

# City of Eagle Point

## Water Quality Implementation Plan



*Little Butte Creek, 2010 - Eagle Point, Oregon*

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## 1.0 INTRODUCTION

The “**Eagle Point Water Quality Implementation Plan**” describes the strategies and practices to be implemented by the City over the next five years. The goals of the Total Maximum Daily Load (TMDL) program and the Clean Water Act are to make all waters fishable and swimmable through the reduction of temperature and bacteria levels in the City, and, by extension, the Rogue Basin. Implementation plans from urban Designated Management Agencies (DMAs) are required to comply with the Rogue Basin TMDL order from the Oregon Department of Environmental Quality (DEQ), and to meet pollutant load allocations for the Rogue Basin (an outfall of Little Butte Creek) as approved by the U.S. Environmental Protection Agency (EPA) in December, 2008. Eagle Point’s Plan is one part of a larger collaboration designed to meet the TMDL (see sections 1.1.1 and 1.1.2), and is written in a manner such that management strategies determined to significantly affect land uses are carried out in compliance with applicable Statewide Planning Goals and are compatible with the City’s acknowledged Comprehensive Plan.

The City of Eagle Point is a participating municipality in the larger, Rogue River Basin TMDL. The Basin Plan applies to all perennial and intermittent streams, rivers, and lakes within Oregon’s Rogue River Basin, with the exception of those areas where TMDLs have been previously developed: Bear Creek Watershed (TMDL approved 2007), Applegate Subbasin (TMDL approved 2003), the Lobster Creek Watershed (TMDL approved 2002) and Upper and Lower Sucker Creek (TMDLs approved 1999 and 2002, respectively).

The Plan is organized into six sections:

- Section 1. Introduction
- Section 2. Overview
- Section 3. Plan Organization & Land Use Law Compatibility
- Section 4. Management Strategies Overview
- Section 5. Performance Monitoring & Reporting (Implementation and Efficiency)
- Section 6. Fiscal Analysis

Appendices.

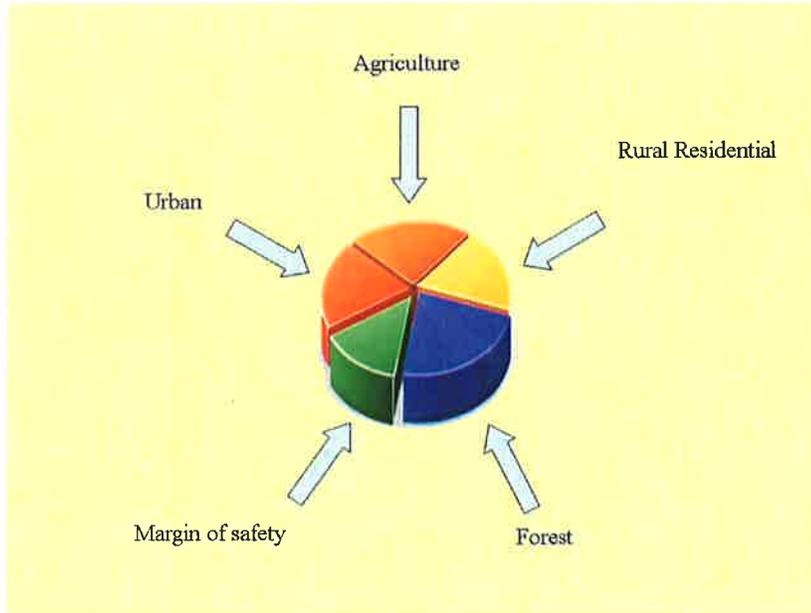
### 1.1 TMDL Responsibility and Regional Cooperation and Regional Collaboration

#### 1.1.1 TMDL Responsibility and Regional Cooperation

Through the TMDL process, Designated Management Agencies (DMAs) are identified. DMAs are recognized by the State of Oregon as being those entities with the legal authority to ensure that the targets set forth in the TMDL are met (OAR 340-042-0030 (2)). Responsibilities for meeting the TMDL allocations are divided among the DMAs (see **Figure 1-1**).

