete a strategy. It is important to confirm that implementation*

efforts supportive of TMDLs are underway, not that timelines and measures have been met 100%. Delays in timelines and not meeting 100% of the measures are anticipated.

c. **Matrix Strategy Summary** - Please provide the following information based on information from b above:

Number of tasks **completed** __1___
Number of tasks implemented and now **ongoing** __15___
Number of tasks **incomplete, but started** _____
Number of tasks **not implemented** __1____
Number of tasks **replaced** ___2___
Number of tasks **delayed** _____
Number of tasks **added** _____

ii. **Strategy Effectiveness documentation** – Please confirm that strategies were implemented and effective at reducing pollutant loading in your **matrix status column** (refer to Appendix B example).

Based on quantitative (water quality monitoring if utilized) or qualitative data (performance measures and milestones identified in matrix), summarize the metrics in the matrix status column for the four years of implementation that document progress on meeting load allocations and water quality standards.

Note:
Quantitative - *Measurement of the effectiveness of pollution reduction efforts by conducting laboratory or field analyses of water samples.*
Qualitative - *Measurement of implementation progress. Examples: Photo documentation of training; Before and after photo documentation of improvement in stream bank vegetation/cover; Vegetated stormwater containment/collection swales; Documentation of relative sediment volume/ year collected from catch basins; Roads, detention ponds or filters in stormwater treatment systems; Copies of education and outreach documentation and the number issued; Stormwater and temperature websites created.*

7) **Implementation Plan Update Recommendations** - Based on the information you documented for sections 2-6, describe your preliminary recommendations for continued strategy implementation and improvements to your plan for the next five year cycle and fifth year review.

The plan for the coming years is to continue the activities within the County jurisdiction, and continue to coordinate with DMAs and NGOs in each of the TMDL watersheds. Because the County has limited jurisdiction in the rural area, the key strategy is to support the work of other jurisdictions and groups on watershed wide endeavors. For example, the County works together with ODA for regulatory compliance and EMSWCD for education materials. The County also shares water quality and biological data with watershed jurisdictions. In the next cycle, we are taking the Johnson Creek IJC model to Beaver Creek to help affect bacteria and temperature water quality exceedances there.

In some ways, waste load allocations (WLA) are like the proverbial "finger pointing at the moon" where the real concerns are about the human contact and the health of aquatic organism, not the WLA. Ideas such as preserving cold water refugia by preventing thermal loading in small tributaries or correcting fish passage to these streams may be more important to watershed recovery than chasing WLA, particularly in the short term. Alternatives like these must be considered if a true watershed approach is the key to successful restoration.

Note: *If your evaluation indicates that the plan and corresponding matrix are not likely to be adequate to meet the pollution reduction goals, describe how the plan and matrix will be modified or what efforts will be*

undertaken to achieve these goals and the timeline for working towards accomplishing them over the next four year cycle.

8) **"Next 5 Years" Implementation Plan Strategy Review Checklist (Appendix A checklist)** - Based on information you provided for sections 2 through 7, please check-off the strategies in Appendix A column, "next five year cycle," that you will consider for the next four years of TMDL implementation. Please remember to attach the completed Appendix A checklist with this report.

9) **Updated TMDL Implementation Plan Matrix** – You may submit an updated implementation plan matrix now or submit the matrix with your revised implementation plan.

10) **Revised Plan** - All DMAs are expected to revise their implementation plan. You may submit a revised implementation plan now, or wait until the due date negotiated with your Basin Coordinator.

I am including a revised plan with this Fifth Year Review Report:
☐Yes ☑ No ☐ I will coordinate with my basin coordinator

11) **Confirm Annual Reporting Date** - Your submittal due date for this fifth year report will restart the clock for the next five year cycle (progress reporting and fifth year review report). The fifth year report review and acceptance date by DEQ will not change your assigned annual progress report due date. Please confirm your assigned annual report submittal date _____TBD through NPDES process_____(MM/DD).

Note: It may be appropriate to negotiate a new date that aligns with your MS4 reporting to facilitate reporting efforts.

Part III: Signature of Legally Authorized Representative

Signature of Legally Authorized Representative for Fifth Year Report (Definition: Principal executive officer or ranking elected official):

Type or Print Name: _____Kim Peoples_____

Title: _____Interim Director, Department of Community Services_____

I hereby certify that the information contained in this document is true, accurate, and complete to the best of my knowledge and belief.

