BENTON COUNTY
Willamette River Basin
TMDL Implementation Plan

Submitted to:
Oregon Department of Environmental Quality
for compliance with the Willamette River Basin TMDL
March 31, 2008

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This plan was compiled by staff in the following Benton County departments and divisions: Community Development, Environmental Health, Natural Areas and Parks, and Public Works.

Benton County
TMDL Implementation Plan

Background and Implementation Plan Goals

Benton County is located in the Upper Willamette Subbasin with the County seat located in the City of Corvallis. Other cities and communities include: Adair Village, Albany, Alsea, Alpine, Bellfountain, Blodgett, Monroe, Philomath, Summit, and Wren. The County is approximately 677 square miles with more than 8,000 households served by septic systems outside the city limits. Many of these properties are located along rivers and streams

The Willamette River borders Benton County to the east from River Mile 111 to River Mile 160. The major tributaries to the Willamette River include the Long Tom River, Marys River, and Luckiamute River. Minor tributaries include Muddy Creek and Soap Creek. All the tributaries originate in the Coast Mountain Range. The Willamette River and numerous tributaries do not currently meet several water quality standards that assure beneficial uses of the rivers. When these water quality standards are not met, the federal Clean Water Act (CWA) requires that Total Maximum Daily Loads (TMDLs) be established to determine how much pollution can be added to the river without exceeding the standards.

On September 21, 2006, the Oregon Department of Environmental Quality (DEQ) issued the Willamette Basin TMDL as an Order, which was later approved by the Environmental Protection Agency (EPA). As part of the Willamette Basin TMDL, a framework was established for implementation of the TMDL. This framework, the Water Quality Management Plan (WQMP) includes activities and programs to assist DEQ and the Designated Management Agencies (DMA) in applying their regulatory authority. DEQ named Benton County, along with other cities and agencies, as a DMA which has legal authority over a sector or source contributing pollutants to the system. Since the Willamette River and several of its tributaries have been listed as water quality limited, Benton County is required to develop a TMDL Implementation Plan for review and approval by DEQ. The Benton County TMDL Implementation Plan will focus on general applications that will benefit the Upper Willamette River Subbasin which will, in turn, benefit the mainstem of the Willamette River.

TMDLs and this implementation plan are designed to help reduce pollution in the water to comply with water quality standards. In this way, designated beneficial uses such as aquatic life, drinking water supplies, and water contact recreation will be protected. When implemented successfully, the TMDL will result in a cleaner and healthier Willamette River for current and future generations.

Water Quality Assessment

The Upper Willamette Subbasin has stream segments that are listed under section 303(d) of the CWA that are exceeding water quality criteria for temperature, bacteria, dissolved oxygen, turbidity and toxics. County stormwater drains to these waterbodies as well as several wastewater and industrial users. According to the Willamette Basin TMDL, there are approximately 42 individual National Pollutant Discharge Elimination System (NPDES) permits that are issued in the Upper Willamette Subbasin. Of those, 9 of the sites are located within Benton County. Two examples of domestic permits are: the Alpine County Service District which discharges treated effluent into the Muddy Creek and the City of Philomath which discharges treated effluent into the Marys River.

TMDLs for temperature, bacteria, dissolved oxygen (DO), turbidity, and mercury have been established for several rivers and streams that are tributary to the Willamette River. Within Benton County, these parameters have been identified as water quality limiting factors in the following water bodies:

Waterbody Name	Listed River Mile	Parameter	Season
Long Tom River	0 to 24.2	*E. coli* & Fecal Coliform	Winter/Spring/Fall
Long Tom River	0 to 24.2	Temperature	Summer
Marys River	0 to 13.9	Temperature	Summer
Marys River	0 to 41.1	Dissolved Oxygen	January 1 – May 15
Muddy Creek	0 to 33.4	Temperature	Year-round (non-spawning)
Soap Creek	0 to 16.8	Dissolved Oxygen	October 1-May 31
Soap Creek	0 to 16.8	Temperature	Year-round (non-spawning)
South Fork Berry Creek	0 to 2.1	Temperature	Year-round (non-spawning)
Willamette River Mainstem	54.8 to 186.5	Dissolved Oxygen	October 15 - May 15
Willamette River Mainstem	108 to 148.8	Fecal Coliform	Winter/Spring/Fall
Willamette River Mainstem	0 to 186.5	E. coli	Winter/Spring/Fall
Willamette River Mainstem	0 to 186.4	Mercury	All Year
Willamette River Mainstem	0 to 186.5	Temperature	Year-round (non-spawning)
Willamette River Mainstem	54.8 to 186.5	Temperature	October 15 - May 15

As noted above, the main TMDL pollutant parameters identified within the Upper Willamette River Subbasin include temperature, fecal coliform, dissolved oxygen, turbidity, and mercury. However, the Dissolved Oxygen TMDL is limited to the Amazon Diversion Channel and Coyote Creek in Lane County and, at this time, does not address DO in the Marys River or Soap Creek. Also, turbidity concerns are limited to Fern Ridge Reservoir in Lane County. Therefore, concerns associated and potential sources of the remaining parameters (temperature, bacteria, and mercury) are as follows:

Temperature – warmer temperatures are likely caused by removal of shade producing vegetation along streams. At times, the Willamette River and its tributaries are too warm to support healthy salmon and trout. Elevated stream temperatures have contributed to the decline of threatened Coho, spring Chinook, and winter steelhead. Warmer water not only interferes with migration and spawning, but also makes the salmon and trout more susceptible to disease. Warm water also decreases chances of juvenile survival, affects egg and embryo development, alters juvenile fish growth rates and decreases their ability to compete for habitat and food with fish that are more tolerant of the temperature changes.

Bacteria (Fecal Coliform) – sources may include domestic animal waste, failing septic systems, and illicit discharges. People can be affected by bacteria present in the water when enjoying water activities. Ingestion or contact with water contaminated with bacteria can cause skin and respiratory ailments, vomiting and diarrhea, and other illnesses.

Mercury – sources may include erosion of soils from sites not covered by the NPDES permits and agricultural practices. Mercury is a potent toxin that can cause damage to the brain and nervous system. The primary way that humans are exposed to mercury is through the consumption of fish or seafood containing elevated levels of mercury.

The County has utilized the DEQ sample TMDL Implementation Tracking Matrix to help prioritize strategies and collect them in an easy-to-read format. Timelines for the major strategies are also included in the matrix. The matrix is attached to this plan as Appendix "A" and is included as a supplement to the text.

Management Strategies - Bacteria

Human Waste Management:

Many rivers and streams in Oregon do not meet water quality standards for various pollutants. In Benton County, bacteria (E. coli), among other pollutants, have been identified as a problem for water quality. The Water Quality Implementation Plan (WQIP) describes the actions Benton County will undertake to reduce pollution in order to restore and protect water quality in the Upper Willamette Subbasin. On-site sewage disposal systems, more commonly known as septic systems, serving rural properties can fail and contribute bacterial contamination to both ground water and surface water.