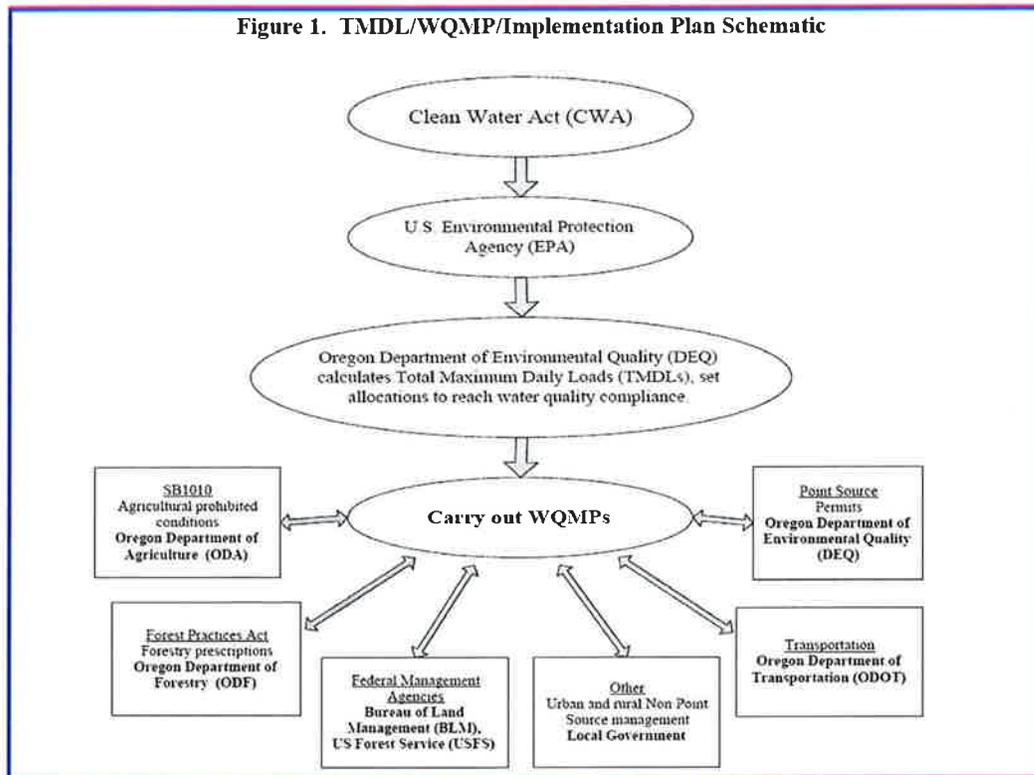
DMA's for the Rogue Basin represent the following sectors: urban areas, agriculture, forestry, and rural residential areas. Identified DMA's include Counties, Cities, Irrigation Districts, ODOT, ODA, ODF, and others. Specific responsibilities of each DMA are outlined in **Section 1.2**.

**Figure 1-1: Distribution of TMDL Responsibilities**



All the DMAs in the Rogue Basin must work together and do their part to meet the targeted water quality condition. All DMAs will implement management strategies through different plans and mechanisms (see Figure 1-3). Eagle Point’s Plan is one part of the larger program to meet the TMDL Implementation Goals.

**Figure 1-3: Responsibilities of DMAs under the Water Quality Management Plan**



### **1.1.2 Regional Collaboration**

All the Urban DMAs and the Irrigation Districts fall into the “Other” category in **Figure 1-3**. As a result, they all must undertake activities to reduce bacteria and temperature inputs in the Basin. Since many of the potential management strategies overlap, and the foundation of WQIPs are the same, the Plan was discussed collaboratively as a region with the Urban DMAs and Irrigation Districts working together. The plan was then refined individually, and within groups of DMAs.

The overall goal of the plan is to work, both collaboratively and individually, to reduce the inputs of temperature and bacteria in jurisdictional waterways. Using a regional approach, where possible, provides a cost effective, consistent approach, and maximizes the effectiveness of the programs in reducing solar inputs, heat, and bacteria contributions to the surface waters in the Rogue Basin. In addition, the regional collaboration will allow for future leveraging of additional funding, reducing costs, sharing of resources, and effective management strategies.