_____ Date (MM/DD/YY): 7/1/13
Signature

Note: *Please remember to complete and attach the Appendix A checklist and the TMDL implementation plan matrix that are used for documenting implementing strategies that will be used for tracking progress.*

1st 5 Year Cycle	MS4 City or Countywide	MS4 Permit Boundaries	Next 5 Year Cycle	Appendix A Recommended List of Key Strategies for TMDL Implementation	Bacteria(E coli)	Dissolved Oxygen	Mercury	Toxics	Phosphorus and chlorophyll	Temperature
				Riparian and Wetland Protection and Restoration Programs						
x	x		x	Ordinance that protects the floodway and floodplain from development	•	•	•	•	•	•
				Riparian Protection ordinance that provides a "no touch" riparian buffer on both sides of a waterbody with the width (in feet) based on the TMDL effectiveness shade and buffer width	•	•	•	•	•	•
				Tree protection ordinance that retains at least 60% canopy coverage, which will hold water and reduce temperature increases on impervious surfaces.						•
x	x		x	Wetland protection ordinance that includes protection of headwaters and riparian corridors and other groundwater resources that provides cool water inflow from groundwater, hyporheic (near surface), wetland, or other sources into waterbody during the hottest time of year.	•	•	•	•	•	•
				Adopt a Low Impact Development (LID) ordinance that requires new, redevelopment, and retrofit projects to retain natural site conditions for surface water flows	•	•	•	•	•	•
				Establish City/County exclusive requirement to protect buffers, riparian, wetland, and native vegetation areas on city/county property (ex., conservation) programs)	•	•	•	•	•	•
				Strategies and timelines to protect and establish system potential vegetation (ex., inventory land features and conditions; prioritize riparian and wetland areas; select sites for planting)	•	•	•	•	•	•
				Restore stream with placement of large woody debris, and bed and bank material (e.g. gravel) instream						•

1st 5 Year Cycle	MS4 City or Countywide	MS4 Permit Boundaries	Next 5 Year Cycle	Appendix A Recommended List of Key Strategies for TMDL Implementation	Bacteria(E coli)	Dissolved Oxygen	Mercury	Toxics	Phosphorus and chlorophyll	Temperature
				Protect or restore riparian buffer, at least 150-foot on both sides, with native shrubs and trees that would grow and restore stream conditions to natural conditions.	•	•	•	•	•	•
				Protect or Restore riparian buffer, less than a 150-ft., with native shrubs and trees that would grow and restore stream conditions to natural conditions.	•	•	•	•	•	•
				Zoning and development code audit and update to protect natural drainage and surface water areas and incorporate LID and structural collection & treatment of stormwater	•	•	•	•	•	•
x	x		x	Enforce riparian zone violations	•	•	•	•	•	•
				Identify watershed partners and projects that support implementation efforts and participate/support implementation of riparian restoration and LID on-the-ground projects	•	•	•	•	•	•
				Purchase permanent instream flow transfers through Oregon Water Resources Department, particularly during the summer and late fall flow periods.		•			•	•
				Identify what is lacking for riparian restoration and preservation (Gap analysis of DMA's programs)	•	•	•	•	•	•
				Pollution Prevention in Municipal Operations						
x	x		x	Adopt an Integrated Pest Management (IPM) Ordinance to develop effective plans, programs, and policies		•		•	•	

1st 5 Year Cycle	MS4 City or Countywide	MS4 Permit Boundaries	Next 5 Year Cycle	Appendix A Recommended List of Key Strategies for TMDL Implementation	Bacteria(E coli)	Dissolved Oxygen	Mercury	Toxics	Phosphorus and chlorophyll	Temperature
x		x	x	Conduct regular street sweeping of streets, parking lots, and other impervious surfaces with sweepers that have good efficiencies for removing the tiniest particles.	•		•	•	•	
x	x		x	Adopt and implement policy to prevent over-application of products (ex., reduce fertilizers , herbicides, pesticides to public lawns and landscaped areas; avoid over application of deicing salts)		•	•	•	•	
x	x		x	Employee training about maintenance and construction practices to protect water quality	•	•	•	•	•	•
x		x	x	Maintenance program for stormwater collection and treatment systems	•		•	•	•	
				Incorporate electric and high MPG vehicles into transportation fleet				•		
				Pet/Animal waste, Septic Systems, Illicit discharges						
				Adopt a No Wildlife Feeding Ordinance near water bodies to limit the amount of wildlife waste and sediment from riparian damage entering waters of the state, including lakes, reservoirs, ponds, and other impoundments.	•	•	•	•	•	
				Adopt a pet waste pick-up ordinance for home and public areas	•	•			•	
				Establish Dog Run Areas in a dog park that is sited away from environmentally sensitive features and provides a safe off-leash fenced area.	•	•			•	