Benton County maintains a contract with the Oregon Department of Environmental Quality (ODEQ) for the management of the On-Site sewage disposal program, which regulates the installation of septic systems in order to protect water quality throughout the county. All residents in the rural portion of Benton County, including the urban growth fringe, are served by individual, privately owned septic systems. These systems are regulated under Oregon Administrative Rules (OAR) 340-71 and 73.

Benton County maintains a staff of Registered Environmental Health Specialists that evaluate both residential and commercial properties and issue permits for new installations, repairs, and alterations. They issue Authorization Notices to place into service, reconnect to, change the use of, and increase the projected daily sewage flow into existing on-site systems and issue Existing System Evaluation Reports. They also respond to sewage complaints made by the public.

According to Chapter 10 in the Willamette Basin TMDL, the numeric criteria for organisms of the E. coli group commonly associated with fecal sources in freshwaters or estuarine waters other than shellfish growing areas shall not exceed the following:

A) A 30-day log mean of **126 E. coli organisms per 100 ml**, based on a minimum of five samples

B) No single sample shall exceed **406 E. coli organisms per 100 ml**

E. coli data collected by ODEQ along the Willamette River in Benton County has met the E. coli criterion during the summer months (June 1 – September 30). Moreover, samples collected by ODEQ during the fall, winter, and spring (October 1 – May 31) have also met the E. coli criterion. This section of the Willamette River has been found to be in compliance most of the time, where violations are rare and only modestly exceed the single sample violation (See Figures 2.2, & 2.3).

Figure 2.2 Distribution of *E. coli* Data at Willamette River Stations during Summer from 1996-2003 (ODEQ data). Number of Samples in (parentheses).

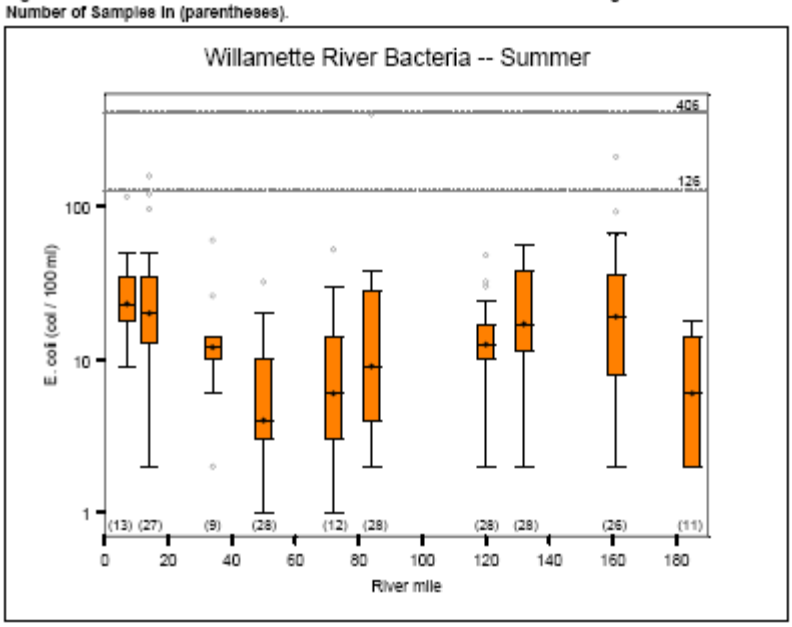
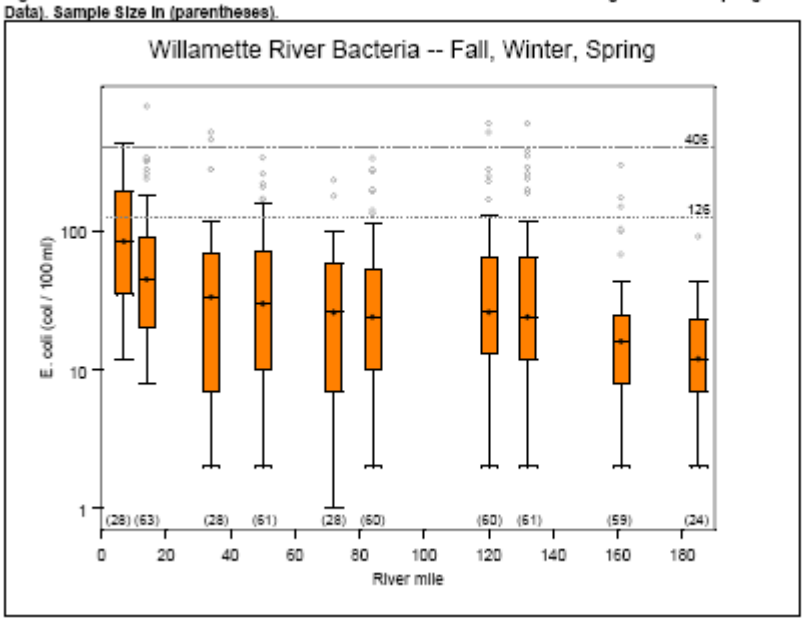
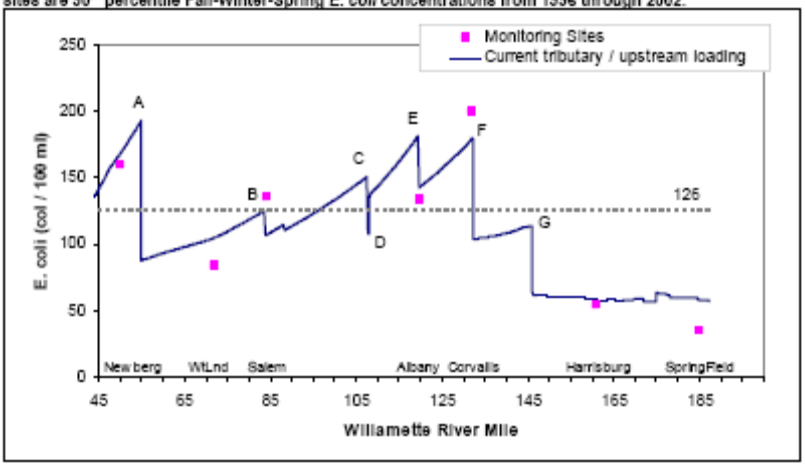


Figure 2.3 Distribution of E. coli Data at Willamette River Stations during Fall-Winter-Spring from 1996-2003 (ODEQ Data). Sample Size in (parentheses).



However, tributaries to the Willamette River, including the Marys and arguably the Long Tom Rivers, often exceed the E. coli criteria during the fall, winter, and spring (See Figure 2.7).