## **1.2 Background**

### **1.2.1 TMDL Process**

The Federal Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) to be established for any waterbody having impaired water quality. The TMDL process begins when a stream, lake, or river does not meet water quality standard, and is placed on the State’s 303(d) list. The 303(d) list identifies the stream as “water quality limited”, requiring the development of a TMDL. A TMDL determines how much of a pollutant can be discharged to a waterbody while still meeting water quality standards and protecting all designated, beneficial uses of that waterbody. The State of Oregon requires identified DMAs to prepare an implementation plan to meet the requirements of the TMDL.

### **1.2.2 Designated Management Agencies (DMAs)**

DMAs are recognized by the State of Oregon as those entities with the legal authority to ensure that the targets set forth in the TMDL are met (Oregon Administrative Rule OAR 340-042-0030 (2)). The participating DMAs either have existing plans or are required to submit TMDL Implementation Plans as part of the Rogue River Basin. This plan represents Eagle Point’s Plan submittal for the land uses listed below as applicable under their jurisdiction. Additional TMDL Implementation Plans have been created by other DMAs in the Rogue River Basin.

### **1.2.3 Responsibilities of Designated Management Agencies**

**DMA: Oregon Department of Environmental Quality (DEQ)**

**Land Use: Various Permitted Sources**

The following permits are issued by DEQ. Contact the DEQ Medford office at (541) 776-6010 for more information.

- NPDES Permitting and Enforcement
- WPCF Permitting and Enforcement
- Municipal Separate Storm Sewer System (MS4) Discharge Permit
- 401 Hydroelectric Certifications
- 401 Dredge and Fill Certifications
- On-Site Septic System Permitting and Enforcement (except where delegated to a specific county)
- Nonpoint Source TMDL Implementation Program
- Technical Assistance
- Financial Assistance
- Sewer and septic systems related to human habitation

**DMA: Oregon Department of Agriculture (ODA)**

**Land Use: Agriculture**

Agricultural land uses are addressed in the *Inland Rogue Agricultural Water Quality Management Area Plan* and the *Curry County Agricultural Water Quality Management Area* as required by Senate Bill 1010. Contact the Oregon Department of Agriculture at (503) 986-4550 for more information regarding agricultural or farm related activities including confined animals feeding operations (CAFOs). The land uses falling under this category include:

- Agricultural or farm-related activities, both commercial and noncommercial including livestock stable and pastures, both inside and outside of municipal boundaries
- Agricultural Water Quality Management Plan Development, Implementation, Enforcement and Revision
- CAFO Permitting and Enforcement
- Container nursery operations
- Technical Assistance
- Rules under Senate Bill (SB) 1010 to clearly address TMDL and Load Allocations as necessary
- Riparian area management
- Oregon Conservation Reserve Enhancement Program

**DMA: Oregon Department of Forestry (ODF)**

**Land Use: Forestry on Private Lands**

Private lands' forestry uses are addressed in the Forest Practices Act. If additional actions are needed to meet the TMDL, ODF may revise statewide FPA rules and/or adopt subbasin specific rules as necessary. Contact the ODF, Southwest Oregon District Office at (541) 664-3328 for more information. The forest management activities covered under the Forest Practices Act are included in the following general categories:

- Harvesting or Salvaging Trees

- Site Preparation and Reforestation
- Chemical Application
- Clearing Forest Land for Nonforest Uses
- Road Construction and Improvements
- Riparian area management
- Precommercial Thinning/Slash Disposal

**DMA: Oregon Department of Transportation (ODOT)  
Land Use: Roads, Highways and Bridges**

State road issues will be addressed in a Memorandum of Understanding between ODOT and DEQ. Contact ODOT, District Manager at (541) 774-6355 for more information.

- Routine Road Maintenance, Water Quality and Habitat Guide Best Management practices
- Pollution Control Plan and Erosion Control Plan
- Design, Construction, Operation and Maintenance of state highways and state highway storm systems

**DMA's Required to Develop Implementation Plans**

Other DMA's are required to develop TMDL implementation plans describing the management measures to be taken in achieving their load allocations. These DMA's are listed below. TMDL implementation plans must be submitted to DEQ for approval within 18 months from the time this TMDL becomes an executive order. DMA's may submit a joint TMDL implementation plan. DEQ encourages the development of statewide implementation plans by other state agencies. The required elements of these plans, and the process for monitoring progress under these plans and revising them as necessary, are described in DEQ's TMDL Implementation Plan Guidance.