1st 5 Year Cycle	MS4 City or Countywide	MS4 Permit Boundaries	Next 5 Year Cycle	Appendix A Recommended List of Key Strategies for TMDL Implementation	Bacteria(E coli)	Dissolved Oxygen	Mercury	Toxics	Phosphorus and chlorophyll	Temperature
				Install pet waste stations and provide signs	•				•	
				Provide porta-potties at parks and public events in summer to boost facilities (fairs, markets, holidays, etc.)	•	•			•	
				Minimize inflow and infiltration of stormwater to wastewater system	•			•	•	
				Reduce septic system use through hook-up to public wastewater system	•	•		•	•	
				Develop a Local Community Loan Program to provide low-cost financial assistance to individual homeowners to repair or replace substandard and failing on-site systems (Note: A county or city may contract with DEQ to borrow funds through the Clean Water State Revolving Fund (CWSRF) to establish a "local loan").	•	•		•	•	
				Adopt an ordinance to require on-site septic inspection and maintenance to repair or replace substandard and failing on-site systems in general, or at the time of a property sale	•	•		•	•	
x		x	x	Identify and eliminate illicit discharges and cross connections	•	•		•	•	•
				Drinking water protection						

1st 5 Year Cycle	MS4 City or Countywide	MS4 Permit Boundaries	Next 5 Year Cycle	Appendix A Recommended List of Key Strategies for TMDL Implementation	Bacteria(E coli)	Dissolved Oxygen	Mercury	Toxics	Phosphorus and chlorophyll	Temperature
				Adopt an ordinance to protect drinking water obtained from groundwater sources	•			•		
				Adopt an ordinance to protect drinking water obtained from surface water sources	•			•		
				Erosion and Sediment Control During Construction						
x	x		x	Hillside development (Steep Slopes) protection code/ordinance to minimize or stop soil erosion from steep slopes that are eroding (or subject to erosion from disturbance) causing sediment to enter into a water body.	•		•	•	•	
x	x		x	Develop erosion and sediment control ordinance for less than 1 acre of disturbance	•		•	•	•	
x	x		x	Require erosion and sediment control plans, when applicable, during building permit application phase	•		•	•	•	
				Restore exposed soil areas with erosion control BMPs to prevent and control erosion.	•		•	•	•	
x	x		x	Strengthen 1200-C permit oversight; require permit approval for land use approval	•		•	•	•	
				Stormwater Planning and Programs, Structural Collection and Treatment of Stormwater						

Appendix A
Recommended List of Key Strategies for TMDL Implementation

1st 5 Year Cycle	MS4 City or Countywide	MS4 Permit Boundaries	Next 5 Year Cycle		Bacteria(E coli)	Dissolved Oxygen	Mercury	Toxics	Phosphorus and chlorophyll	Temperature
x	x		x	Adopt an ordinance that requires all new, redevelopment, and retrofit projects to control and treat soil laden stormwater runoff	•		•	•	•	
x	x		x	Adopt a stormwater management ordinance that requires all new, redevelopment, and retrofit projects to maintain post development peak runoff rate and average volume at levels that are similar to pre-development levels	•		•	•	•	
x		x	x	Construct swales that will settle, infiltrate , and treat stormwater	•		•	•	•	
				Construct site pond/wetland system that will settle, infiltrate and treat stormwater	•		•	•	•	
				Install onsite and/or regional basin facility to control and treat turbid runoff (i.e., rock dams, swales, sediment basins, sediment traps)	•		•	•	•	
				Convert road ditches to Grassed Swales (a.k.a. grassed channel, dry swale, wet swale, biofilter, or bioswale) to infiltrate and capture sediment	•		•	•	•	
				Investigate and/or promote the use of low impact development techniques such as bioswales, rain gardens, pervious surfaces, etc.	•		•	•	•	
				Adopt a Low Impact Development (LID) Ordinance that requires all new, redevelopment, and retrofit projects to reduce impervious surfaces and use LID and other BMPs to infiltrate, filter, retain, evaporate, and slow down runoff close to its source and treat nutrients from impervious surfaces.	•		•	•	•	