Figure 2.7 *E. coli* concentrations during reasonable worst case scenario under current conditions above RM 45. Tributary confluences / sources: A. Yamhill River, B. City of Salem WWTP and Mill Creek, C. Lucklamute River, D. Santiam River, E. Calapooia River, F. City of Corvallis WWTP and Mary's River, and G. Long Tom River. Values plotted at monitoring sites are 90th percentile Fall-Winter-Spring *E. coli* concentrations from 1996 through 2002.



Benton County maintains the on-site sewage disposal program to protect these rivers from contamination by ensuring that the septic systems will function properly and not release unsafe levels of bacteria. The sanitarian will evaluate properties to assure the proper siting, installation, and use of on-site sewage disposal systems and respond to violations through enforcement of appropriate state regulations and local ordinances.

Properties are evaluated for soil textures, depth to water tables, slopes, setbacks, etc. to determine what type(s) of septic system can be installed on the property. The evaluation will also identify the type of water table. Seasonal water tables are found in upland areas and will generally dry out in the summer. Permanent water tables are found in low lying areas often along rivers and streams and other bodies of water. These water tables exist year round and are more sensitive to contamination from septic systems.

Two general categories of septic systems include standard systems and alternative systems. Standard systems are less protective of the groundwater table while alternative systems are more protective. Alternative systems are typically used in areas of high groundwater or poorly drained soils and often require pretreatment and disinfection of the effluent. Under certain conditions, standard and alternative systems can be used or are required in areas of both permanent and seasonal water tables. Some sites are not approvable for any type of system and therefore must be denied. If a site is denied, the property owner is given the option to apply for a variance through the ODEQ. This requires a $1300 application fee and typically involves a consultant and a public hearing. This does not guarantee automatic approval of the site as the State Variance Officer will either grant or deny the variance.

There are several problem areas in the county where older septic systems are suspected of contributing to groundwater pollution. These areas are identified in the Environmental Assessment Priority List (EAPL) maintained by Benton County. While the EAPL

identifies multiple environmental health issues such as sewage, drinking water, hazardous waste, etc, the following table identifies areas potentially impacted by septic systems:

Benton County EAPL

RANKING	AREA DESCRIPTION	STATUS
#1	South Third Street	Corrected - Sewer
#2	Whitson Acres	No current action
#3	SW Corvallis Urban Growth Boundary	No current action
#4	North Albany	No current action
#5	Philomath Northern UGB	No current action
#6	Pioneer Village	No current action
#7	Fairplay Area	No current action
#8	Firview Subdivision	No current action

Note: Refer to Benton County Health Department, Environmental Assessment Priority List 2002 for further details.

Benton County Environmental Health has concerns about the potential adverse affects to groundwater in areas identified in the EAPL due to older systems that were installed prior to DEQ rule implementation in 1974. There is also a concern for systems installed after 1974 that were not properly "sited" and/or are not functioning properly in these areas. A map showing the sites noted on the EAPL is included in this document as Appendix "B."

Specific action items regarding Human Waste Management are included in the Bacteria Action Summary on Page 13 of this document.

Storm Water Management:

Benton County's storm water drainage system is predominantly a ditch and culvert network that drains to one of four watersheds contained (or partially contained) within the boundaries of the County. These four watersheds are the Alsea, the Luckiamute, the Marys and the Long Tom. There are isolated storm drainage systems in various rural subdivisions that are equipped with traditional urban storm systems (curb, gutter, storm drain inlets, manholes, underground piping and protected outfalls) but they are few and far between. Most of the systems are relatively modern (built within the last 10 years) and careful attention was given to the design review and construction of the proposed systems with special attention given to the outfalls and the routing of storm water to seasonal streams and ditches. The County's ditch drainage system is cleared in the early summer on a five-year rotating schedule. This schedule allows for regeneration of vegetative cover prior to fall rains and rotates the work in such a manner that nearly all of the County's ditches at any given time are sufficiently vegetated to act as filtration swales. The County specifically does not wish to permanently remove vegetation that acts both as a velocity and pollutant reduction mechanism.

The County storm system in general does not have any piped direct outfalls to the main stems of the watersheds noted above. Drainage from the rural areas of the County are

directed through ditches and seasonal streams to larger creeks and streams and finally to their confluences with the four major tributaries to the Willamette. There are no known cross-connections in the system to present an opportunity for bacterial contamination of the stormwater. Ditches are maintained seasonally with special attention given to managing ditches and waterways so that there will not be an increase in sedimentation or introduction of pollutants to the waters of the State.

Benton County has an on-going and extensive Fish Passage Restoration Program (FPRP) that is currently in its ninth year. This program shares information and resources with Benton Soil and Water Conservation District (BSWCD) and the local watershed councils to identify multiple series of projects on a sub-watershed basis. Fish restoration projects invariably include riparian restoration and enhancement and usually the removal of invasive species. The restorative riparian efforts act as further erosion control and de-facto water quality elements.

Benton County also employs a routine culvert and ditch maintenance program that involves silt removal and preservation of native and endangered plant species.

The bulk of the County's efforts on stormwater management will be focused on implementation of the Storm Water Management Plan (SWMP) for the Corvallis Urbanized Area Benton County was previously named in control of a Municipal Separate Storm Sewer System (MS4) and in an effort to meet the requirements of the National Pollutant Discharge Elimination System (NPDES) Storm Water Phase II (Phase II) program the County recently completed a Stormwater Management Program (SWMP) for the Corvallis Urbanized Area. This SWMP is covered under NPDES Permit No. 102912 and is attached as Appendix "C" to this Implementation Plan. Although the SWMP does not apply to the entire County, there are several strategies that will be useful in the TMDL Implementation Plan. The County will consider expanding some elements of the SWMP beyond the Corvallis Urbanized Area to the county as a whole.

As a part of the SWMP and this Implementation Plan, the County will be revising and updating the Benton County Comprehensive Plan and Development Code. The modifications to the Comprehensive Plan and Development Code would address the issues governing best management practices (BMPs) that would consequently address issues raised by the TMDL implementation. It is Benton County's intent to combine the compliance efforts for both the Phase II and TMDL implementation in order to conserve resources and avoid duplication of public outreach efforts. Benton County will be working closely with BSWCD and the watershed councils for each of the rivers noted above. Benton County has worked with BSWCD to prepare an application for a 319 Grant for Elimination of Non-point Source Pollution. Should BSWCD obtain the grant, an agreement has been reached to share data and include results in Benton County's implementation plan. The County has also involved members of the Benton County Environmental Issues Advisory Committee, the Oregon Department of Fish and Wildlife, local municipal government, local education districts, local irrigation districts and Oregon State University to participate in outreach, monitoring and riparian enhancement efforts.

These agencies and organizations will provide invaluable help especially in areas where Benton County has no jurisdiction.