**DMA: US Army Corps of Engineers (USACE)  
Land Use: Lost Creek Reservoir and Elk Creek Dam**

The US Army Corps of Engineers controls all operations related to Lost Creek Reservoir and Elk Creek Dam. Contact the USACE Rogue River Basin Project Manager at (541) 878-2255 for more information.

**DMA: USDI-Bureau of Land Management  
Land Use: Federal Lands (BLM administered land)**

In July, 2003, the Bureau of Land Management (BLM) signed a memorandum of agreement (MOA) with DEQ defining how water quality rules and regulations regarding TMDLs will be met. BLM will develop or revise existing Water Quality Restoration Plans (WQRPs) as described in MOA, and they will be the TMDL Implementation Plans for BLM. Contact BLM, Medford District Hydrologist at (541) 618-2200 for more information.

**DMA: USDA-Forest Service**

**Land Use: Federal Lands (National Forests)**

In 2002, the US Forest Service (USFS) signed a memorandum of understanding (MOU) with DEQ defining how water quality rules and regulations regarding TMDLs will be met. USFS will develop or revise existing Water Quality Restoration Plans (WQRPs) as described in the MOU, and they will be the TMDL Implementation Plans for USFS. Contact USFS, District Hydrologist at (541) 858-2200 for more information.

**DMA: Oregon Department of Geology and Mineral Industries (DOGAMI)**

**Land Use: Aggregate Mining**

DOGAMI's regulation of aggregate mines, many located in the flood plain of rivers, qualifies DOGAMI as a DMA. Contact DOGAMI, Southwest Oregon Section Leader at (541) 476-2496 for more information.

**DMA: Oregon Department of State Land (DSL)**

**Land Use: Publicly Owned Lands and Removal-Fill Activities**

DSL holds public owned lands in trust and manages these lands in the public's best interests. DSL administers the state's removal-fill permits and is responsible for leasing range and agricultural land and waterways for a variety of business activities. Contact DSL, Jackson/Josephine Resource Coordinator at (503) 986-5250 for more information.

**DMA: Oregon Parks and Recreation Department (PRD)**

**Land Use: State Park Lands**

Oregon Parks and Recreation Department is responsible for land stewardship, overseeing Oregon scenic waterways, several permit programs, and park plants and animals. Contact PRD, Rogue Valley District Manager at (541) 582-1118 for more information.

**DMA: Irrigation Districts including; Eagle Point Irrigation District (EPID), Rogue River Valley Irrigation District (RRVID), Medford Irrigation District (MID), Gold Hill Irrigation District (GHID), Grants Pass Irrigation District (GPID), other Irrigation Districts and Ditch Associations where appropriate in the Rogue River Basin.**

**Land Use: Irrigation water transport and delivery**

Irrigation Districts control operations related to irrigation water transport and delivery in the Rogue River Basin. Irrigation diversion dams fall under the authority of the designated Irrigation District. Irrigation districts and dam operations are considered nonpoint sources that influence the quantity and timing of heat and bacteria delivery to downstream river reaches. For more information, please contact the appropriate district.

- EPID, (541) 823-3411

- RRVID, (541) 773-6127
- MID, (541) 899-9913
- GHID, (541) 582-1802
- GPID, (541) 476-2582

**DMA: Jackson, Josephine and Curry Counties, Cities of Shady Cove, Butte Falls, Eagle Point, Gold Hill, Rogue River, Cave Junction, Grants Pass, and Gold Beach.**

**Land Use: Rural/Urban Nonresource Land Uses in the Rogue River Basin**

Rural and urban land uses are under the authority of the designated County/City. The Counties and Cities are responsible for their governmental operations, as well as zoning and permitting, urban runoff and drainage systems, streets and roads, and riparian protection. The land uses include:

- All nonagricultural, nonforestry-related land uses including transportation uses (road, bridge, and ditch maintenance and construction practices)
- Sewer and septic systems as related to human habitation, On-Site Septic System Permitting and Enforcement (where delegated to specific county)
- Designing and siting of housing/home, commercial, and industrial sites in urban and rural areas
- Golf courses and parks
- Land use planning/permitting
- Maintenance, construction and operation of parks and other County/City-owned facilities and infrastructure
- Construction, operation and maintenance of County/City roads and county storm sewer system
- Riparian area management
- Operation of Gold Hill Intake Diversion (Gold Hill), operation of Gold Ray Dam (Jackson County) or other small dams owned by the jurisdiction
- Other land uses as applicable to the TMDL

## **2.0 ROGUE BASIN SUMMARY:**

### ***2.1 Rogue Basin Overview***

#### ***Geographic Setting***

The Rogue River Basin (within Southern Oregon Coastal Basin, Hydrologic Unit Code [HUC] 171003), including the City of Eagle Point and the waterways within its municipal boundaries, contains 3,300,000 acres (5,156 square miles) in southwestern Oregon and northern California (**Figure 1.2**). This TMDL applies to all land uses including lands managed by the State of Oregon, the U.S. Forest Service (USFS), the Bureau of Land Management (BLM), irrigation districts, private forestlands, agricultural lands, rural residences, urban areas and others. For the purposes of this TMDL, the Rogue River Basin refers to five 4th field hydrologic unit subbasins: the Lower Rogue River Subbasin (HUC 17100310), Middle Rogue River Subbasin (HUC 17100308), Upper Rogue River Subbasin (HUC 17100307), Illinois Subbasin (HUC 17100311) and Applegate Subbasin (HUC 17100309). The subbasins are located on the northeastern flank of the Siskiyou Mountains and the western flanks of the Cascade Mountains in southwestern Oregon. This is one of the most biologically, botanically, and geologically diverse areas in the country. It is steep and rugged, ranging in elevation from 0 feet to 9,485 feet at the summit of Mount McLoughlin.