Appendix A
Recommended List of Key Strategies for TMDL Implementation

1st 5 Year Cycle	MS4 City or Countywide	MS4 Permit Boundaries	Next 5 Year Cycle		Bacteria(E coli)	Dissolved Oxygen	Mercury	Toxics	Phosphorus and chlorophyll	Temperature
x	x		x	Develop a stormwater conveyance systems map to track and locate problems more efficiently	•		•	•	•	
x	x		x	Educate public about illegal discharges (e.g. car washing, used oil) to stormwater system	•	•	•	•	•	•
x	x		x	Develop and implement an outreach program/strategy for water quality protection	•		•	•	•	
x	x		x	Provide employee training about maintenance and construction practices to protect water quality	•		•	•	•	
x	x		x	Enforce stormwater ordinances that protect water quality	•		•	•	•	
				Establish system development charges for stormwater	•		•	•	•	
				ID what is lacking for riparian restoration and preservation and six minimum stormwater control measures (gap analysis of DMA's programs)	•	•	•	•	•	•
x	x		x	Hand out water quality fact sheets with land use and building permit applications	•		•	•	•	
x	x		x	Develop/continue a program to detect Illegal discharges, and to respond to related complaints	•	•	•	•	•	•

1st 5 Year Cycle	MS4 City or Countywide	MS4 Permit Boundaries	Next 5 Year Cycle	Appendix A Recommended List of Key Strategies for TMDL Implementation	Bacteria(E coli)	Dissolved Oxygen	Mercury	Toxics	Phosphorus and chlorophyll	Temperature
				Increase enforcement capacity	•		•	•	•	
x			x	Increase monitoring capacity	•		•	•	•	
				MS4 Phase II & Non-Permittees - Implement strategies and timelines for 6 minimum stormwater control measures	•	•	•	•	•	
				Construct on-site or regional Grassed Swales that infiltrate stormwater and maintain dry weather flow (e.g. grassed channel, dry swale, wet swale, biofilter, or bioswale)	•	•	•	•	•	
				Promote utilization of or require construction of porous concrete and/or asphalt roads when constructing new or re-constructing a road	•	•	•	•	•	
x		x	x	Develop or update Stormwater Master/Management Plan with water quality components for riparian areas and stormwater management controls	•	•	•	•	•	•
				Education and Outreach, Public Involvement, other General Strategies						
x	x		x	Stormwater/water quality protection education via website	•	•	•	•	•	
				Stormwater/water quality protection education via workshops	•	•	•	•	•	

Appendix A
Recommended List of Key Strategies for TMDL Implementation

1st 5 Year Cycle	MS4 City or Countywide	MS4 Permit Boundaries	Next 5 Year Cycle		Bacteria(E coli)	Dissolved Oxygen	Mercury	Toxics	Phosphorus and chlorophyll	Temperature
x		x	x	Stormwater/water quality education via fact sheets, signage, mailers	•	•	•	•	•	
x	x		x	Pursue and implement mutual strategies with other jurisdictions	•	•	•	•	•	•
x	x		x	Outreach - Creek protection and what "you" can do.	•	•	•	•	•	•
				Conduct public education and outreach on riparian and wetland protection and restoration and local zoning/ordinances to protect riparian areas	•	•	•	•	•	•
				Implement a tree planting program in open areas to provide adequate tree canopy coverage						•
x	x		x	Promote carpooling, public transportation to reduce toxics and metals carried in stormwater				•		
				Promote/collaborate/incentivize riparian protection	•	•	•	•	•	•
x	x		x	Conduct public education and outreach on stormwater quality: riparian protection; promote conservation programs and grants	•	•	•	•	•	•
x	x		x	Pet waste education - Inform residents about bacteria issues; Partner with other jurisdictions in media campaign	•				•	

Appendix A
Recommended List of Key Strategies for TMDL Implementation

1st 5 Year Cycle	MS4 City or Countywide	MS4 Permit Boundaries	Next 5 Year Cycle		Bacteria(E coli)	Dissolved Oxygen	Mercury	Toxics	Phosphorus and chlorophyll	Temperature
x	x		x	Post TMDL Implementation Plan on website or make available to public for review and comment	•	•	•	•	•	•
x	x		x	Conduct public education and outreach on stormwater quality: illegal dumping; septic system maintenance	•	•	•	•	•	
				Provide updates of/discuss implementation of TMDL plan, protecting water quality at Council or Commission meetings several times/year	•	•	•	•	•	•
				Financial analysis and funding source identification - what can they really do with the funding they have	•	•	•	•	•	•
		x	x	Quantify BMPs and protection needed to meet water quality standards and TMDL load allocations	•	•	•	•	•	•