The County is also working with our local partners to utilize existing water quality monitoring efforts. For instance, the BSWCD, the City of Corvallis, and the Willamette Riverkeepers are groups that are either providing their own monitoring or know other groups that are recording bacteria levels in the Willamette River and its tributaries. The County does not have the resources or personnel adequate to provide monitoring of the listed waterbodies, therefore we are proposing to utilize existing programs and we are currently exploring options for partnerships. There may also be the opportunity to apply for funding with these groups to expand the monitoring program in the future.

Educational Opportunities:

Benton County currently distributes three primary brochures related to water quality: one contains general information regarding a number of topics regarding rural residential development and property maintenance with an eye to protecting water quality and environmental quality. The other two brochures (one geared to the general home owner and the other to developers) specifically address how to protect streams. The County is looking into expanding the educational materials available to the general public in the following ways:

Livestock
Fecal matter from livestock can wash into streams and cause bacterial pollution. Therefore, with every building permit associated with livestock, Benton County will distribute a fact sheet with BMPs and websites to help livestock owners manage their land and animals to reduce and prevent fecal pollution. For an example, manure stored within 200 feet of a stream should be covered from rain between October and April, and manure should not be stored closer than 50 feet from a stream. Other BMPs are contained as requirements within the King County (Washington) Livestock Management Ordinance (http://www.kingcd.org/pro_far_lmo_sum.htm). This information will also be available at the Planning Division's customer service counter.

Benton County Parks Department
Dog waste can account for up to 15% of fecal bacteria in some Oregon streams.* Encouraging park visitors to pick up after their dogs and toss the waste in the garbage can reduce fecal pollution in streams. Providing bags and garbage cans in heavily used parks makes the task more convenient for dog owners and reduces excuses.
(*http://www.oeconline.org/rivers/stormwater/2prongedsolution/document_view)

The Benton County Parks Department has signs at park kiosks encouraging visitors to scoop after their dogs. Three parks currently have stations providing bags, and more are planned. Additionally, Beazell Memorial Forest has a kiosk that will soon have a brochure about the impact of dog manure on stream habitat. The Parks Department is also using signs to discourage horses from being ridden in Beazell Memorial Forest.

Dog Kennels
Commercial dog kennels are currently allowed as a home occupation in all zones. They can be authorized as stand-alone operations (i.e., not in conjunction with a dwelling) in the resource zones through a conditional use review. Although kennel operators are supposed to obtain approval from Benton County Environmental Health Department for their plan for dealing with animal waste, there is no procedure in place to ensure this approval is obtained, nor that the plans are implemented. Also, although the code specifies setbacks from property lines for the kennel and impoundment area, no setbacks are specified from streams. Benton County Planning Division will address these two issues by seeking to change the dog kennel code to ensure stream water quality is protected. Also, planning staff will give a BMP fact sheet to commercial dog kennel operators who visit the office. Hobby kennel operators are supposed to operate under the same kennel standards (including sanitary waste disposal) as commercial kennel operators, however they are not required to obtain a permit. Nonetheless, when planning staff hears of hobby kennels, planning staff can give the dog owners a BMP fact sheet.

Benton County Website and Violation Phone Number
Benton County will create a stormwater page on its website that contains BMP fact sheets for various situations and has links to water quality websites. Since the public is "eyes on the ground" and is aware of many stormwater issues that the County is unable to observe, a phone number will be listed on the website and on the fact sheets created by Benton County for concerned citizens to call with questions and to report stream pollution issues. This is in accordance with the County's Phase II SWMP and the establishment of a "Point of Contact" for all stormwater quality questions and concerns.

If the public observes a problem with soil erosion, animal waste management, pesticide/fertilizer management, or damage to stream areas that falls under the jurisdiction of the Oregon Department of Agriculture (ODA)*, then the County will inform them of the need to submit the information required on the "Agricultural Water Quality Complaint" form so ODA can work on resolving the issue. The County will also keep on hand an ODA brochure that explains how agricultural producers can protect water quality. (* Any area greater than ¼ acre in agricultural use is regulated by the Oregon Department of Agriculture).

Farming Conference
Every year a "Small Farms and Farm Direct Marketing Conference" is coordinated by the Oregon State University Extension Small Farms Program and held in Corvallis. Benton County will look into the possibility of having stream protection brochures and BMP fact sheets available at this event.

Planning:

Population Growth as a Factor
As a rural jurisdiction overseeing land use in unincorporated areas, Benton County's role under the statewide planning program is not to accommodate growth but rather to preserve the resource land base and allow development within urban growth boundaries (UGBs) and rural exception areas. Within UGBs, growth potential is limited by large parcel sizes and clustering requirements designed to preserve the majority of a given property for urban density development at the time the property annexes to the city and municipal sewer and water services are provided. Development is limited in rural exception areas by the facts that there is a limited supply of vacant lands, and re-zoning to create new exception areas is approved in only a small number of cases. Scattered development of individual houses on resource lands occurs, but is very limited due to state-mandated land use regulations.

Given those limitations, development does occur at a gradual pace within the County's jurisdiction. The greatest impact of development on bacteria in Benton County waterways is likely through failure of existing septic systems rather than through growth pressure on the carrying capacity of the land to process additional sewage. Current on-site sanitation regulations establish a high level of safety for new development.

Other Factors
Management and improvement of mitigative or correlative factors will be beneficial in reducing bacteria in waterways. Better preservation of riparian corridors along waterways will enable better filtering of bacteria and other pollutants before they reach the stream. Increasing dry-season streamflows will reduce the concentration of pollutants. Managing and developing strategies from a watershed perspective will enable better understanding of problems and better ability to formulate solutions.

These perspectives were incorporated into Benton County's new Comprehensive Plan, which was adopted and went into effect in March 2007. The plan includes a number of new policies relating to water quality. One of the major projects called for in the Comprehensive Plan is development of improved county-wide riparian protections. The County will endeavor to implement the following Comprehensive Plan policies through the Stormwater Management Plan, development of a riparian protection program, updates to the Development Code, and other efforts. See the attached Implementation Matrix for details.

Benton County Comprehensive Plan
Goal 5 -- Natural Resources, Scenic & Historic Areas, Open Spaces

5.2 Rivers and Waterways

5.2.1 Benton County shall work with landowners, state and federal agencies, and non-profit organizations along rivers and waterways to support efforts to restore natural functions, improve public access and improve fish habitat.

5.6 Riparian Resources and Fish Habitat

5.6.1 Benton County shall undertake the Goal 5 process and adopt a protection program for significant riparian areas within 18 months of adoption of the Plan amendments.

5.6.3 Benton County shall require land development and transportation projects to be designed to minimize incursions and other impacts to floodplains, wetlands, and riparian areas. When no reasonable option exists, roads, bridges, and access ways may be allowed, provided fish passage is assured, channel capacity is maintained, and removal of riparian vegetation is minimized.

5.6.4 Benton County shall use Best Management Practices in County-owned riparian areas and along public rights of way to protect native vegetation and natural functions.