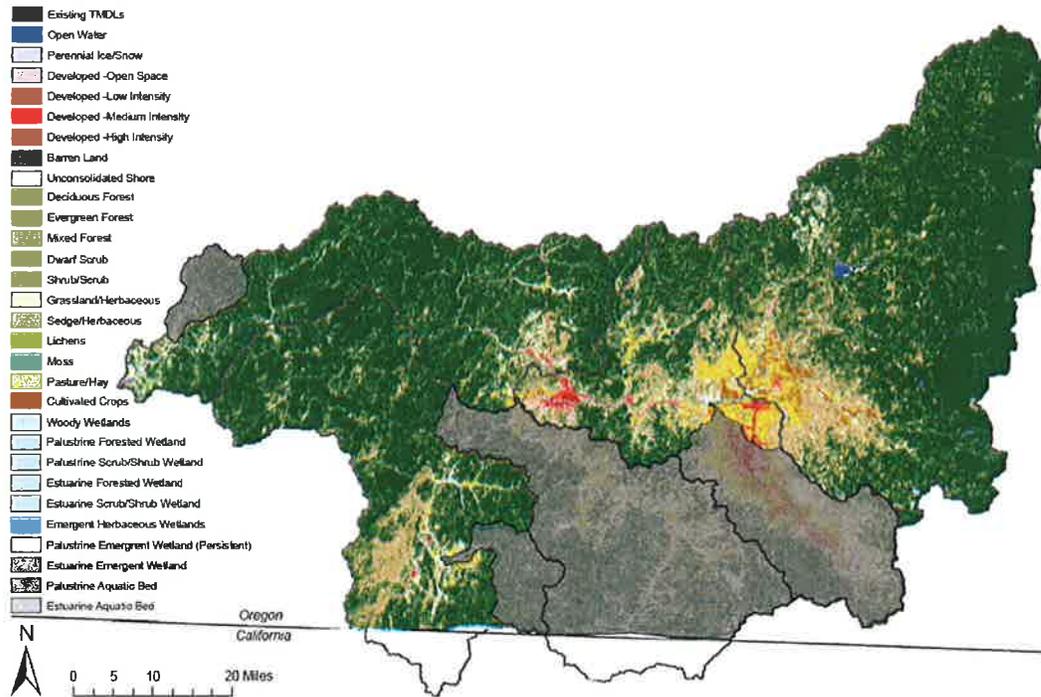
#### ***Ownership***

The Rogue River Basin is located within Jackson, Josephine, Curry, Klamath and Douglas Counties in Oregon with portions located in Siskiyou and Del Norte County California. Jackson County has a population of 181,269, mostly residing within the Bear Creek Valley in the population centers of Ashland (21,505), Talent (6,680), Phoenix (4,855), Medford (77,240), Central Point (17,165), and Jacksonville (2665). Outside of the Bear Creek Valley are the Jackson County Cities of Shady Cove (2,865), Eagle Point (8,790), Butte Falls (445) and Rogue River (2,090). Josephine County has a population of 75,726, and contains the cities of Grants Pass (33,225) and Cave Junction (1,363). Gold Beach (1,897) is the only city in Curry County (21,137) within the Rogue River Basin. Only small, relatively uninhabited, portions of the basin are within Klamath and Douglas Counties.

Approximately 60 percent (1,980,000 acres) of the Rogue River Basin is publicly owned and managed by the US Forest Service, Bureau of Land Management, and US Bureau of Reclamation (Rogue Basin Coordinating Council 2006). These lands are managed for multiple uses including water quality, timber production, livestock management, wildlife and recreation.

**Figure 2.1 Land use in the Rogue River Basin (listed as Figure 1.2 from DEQ's Water Quality Management Plan).**

**Figure 1.2. Land use in the Rogue River Basin.**



## 2.2 TMDL Implementation

### 2.2.1 Near-Stream Vegetation Removal/Management

Near-stream vegetation disturbance or removal reduces stream surface shading via decreased riparian vegetation height, width and/or density, thus increasing the amount of solar radiation reaching the stream surface (shade is commonly measured as percent-effective shade or open sky percentage).

Furthermore, forests, even beyond the distance necessary to shade a stream, can influence the microclimate, providing cooler daytime temperatures (Chen et al. 1999). Riparian vegetation also plays an important role in shaping channel morphology, resisting erosive high flows, and maintaining floodplain roughness. **Table 2.9** shows the potential for improvement in shade for the Rogue River and selected tributaries, such as Little Butte and Antelope Creeks, located in the Eagle Point portion of the Basin, as the difference between current and system potential effective shade. The system potential condition as defined in this TMDL is the near-stream vegetative community that can grow on a site at a given elevation, and aspect, in the absence of human disturbance.

System potential is an estimate of a condition without anthropogenic activities that disturb or remove near stream vegetation.

- Vegetation is mature and undisturbed;
- Vegetation height and density is at or near the potential expected for the given plant community;
- Vegetation buffer is sufficiently wide to maximize solar attenuation (Note: Buffer widths required to meet the system potential target will vary given potential vegetation, topography, stream width, and aspect.);
- Vegetation buffer width accommodates channel migrations.

**Table 2.9. TMDL Shade Targets for Rogue River and Selected Tributaries. Temperature impacts are the average increase to the 7DADM for the modeled reach.**

Waterbody	Percent Effective Shade (August 1)		Shade deficit (% shade)	Predicted temperature increase due to decreased shading (°C)
	Current	System Potential		
Antelope Creek	41	82	41	5.7
South Fork Little Butte Creek	39	74	35	5.7
Evans and West Fork Evans Creek	29	78	48	5.3
Little Butte Creek	29	69	40	5.0
Elk Creek	44	80	36	4.4
North Fork Little Butte Creek	62	91	29	1.8
Rogue River Mainstem	8	17	9	0.5

The City of Eagle Point is an expanding urban center in the Upper Rogue portion of Jackson County, bisected by approximately one mile of Little Butte Creek, in a northeast to southwest direction. Much of the one mile stretch within the community is privately owned. All portions of public access are contained within four parks: Harnish Wayside Little Butte Creek, Matte Brown and Lagoon Parks. This TMDL Management Plan also addresses portions of Antelope Creek located on the southerly edge of the City. Only a small portion of Antelope Creek lies adjacent to the City limits, where the creek forms the western boundary of the Lagoon Park properties. Both Little Butte Creek and Antelope Creek are influenced by drainage patterns from urban areas of Eagle Point, irrigation water from Little Butte Irrigation Company and Eagle Point Irrigation District and natural drainage channels from the north and west of the City.