				List Strategies Ongoing, Implemented, or Partially Implemented That are not Identified in the Above Categories						

APPENDIX B. Table of Multnomah County TMDL Management Strategies

Pollutant: Temperature (Shade surrogate)

Waterbody: Sandy River, Gordon Creek, Beaver Creek, Kelly Creek, Johnson Creek

Source	Strategy	How	Fiscal Analysis	Measure	Timeline	Milstone	Status	Efectiveness
1. Lack of stream shading	a. Ensure stream buffers requirements are met through plan review	Continue plan review for new development and redevelopment	No additional resources needed	None	None	None	ONGOING: County Planning Dept continues to review plans in the areas of Significant Environmental Concern.	Protecting riparian buffers on large rural lots is very rarely an issue.
	b. Enforce County stream buffer requirement for new development	Continue County code enforcement	No additional resources needed	None	None	None	ONGOING: County Planning Dept continues to review plans in the areas of Significant Environmental Concern.	Protecting riparian buffers on large rural lots is very rarely an issue.
	c. Address riparian vegetation in agricultural areas through Agricultural Water Quality Plans	Notify local Soil & Water Conservation Districts of runoff issues and ODA for enforcement on agricultural land	No additional resources needed	None	None	None	NOT IMPLEMENTED: The riparian zone in agricultural areas falls under the Ag WQ Mgmt Area Plan rules and under ODA jurisdiction. Although the County participates in the biennial reviews of those plans, there are not any complaints to ODA.	
	e. Educate landowners and encourage riparian vegetation maintenance and restoration	Work with East Multnomah Soil & Water Conservation District to provide technical assistance and disseminate grant opportunities	No additional resources needed	None	None	None	ONGOING: SWCD outreach materials are provided at the County Planning office. Created State of the Watershed Reports for Beaver and Johnson Creeks	In a given year approximately 100 brochures on various rural living issues are taken. This is not an aggressive strategy but it also costs nothing to implement.
2. Improper implementation of timber harvest practices	a. Ensure permit violations are enforced	Notify Oregon Department of Forestry about suspected permit violations and other negative impacts from timber harvesting	No additional resources needed	None	None	None	ONGOING: No specific concerns with Forestry have occurred in this review term.	

Pollutant: Bacteria

Waterbody: Beaver Creek, Kelly Creek, Johnson Creek, Tualatin tribs

Source	Strategy	How	Fiscal Analysis	Measure	Timeline	Milstone	Status	Efectiveness
1. Failing septic systems	a. Conduct reach scale investigations in Johnson Creek	Follow the Agricultural Water Quality Plan baseline sampling (2007-2008) with analysis and additional investigative monitoring	No additional resources needed	Replaced	Replaced	Replaced	REPLACED: DEQ supported the JCWC and IJC with a 319 grant in 2012-13 for source ID.	See comment boxes in the 5 year report regarding IJC coordination.
	b. Conduct reach scale investigation in Beaver and Kelly Creek	Partner with City of Gresham to collect data	No additional resources needed	Per IGA	Sampling 4 times / year	NPDES permit renewal	ONGOING: City of Gresham collects bacteria from several sites in the Beaver Creek basin under contract.	Ambient monitoring results from 2012 indicate that Beaver Creek bacteria standards are typically met.
	b. Inspect OSS systems suspected of failure	County contracts with City of Portland sanitarian to provide inspection services	No additional resources needed	None	None	None	ONGOING: One notice of violation was issued by Portland BDS, based on a County call.	It is very difficult to determine where failing septic systems occur even with WQ data and DNA analysis.
	c. Educate homeowners about septic system maintenance	Partner with East Multnomah Soil & Water Conservation District (EMSWCD) to develop and disseminate educational materials	No additional resources needed	None	None	None	ONGOING: SWCD outreach materials are provided at the County Planning office. Created State of the Watershed Reports for Beaver and Johnson Creeks	In a given year approximately 100 brochures on various rural living are taken. This is not an aggressive strategy but it also costs nothing to implement.
2. Non-point source from agricultural lands	a. Conduct reach scale investigations based on TMDL study	Follow the Agricultural Water Quality Plan baseline sampling (2007-2008) with analysis and additional investigative monitoring	No additional resources needed	Replaced	Replaced	Replaced	REPLACED: EMSWCD received funds from ODA to conduct reach scale monitoring in the agricultural areas.	
	b. Address runoff issues via Agricultural Water Quality Plans	Notify local Soil & Water Conservation Districts when problems are identified, or notify ODA for enforcement	No additional resources needed	None	None	None	ONGOING: One livestock bacteria-related complaint was submitted to the ODA Water Quality Complaint program.	This strategy is very opportunistic as the County has no jurisdictional authority here.
3. Pet wastes	a. Educate pet owners	Partner with local Soil & Water Conservation Districts to develop and disseminate educational materials	No additional resources needed	None	None	None	ONGOING: SWCD outreach materials are provided at the County Planning office. Helped to create State of the Watershed Reports for Beaver and Johnson Creeks	In a given year approximately 100 brochures on various rural living are taken. This is not an aggressive strategy but it also costs nothing to implement.
4. Illegal dumping	a. Enforce Solid Waste Nuisance ordinance	Report all illegal dumping to County nuisance code enforcement (See Stormwater Program components below)	No additional resources needed	None	None	None	ONGOING: The County Nuisance Enforcement encountered one minor incident involving human feces not related to the stream.	Illegal dumping is very rarely related bacteria in the stream.