5.6.5 Benton County shall provide educational information regarding the importance and protection of riparian areas and water bodies, the existence of county and state regulations concerning these areas, and where feasible shall develop incentives to encourage preservation and/or restoration of these resources.

5.6.6 Benton County shall encourage landowners to maintain and enhance native vegetation and remove invasive species growing along the banks of surface water areas (streams, creeks, lakes, sloughs, and marshes) with incentives such as the Wildlife Habitat Conservation and Management Program (OAR 635-430).

5.6.7 Benton County's riparian planning process shall place particular emphasis on identifying and protecting headwater areas from adverse impacts of development.

5.7 Wetlands

5.7.1 Benton County shall protect wetlands that have been identified as significant pursuant to the Goal 5 process, utilizing federal and state inventories and other available information.

5.7.2 Benton County shall utilize federal, state, and local inventories and other available information to determine if a proposed development is located in a wetland. The Division of State Lands will be notified when development is proposed in wetland areas.

5.7.3 Benton County shall recognize Jackson-Frazier Wetland (JFW) as a unique wetland prairie by implementing the JFW Management Plan, and collaborating with the City of Corvallis, Greenbelt Land Trust, Good Samaritan Hospital, and

adjacent property owners to achieve a watershed approach to wetland management in the basin.

5.7.4 Benton County shall work with others to conserve and protect natural functions of the county's most important wetland habitats.

Goal 6 – Air, Water and Land Resource Quality
6.2 Water Resources

6.2.1 Benton County shall encourage collaborative efforts involving state agencies, municipalities, users of surface waters and environmental interests, to preserve and enhance surface water quantity during low-water periods.

6.2.2 Benton County shall incorporate vulnerability assessments and source protection for the public's water supply as part of the land use process. The source of such assessments and information shall be state agencies and other qualified entities.

6.2.4 Benton County shall place a high priority on maintaining natural systems and processes as a biological method for maintaining and protecting clean water.

6.2.5 Benton County shall collaborate with others to promote watershed management practices that protect and enhance water quality and quantity.

6.2.6 Benton County shall require development to be designed or located in a manner that will result in no net degradation of water quality and quantity.

6.2.8 Benton County shall encourage protection of water quality by developing a septic management system to monitor existing systems and by working with DEQ, municipalities, and others to identify point and non-point sources of pollution and encourage effective abatement.

6.2.10 Water resources shall be managed wherever possible on a watershed or landscape scale to assure continuity and integrity of practices to the waterway.

6.4 Subsurface Sewage Disposal Systems

6.4.1 Benton County shall maintain standards for the siting of septic systems and promote proper use and maintenance through education and enforcement.

6.4.3 Benton County shall work with county neighborhood groups, municipalities, and central water and sewer system providers to correct area wide health hazards caused by multiple septic system failures.

6.4.4 Benton County shall perform sanitary surveys and prioritize problem areas, as needed.

Bacteria Action Summary:

As stated previously, the County has summarized the management strategies in the tracking matrix attached as Appendix "A" to this plan. Timelines and proposed funding strategies are outlined in the matrix, therefore the reader should reference the appendix while reviewing the actions summarized below:

Human Waste Management:

- Maintain standards for proper siting
- Educate property owners on proper use and maintenance
- Enforce against failing, improperly used or un-maintained systems
- Correct area-wide failures collaboratively with neighborhood groups, municipalities, and water and sewer system providers
- Perform sanitary surveys and prioritize problem areas, as needed
- Seek funding to initiate testing of older septic systems near streams and support or serve as partner in resulting septic upgrade projects

Stormwater Management:

- Implement the NPDES Phase II Stormwater Management Program
- Continue practicing BMPs in maintenance efforts
- Seek funding to assist in monitoring efforts

Educational Opportunities

- Produce additional brochures and information for the general public
- Seek funding for mass production of brochures and leaflets
- Actively pursue new opportunities for public education

Planning

- Continue to implement current Comprehensive Plan
- Coordinate revisions to Comprehensive Plan and Development Code in concert with the SWMP and the TMDL Implementation Plan

Management Strategies - Mercury

Sources of Mercury:

High mercury levels render many of the fish from the Willamette Valley's waterways unsafe to eat. Mercury is a naturally occurring element in Benton County's soils. Coal and other fossil fuels also contain mercury, which is released into the atmosphere when the fuels burn. The mercury in the air eventually falls to land, and is washed into streams along with the mercury naturally occurring in the soil. DEQ studies indicate that approximately 48% of the mercury in our waterways is due to erosion of native soils, and approximately 42% is due to airborne mercury from burning fossil fuels (both domestic and foreign) falling to the ground. To reduce the amount of mercury found in Benton County's waterways, soil erosion should be minimized and less fossil fuels should be burned.

Currently, there are no known direct sources of mercury contamination within Benton County's jurisdiction. One of the actions that the County and its partner agencies and organizations propose to accomplish is mapping of possible point sources of mercury contamination that fall within the County's jurisdiction. The County recognizes that there are numerous potential direct and non-point sources of mercury but nearly all of the recognized sources fall under the authority of other jurisdictions and agencies. These sources are noted below, followed by the County's strategy for addressing non-point sources within our jurisdiction.

There are no **dental offices** outside of the City limits of Corvallis, North Albany, Philomath or Monroe. The remaining population centers (Adair Village, Alpine, Alsea, Bellfountain, Blodgett, Summit and Wren) have no dental offices. Therefore there are no dental offices that fall within Benton County's jurisdiction.

There are several large **commercial gravel pits** in Benton County that are privately owned and operated. In addition, there are numerous smaller pits owned and operated by Federal and State agencies. Gravel pits are a recognized source of mercury. However, environmental regulation of gravel pits fall under the jurisdictional authority of the Department of Geology and Mineral Industries (DOGAMI) and the Department of Environmental Quality (DEQ) through the NPDES-A and NPDES-1000 Programs. Benton County has land use authority over siting of new gravel pits; however, regulation of environmental impact and reclamation fall outside Benton County's jurisdiction.

There are seven **waste water treatment plants** within the boundaries of Benton County. Four of these facilities are publicly operated within the Cities of Monroe, Philomath, Adair Village and Corvallis. Two of the facilities are operated by Benton County for the communities of Alpine and Alsea and one is a privately owned treatment facility. Waste water treatment plants are a recognized source of mercury. Each of these facilities is regulated by the DEQ and therefore these facilities fall outside Benton County jurisdiction.

Examples of other point sources of mercury deposition that fall outside Benton County's jurisdiction are the Corvallis Municipal Airport, Coffin Butte Landfill, the City of Albany and the City of Corvallis storm water systems, and junkyards located within the city limits of Corvallis, Monroe & Philomath.

It is likely that the single largest mercury source in Benton County is agricultural cultivation. All agricultural activities are governed by the Oregon Department of Agriculture (ODA) and therefore these activities fall outside Benton County jurisdiction.