Vegetative cover for Little Butte Creek has been an ongoing issue of importance to the City for decades. Public Works programs have worked for several years to remove large portions of invasive species, such as blackberries, in areas where the City has gained access to the creek. Plantings of various trees along the banks of the creek, within the public parks identified above, have added to cooling effects along the creek. These plantings have also been part of an eighteen year commitment to Tree City USA Program, in which the City has been a proud participant. In order to more effectively administer public education programs, the City will inventory private lands that influence and control much of the banks along Little Butte Creek and other natural drainageways.

Existing City maps, utility accounts and Jackson County GIS data will be utilized for the aforementioned inventories. Public outreach to all properties within the City, but especially with those land owners along Little Butte Creek, will help to educate property owners on “best management practices” for stream side health. A property inventory remains part of the future management plan for the creek.

The management program will also include the creation of a Riparian Ordinance, designed to guide streamside development for both public and private spaces. Development guidelines will discuss the types of invasive species to be removed, and provide a suggested list of replacement plantings. Partnerships with the Little Butte Watershed Council and Rogue Valley Council of Governments will assist in maximizing program efficiency. The City is also expected to formalize an Urban Forestry Program, coinciding with its long standing relationship with Tree City USA, and Oregon State Department of Forestry.

Vegetative cover for Antelope Creek, as the creek relates to publically owned park property southwest of the City limits, is comprised of heavy natural riparian cover. This scenario provides significant opportunity for cooling throughout the entire portion of the creek where the City has any chance to exercise its influence. Visual inventory/removal of invasive species on City park lands, and along Antelope Creek, will be part of the TMDL Management Plan.

Little Butte Watershed Council, serving Eagle Point and the remaining 373 square miles of the Little Butte Watershed, has included the City as a member of the Watershed’s Board of Directors. Collaboration with the Watershed Council offers an opportunity to enhance future streamside vegetation projects within the City. Most of the Watershed’s projects are outside the City limits, and upstream of the community. The upstream sections of creek are outside Eagle point’s jurisdictional control, and largely influenced by ranch and large parcel irrigation practices. Another significant influence is the ongoing diversion of substantial portions of Little Butte Creek’s spring and summer water flows to the Bear Creek Valley for agricultural and recreation purposes. What occurs upstream of Eagle Point largely influences the quality and quantity of water flow during the critical summer season in all the creek’s downstream reaches, with significant negative impacts in Eagle Point. Little Butte Creek bank restoration and re-vegetation projects initiated by the Watershed Council, outside the City limits, will have lasting impacts on the Creek, particularly as the water reaches Eagle Point and moves on to its eventual confluence with the Rogue River.

## **2.2.2 Channel Modifications and Widening**

Human activities altering channel form generally fall into one of three categories: direct modification, increased sediment load and removal of riparian vegetation. Direct modification includes changes to channel form associated with road building, flood control, gravel extraction or channel realignment. Increased sediment loading can result from agricultural, logging and mining activities which can result in increased runoff, landslides, debris torrents and other mass wasting events. Lastly, removal of riparian

vegetation can lead to bank instability and increased erosion. In the Rogue River Basin, waterbodies within wide valleys with low gradients are likely to be more degraded due to channel temperatures in the following ways:

#### *Sediment filled pools*

In California, a Mattole River study observed that thermally stratified pools often contained sediments decreasing the depth of thermal refugia, therefore decreasing the volume and frequency of the pools, decreasing assimilative capacity for thermal loading in a reach (California Regional Water Board 2002).

#### *Wider, shallower streams*

Furthermore, human activities can cause wider, shallower streams (increased width to depth ratios) which increases surface area exposed to solar radiation and ambient air temperatures. Wider channels will have less effective shade than narrower channels with the same amount of riparian vegetation. A lower potential effective shade condition allows more direct solar radiation to reach the stream surface (DEQ 2000).