Pollutant: Phosphorus, Metals, Toxics, Mercury, DDT and Dieldrin (TSS surrogate and stormwater)

Waterbody: Lower Willamette River (Mercury), Johnson Creek (DDT, Dieldrin), Tualatin (P), Columbia Slough, Fairview Creek

Source	Strategy	How	Fiscal Analysis	Measure	Timeline	Milstone	Status	Efectiveness
1. Non-point source of sediment from agricultural lands	a. Address agricultural runoff issues via Agricultural Water Quality Plans	Notify East Multnomah Soil & Water Conservation Districts of runoff issues and ODA for enforcement on agricultural land	No additional resources needed	None	None	None	ONGOING: Eight sediment related complaints were submitted to the ODA Water Quality Complaint Program.	This strategy is very opportunistic as the County has no jurisdictional authority here.
	b. Educate landowners and encourage riparian vegetation maintenance and restoration	Work with East Multnomah Soil & Water Conservation Districts to provide technical assistance and disseminate grant opportunities	No additional resources needed	None	None	None	ONGOING: SWCD outreach materials are provided at the County Planning office. Created State of the Watershed Reports for Beaver and Johnson Creeks	In a given year approximately 100 brochures on various rural living are taken. This is not an aggressive strategy but it also costs nothing to implement.
2. Soil erosion and sediment transport from urban development and roadways	a. Continue implementing the County Stormwater Management Plan in NPDES areas and Road Maintenance and Operations Manual in rural areas.	Implement BMP approaches to avoid and minimize stormater and pollutant runoff from County drainage network	No additional resources needed	Performance measures are included in the NPDES SWMP	See NDPES SWMP	See NDPES SWMP	ONGOING: See NPDES Annual Reports for details on program implementation.	TMDL benchmarks will be developed for Beaver Creek, however quantifying nonstructural BMPs is very difficult to estimate, and the results are likely better suited as a planning tool rather than a measuring tool.
3. Mercury-containing products used in County practices	a. Reduce use of products containing mercury	Purchase alternative products that contain less or no mercury: *Specify low-mercury fluorescent lamps; Ensure that new thermostats and switches in vehicles and equipment are mercury-free.*	No additional resources needed	Goals identified in Toxics Reduction Plan	See Toxics Reduction Plan	See Toxics Reduction Plan	ONGOING: County implements a Toxics Reduction Plan jointly with the City of Portland.	This strategy does not have a direct connection with water quality.
	b. Ensure proper disposal of products containing mercury	Recycle products containing mercury: *Recycle all mercury-containing light tubes and non-alkaline batteries; Ensure best management practices for recycling of electronic waste*	No additional resources needed	Goals identified in Toxics Reduction Plan	See Toxics Reduction Plan	See Toxics Reduction Plan	ONGOING: County implements a Toxics Reduction Plan jointly with the City of Portland.	This strategy does not have a direct connection with water quality.
		Install dental amalgam separators in County dental clinics	No additional resources needed	Oregon state law	Complete by 2011	Project completion	COMPLETED: Dental clinics have been retrofitted since 2011	Mercury dental amalgam is diverted from wastewater.