Although the principal sources of mercury in Benton County come from sources outside its jurisdiction there are measures that will be taken to ensure reductions in releases and an increase in public awareness. New erosion control regulations will reduce disturbed ground from leaching mercury from natural soil depositions or from surface depositions that are the result of airborne mercury contamination. The County will work with associated agencies, the local garbage hauler, and the public to raise awareness of the sources of mercury in everyday products and guide the public to use proper disposal techniques.

Mercury Source Reduction:

Planning

Benton County will propose amendments to the County's Comprehensive Plan and Development Code to address erosion control. Benton County's own operations currently employ erosion and sediment control practices that comply with the Oregon Department of Transportation (ODOT) Hydraulics Manual Volume II (most recent edition). Key personnel in the road maintenance department and Engineering Department are certified by ODOT as erosion control designers and inspectors. The ODOT standard is also required of any development within Benton County jurisdiction that will disturb one acre or more of native soil, through the requirements for NPDES 1200C Permits for private development. Currently, Benton County will not issue approval for building permits or development plans, or allow clearing or excavation of any type, until a 1200C permit is approved by DEQ and the erosion control plan has been thoroughly reviewed by Benton County Engineering staff. It is the County's intent to request to become an agent for the 1200C program, for some or all of the County, as part of the Phase II implementation process.

The proposed modifications to the County's Comprehensive Plan and Development Code will also address construction that disturbs less than one acre of native soil. At this point, erosion control during construction on these sites is under development. It is likely that erosion control for this type of project will be determined on a case by case basis, driven by site conditions (including slope), proximity to waterways, intended use and future landscaping. In addition to erosion control during construction, in both instances (greater than and less than one acre of disturbance) future applicants/developers will be required to provide a Post-construction Stormwater Management Plan to ensure that post-construction runoff does not adversely affect water quality downstream. In accordance

with the SWMP, these requirements will be included in changes to the Comprehensive Plan and Development Code.

Benton County Parks Department
Trees and other vegetation capture and hold rainfall in leaves and branches, which slows runoff and decreases stormwater volume, both of which reduce soil erosion. Planting trees and shrubs and protecting existing trees and shrubs can reduce stormwater runoff. When the Parks Department removes trees from parks, Parks uses selective thinning to avoid leaving a large area of bare soil. Also, when Parks logs next to streams, Parks leaves a riparian buffer next to the stream that is larger than required by Forest Practices Act. To reduce erosion and stream sedimentation in mini-landslide areas, Parks plants native trees and shrubs. Parks also attempts to reduce in-stream soil erosion by leaving trees that have fallen in the stream, which reduces the erosive energy of streams, creates pool habitat, and facilitates sediment sorting. If Parks had more funding, Parks could increase or enhance side channels, which would reduce the erosion caused by high flow events.

Livestock Erosion
Some livestock owners allow their livestock to trample the ground to mud, which washes into streams. Therefore, with every building permit associated with livestock, Benton County will distribute a fact sheet with BMPs and websites to help livestock owners manage their land and animals to reduce soil erosion into streams. These will contain simple tips, such as wintering livestock in well drained areas away from streams, fencing streams to prevent livestock from trampling the banks, directing gutters and drains away from the livestock use areas, and rotating pastures. This information will also be available at the Planning Division's customer service counter and on the website.

Additionally, Benton County Community Development will look into developing code language to help protect streams from negative impacts from livestock.

Oregon State University Extension Service Small Farms Program distributes a free online newsletter, "Oregon Small Farm News," that concentrates on both commercial small farm entrepreneurs as well as non-commercial small acreage landowners. The Spring 2008 issue had an article alerting area livestock owners as to BMPs for mud management and reducing soil erosion. Benton County will also contact OSU Extension about continuing to include riparian protection information.

Roads and Stormwater
Benton County maintains approximately 275 miles of paved road and 185 miles of gravel road. In addition the system includes 104 bridges and approximately 65 culverts with a five foot diameter or greater. There are approximately 5970 approach culverts with diameters of five feet or less. As noted above, Benton County road maintenance practices mirror those of the ODOT Erosion & Sediment Control Manual (ESCM). In addition, Benton County generally adheres to the ODOT Road Maintenance Practices and Environmental Performance Standards, and in many cases exceed the requirements of their BMPs. Periodic evaluation is completed as new technology is identified. Many

types of erosion control measures are implemented during activities that have the potential for sediment loading of streams or ditches.

It is Benton County's goal to pave as many gravel roads as is fiscally possible. This goal reduces sediment transport to waterways. However, due to lack of funding and continuing budget shortfalls this effort has slowed in recent years. Between 2003 and 2005 approximately 5.8 miles of gravel road have been paved or oil matted. There is significant experimental evidence that gravel roads function as impermeable surfaces. Gravel roads are designed to shed water, not absorb it. Gravel roads do carry and emit an enormous quantity of fine material into the atmosphere and waterways. It has been proven that paved roads deliver fewer fine silts and contaminants to waterways than gravel roads. In addition, gravel roads tend to damage roadside vegetation by delivering repeated coatings of fine materials to leaves and branches. As a result, the goal of paving as many gravel roads as possible is desirable. Currently, the County is experimenting with dust suppression palliatives on several of our gravel roads to reduce airborne dust and sediment runoff. These applications serve a dual purpose, in that they also strengthen the road base and prepare the surface for future paving in addition to reducing erosion. These programs also discourage the age-old and environmentally damaging practice of using engine waste oil as a dust suppressant which is still employed by many agricultural enterprises.

Over the past 5 years Benton County has increased the number of cross culverts and replaced undersized culverts within its conveyance system. This reduces the potential for failure of the system during peak flows. During times of high water, undersized or overburdened systems will contribute to soil erosion around culvert inlets and adjoining property. Increasing the size of culverts reduces velocity of water through the system and allows sediment to naturally settle out of the water and deposit into the bottom of the ditches. Several different techniques are used to remove sediment from the ditch bottom on a seven to ten year cycle. This removal takes place during the dryer seasons (late Spring, early Summer) and allows for a regrowth period prior to the onset of significant rainfall.

As noted above, our ditch maintenance practices are designed to result in a minimum of sediment transport. During the wet weather months the ditches are thoroughly vegetated and act as biofiltration swales prior to discharge to local waterways. Benton County also plans to work with the Oregon State University Extension Service and The Benton Soil and Water Conservation District to perform outreach to local land owners to establish vegetated buffer zones and enhanced riparian zones between fields and ditch edges to reduce the transport of naturally occurring mercury from entering ditches and seasonal streams. This outreach program will also bring BMPs to the attention of local land owners who may not be aware of the effects of their farming or land management practices.

Reduction of Fossil Fuel Combustion

Mercury is found in trees grown in mercury rich soils, coal, natural gas, diesel, and heating oil. According to DEQ's Fact Sheet on mercury, almost half of the mercury in

the Willamette Valley's waterways comes from burning these fuels. Therefore, successful efforts in reducing the use of these fuels will improve water quality.

In the waiting room area next to the building permit information, Benton County will provide a fact sheet on proper building insulation in an effort to reduce the amount of fossil fuels burned for heating.

Recycling
Fluorescent light bulbs, computers, computer monitors, batteries, and televisions may contain mercury. As of February of 2008, the local garbage hauler currently accepts compact fluorescent light bulbs, batteries, computers, and monitors seven days a week. Televisions are accepted five times a year with a $10 fee. Fluorescent light tubes are accepted four times a year. The above acceptance policies are subject to change, therefore Benton County will have an up-to-date fact sheet with this information available on the County website, as well as a web link to the local garbage hauler's recycling program. Staff will ask the Solid Waste Advisory Council to look into promoting recycling events.

Benton County Website and Violation Phone Number
The Benton County website and "Point of Contact" program will also have information about mercury reduction.

Mercury Action Summary:

As stated previously, the County has summarized the management strategies in the tracking matrix attached as Appendix "A" to this plan. Timelines and proposed funding strategies are outlined in the matrix, therefore the reader should reference the appendix while reviewing the actions summarized below:

Planning
- Continue to implement current Comprehensive Plan
- Coordinate revisions to Comprehensive Plan and Development Code in concert with the SWMP and the TMDL Implementation Plan

Educational Opportunities
- Produce additional brochures and information for the general public
- Seek funding for mass production of brochures and leaflets
- Actively pursue new opportunities for public education
- Coordinate with local partners to teach private property owners about erosion control and mercury sources

County Maintenance Activities
- Continue practicing BMPs in maintenance efforts
- Keep County staff certifications current in Erosion and Sediment Control practices
- Seek funding to assist in channel enhancement projects (County Parks)

Management Strategies – Temperature

The major contributors to increased stream temperatures are point-source thermal inputs and solar radiation. Point sources are regulated directly by Oregon DEQ and are not part of Benton County's jurisdiction. Solar radiation is directly affected by the amount of shade created by trees and other tall vegetation next to streams. In addition to mitigating temperature impacts, such vegetation also provides wildlife habitat, improves aesthetics, and increases property values. Therefore, planting trees and protecting existing trees is beneficial in many ways.

Planning
Current Benton County regulations protect riparian vegetation within the Corvallis UGB. Elsewhere in the County's jurisdiction, setbacks are required to keep structures at least 25 feet from small streams and 50 feet from large streams but there is no restriction on vegetation removal.

As discussed in the Bacteria section above, policies in Section 5.6 of the new Benton County Comprehensive Plan direct the County to develop riparian protection provisions in the Development Code and undertake other efforts to improve riparian conditions in the county. Specifically, planning for riparian corridor protection under Statewide Planning Goal 5 is anticipated to begin in mid-2008.

Benton County Parks Department
When Parks must remove trees, Parks leaves a riparian buffer next to the stream that is larger than required by Forest Practices Act. Although parks in Benton County contain streams that would benefit from riparian enhancement, the main reason for Parks planting trees along stream banks is to reduce sedimentation, not to reduce water temperature. There are many things Parks must accomplish, and reducing water temperature has not been at the forefront. However, recently the Benton County Board of Commissioners directed Parks to make temperature reduction a goal.

Parks has received a few grants to remove invasive plants and plant native plants, but not specifically in stream areas. There are *opportunities* to plant more trees along streams in Salmonberry, Mill Creek, and Fitton Green, however funding and prioritizing would need to occur.

Parks is not currently collaborating with watershed councils and other related groups to carry out enhancement activities. Parks is open to collaboration, especially if such groups would provide volunteers and financial assistance, however financial constraints prevents Parks from actively seeking out streamside collaboration opportunities.

Benton Soil and Water Conservation District
The Benton Soil and Water Conservation District (BSWCD) is currently collaborating with landowners to plant trees along streams, and is in a prime position to analyze the best areas to plant trees for shading and cooling. However, money given to BSWCD

from *Public Works* (recently $5,000) can be used only if the action directly relates to *road systems*. For example, the County contributes funds toward revegetation in association with the Fish Passage culvert replacement program. However, general planting along streams for the purpose of shading to reduce temperature is not possible using road fund dollars. If Benton County contributed money from the *general fund* to BSWCD, the County could request BSWCD to prioritize areas that would also greatly benefit from temperature reduction. Nonetheless, the trees do help reduce erosion of riparian soils into the streams, which reduces mercury contamination.

Right now most landowners contacting BSWCD hear about BSWCD's riparian restoration efforts through word of mouth; however BSWCD has recently been approved for a grant that (within a few years) will allow them to actively seek out participants. For now, BSWCD would like the Benton County website to mention the BSWCD program and contain a link to the BSWCD website.

Anybody in the community can purchase native trees, shrubs, and forbs at low prices during BSWCD's annual native plant sale. Benton County helped publicize this event in 2008. Benton County can continue to encourage stream shading in this manner.

Oregon Watershed Enhancement Board (OWEB) - Funded Collaboration
Benton County Public Works, in cooperation with BSWCD, local watershed councils, and Oregon Department of Fish and Wildlife, work together each year to identify and replace culverts that pose as fish passage barriers. Additionally, some projects have also included large stream restoration. Trees, shrubs and grasses have been planted to reduce stream temperature, minimize future erosion and improve wildlife habitat. Continued success of this program is dependent on funding received through Oregon Watershed Enhancement Board (OWEB).

Benton County Website
The Benton County website will contain information regarding the importance of natural shading of streams and the impact of temperature on wildlife in the streams.

Studies have shown that groundwater flowing into streambeds (hyporheic flow) often reduces the stream water temperature. Therefore, the County website will also contain information about methods of conserving water, to reduce the amount of groundwater pumped, to allow more groundwater to flow into and cool streams.

Temperature Action Summary:

As stated previously, the County has summarized the management strategies in the tracking matrix attached as Appendix "A" to this plan. Timelines and proposed funding strategies are outlined in the matrix, therefore the reader should reference the appendix while reviewing the actions summarized below:

Planning

- Continue to implement current Comprehensive Plan

- Coordinate revisions to Comprehensive Plan and Development Code in concert with the SWMP and the TMDL Implementation Plan

Educational Opportunities

- Produce additional brochures and information for the general public
- Seek funding for mass production of brochures and leaflets
- Actively pursue new opportunities for public education
- Coordinate with local partners to teach private property owners about temperature and shading streams

County Maintenance Activities

- Continue practicing BMPs in maintenance efforts
- Seek funding to assist in channel enhancement projects (County Parks)
- Continue to coordinate with local partners to pursue funding opportunities on joint public/private projects

Performance Monitoring

Implementation Monitoring
Benton County will provide a description of the progress of the management strategies as they are outlined in this TMDL Implementation Plan. It is anticipated that the status of the strategies will be included as a part of the yearly reporting requirements attached in the TMDL Implementation Tracking Matrix for Benton County.

Effectiveness Monitoring
As Benton County does not have the resources to test water quality, we will work with our local partners to utilize existing water quality monitoring efforts to determine if the strategies outlined in the TMDL Implementation Plan are effectively reducing the pollutants in the Willamette River and its tributaries in the Upper Willamette Subbasin. On an annual basis, the County will consult with DEQ, Oregon Department of Fish and Wildlife, BSWCD, local watershed councils, and the Willamette Riverkeepers to determine if there is any measurable improvement in water quality. As noted previously, the County is already meeting several times a year with these local groups and it will be relatively easy to coordinate an annual TMDL meeting.

Plan Review, Revision, and Reporting Requirements

Benton County will track the TMDL Implementation Strategies outlined above on an annual basis and will report to DEQ on progress and accomplishments by November 1st of each year. The County will also update the TMDL Implementation Tracking Matrix and submit it to the DEQ for review as a part of this annual report.

Once every five years, Benton County will review this TMDL Implementation Plan, existing water quality data, and other information to evaluate the effectiveness of the Plan in meeting the pollution reduction goals. The report will describe the source(s) of the information, related findings, and the basis for the measure of effectiveness. If the evaluation demonstrates that the Plan does not appear adequate to reduce pollutants in the Willamette River and its tributaries, the County will describe how the Plan will be modified, what new actions may be taken, and establish a timeline for completing the revisions. The next scheduled update to the TMDL Implementation Plan is due in 2013.

In addition, Benton County will review and revise the Implementation Plan as needed following DEQ reevaluation of the TMDL for the mainstem of the Willamette River and the Upper Willamette Subbasin.

From time to time, it may become necessary to modify portions of the plan to reflect improved knowledge, changing conditions, fiscal limitations, and so on. At such times, Benton County will coordinate with DEQ to ensure the plan remains workable and meets the goal of contributing to improved water quality.

Evidence of Compliance with Land Use Requirements

All of the strategies outlined in this TMDL Implementation Plan and listed in the Implementation Tracking Matrix are consistent with Benton County's land use plans. Benton County will evaluate and maintain consistency with local and statewide land use laws in any future actions related to TMDL implementation.

Additional Requirements

Stormwater Management to Control Bacteria and Mercury
Benton County is currently covered by an MS4 NPDES permit (No. 102912) for the Corvallis Urbanized Area. The associated Stormwater Management Program (SWMP) is included as Attachment "B" to this TMDL Implementation Plan. The SWMP specifically addresses those concerns outlined in Part 2 of the Water Quality Management Plan (Chapter 14) of the Willamette Basin TMDL; elements of the SWMP will be considered for application to all of Benton County (i.e., outside the Corvallis Urbanized Area). Timelines for completing this work is also included in the attached SWMP.

Benton County understands that the requirements for the reduction of mercury in the Willamette River are already under revision for the 2011 Willamette Basin TMDL. The County will be prepared to modify this TMDL Implementation Plan if those modified requirements necessitate new mercury reduction strategies.

Fiscal Analysis:
While Benton County is limited in existing funding to implement and enforce the proposed management strategies, some of the strategies are currently programmed as a part of the Phase II SWMP Implementation (yet still unfunded). Currently, staff is evaluating the possible workload and may approach the Board of Commissioners about establishing a stormwater fee so that the County can enforce and practice the principals outlined in the TMDL Implementation Plan as well as the SWMP. At this point in time, the level of effort is confined to revising the Comprehensive Plan to align with the program goals and enforcement will follow. County maintenance practices are anticipated to remain consistent and therefore the fiscal impact should be minimal. While Benton County does not currently have funding in place to support the implementation of this plan, there are several grant and assistance programs the County will investigate:

Program	Agency/Source
Oregon Plan for Salmon and Watersheds	OWEB
Environmental Quality Incentives Program	USDA-NRCS
Wetland Reserve Program	USDA-NRCS
Conservation Reserve Enhancement Program	USDA-NRCS
Stewardship Incentive Program	ODF
Access and Habitat Program	ODFW
Partners for Wildlife Program	USDI-FSA
Water Projects	OWRD

Nonpoint Source Water Quality Control (319) Grants	ODEQ-USEPA
Statewide Planning Goals Technical Assistance Grants	DLCD
Oregon Community Foundation	OCF
Watershed Initiative Grants	USEPA
Clean Water State Revolving Fund (SRF) Low Interest Loans	ODEQ

Legal Authorities

The County operates under several state, federal, and local authorizations to plan strategies for improving the water quality within the Willamette River and its tributaries in the Upper Willamette Subbasin. A synopsis of the authorizations are as follows:

CLEAN WATER ACT, SECTION 303(D) - Section 303(d) of the 1972 federal Clean Water Act as amended requires states to develop a list of rivers, streams and lakes that cannot meet water quality standards without application of additional pollution controls.
ENDANGERED SPECIES ACT, SECTION 6 - Section 6 of the 1973 federal Endangered Species Act as amended encourages States to develop and maintain conservation programs for federally listed threatened and endangered species.
OREGON REVISED STATUTES - The ODEQ is authorized by law to prevent and abate water pollution within the State of Oregon.
NPDES AND WPCF PERMIT PROGRAMS - ODEQ administers two different types of wastewater permits in implementing Oregon Revised Statute (ORS) 468B.050
401 WATER QUALITY CERTIFICATION - Section 401 of the CWA requires that any applicant for a federal license or permit to conduct any activity that may result in a discharge to waters of the state must provide the licensing or permitting agency a certificate from ODEQ that the activity complies with water quality requirements and standards.
USACE DAM OPERATION AND MANAGEMENT - In association with other federal statues, including House Document No. 531 Volume V, the River and Harbor Act, the Flood Control Act, and the Water Resources Development Act, the U.S. Army Corps of Engineers (USACE) is charged with operating its projects in compliance with the federal Clean Water Act.
OREGON FOREST PRACTICES ACT - The Oregon Department of Forestry (ODF) is the designated management agency for regulation of water quality on non-federal forest lands.
SENATE BILL 1010 - The Oregon Department of Agriculture has primary responsibility for control of pollution from agricultural sources. This is accomplished through the Agriculture Water Quality Management (AWQM) program authorities granted ODA under Senate Bill 1010 adopted by the Oregon State Legislature in 1993.
LOCAL ORDINANCES – The Benton County Development Code and Comprehensive Plan are the guiding documents for new and existing development within the County. The Benton County Stormwater Management Program, while not formally adopted as an ordinance, also serves as a guide for strategies for improving water quality. The revised Comprehensive Plan, which includes a number of new policies relating to water quality, was adopted and went into effect in March 2007. The County is currently working to implement the new Comprehensive Plan policies through the Stormwater Management

Program, development of a riparian protection program, updates to the Development Code, and other efforts.