#### *Less storage base flow*

Many land use activities that disturb riparian vegetation and associated flood plain areas affect the connectivity between river and groundwater sources (DEQ 2000). Natural morphology created areas of temporary water storage which was slowly released during dry periods, increasing base flow. Reduced summertime saturated riparian soils reduce the overall watershed ability to capture and slowly release stored water. Reductions in stream flow slow the movement of water and generally increase the amount of time the water is exposed to solar radiation (DEQ 2007). There are some thermal benefits gained from connecting the cooler, spring-fed pools and off-channel areas to the main channel (DEQ 2007).

#### *Fewer hyporheic seeps*

Groundwater inflow has a cooling effect on summertime stream temperatures. Subsurface water is insulated from surface heating processes and most often groundwater temperatures fluctuate little and are cool (45°F to 55°F) (DEQ 2000). A Mattole River study observed intra-gravel flow seeps in areas of higher streambed complexity. Also, within the main channel, morphologically complex areas were cooler (California Regional Water Board 2002). A study in the Upper Grande Ronde River basin demonstrated that riparian disturbance can separate the connectivity of the groundwater and the stream, and occurs when a permeability barrier prevents normal flood plain functions. The groundwater disconnection prevented water from the riparian zone to cool water in the main channel (DEQ 2000). Channel complexity, cool water inflows, and hyporheic exchange are thought to provide local thermal refugia (DEQ 2007). Excess fine sediment can also decrease permeability and porosity in the hyporheic zone, greatly reducing hyporheic flow, and resulting in less cool water inputs (Rehg et al. 2005).

Within Eagle Point's municipal jurisdiction, the riparian area of Little Butte Creek is predominantly composed of private, urbanized lots. Most properties are subject to potential flooding, forcing any impermeable surfaces (structures, driveways and patios) away from the creek, leaving broad expanses of yards and landscaping as areas to accept and filter impermeable runoff. Remaining public spaces on both Little Butte Creek and Antelope Creek are part of various improved or unimproved City parks. The expanse of Antelope Creek lying adjacent to the City's Lagoon Park properties has been left in a natural riparian setting with virtually no urban influences.

There have been several land-use based causes of changes over time in the geomorphology and groundwater connectivity in Little Butte Creek. These include agricultural development, other types of development such as roadways and residential development, water diversions and their associated physical structures and channel modifications, and water supply reservoirs. Based on review of previous studies, observations within the watershed, and analysis of current and historical aerial photographs, the most prominent causes of change are believed to be (1) channel modifications associated with roadways adjacent to the stream and (2) channel and flow modifications related to water diversions and their structures.

The primary water diversions impacting both water quality and water quantity in Little Butte Creek are the two Springtime diversions of the North Fork (264% reduction in flow) and South Fork (304% reduction in flow) out of the Little Butte System into the Bear Creek Valley and Emigrant Lake by irrigation district and recreational users.

The reduction of spring, summer and fall flows, as seen on Table 2.11, have profound impacts on the creek ecosystem. The loss of flow causes the summertime heat to increase water temperatures and increases the impact of agricultural return flows, spiking bacteria counts in the Eagle Point portion of Little Butte Creek. The community starts to recognize an increase in e-coli bacterial counts in early summer and a "No Contact Posting" of the creek by mid-summer. The City has monitored the e-coli count for over a decade. The bacteria counts are measured at three locations along the City's portion of the creek. Monitoring and measuring methods include input, outfall and midstream bacteria counts. No significant increase in bacteria has been recognized in the decade long monitoring program within the Eagle Point portion of the stream. In fact, a decrease in bacteria levels is generally seen by the time the stream water leaves the City near Harnish Wayside Park, adjacent to Highway 62.

Eagle Point's TMDL Plan will also address influences of stream bank erosion along both Little Butte Creek, and two additional, natural water channels depositing natural runoff water, irrigation water and, to a limited degree, storm water, from urban influences into Little Butte Creek. The degree to which the City can positively influence the erosion of the Creek and the ditch channels of the Buchanan and DeAnjou Ditch Systems will help to protect the water quality in Little Butte Creek.

Appropriate vegetative plantings and their future control, are important to both water

quality and intermittent flooding along the creek. Such high water events have historically been a problem in Eagle Point. Most sections of the natural drainage ways are privately owned, and significantly impact flooding events during high runoff. City Ordinance 2005-26 requires citizens to clean and maintain their respective ditch sections to allow winter runoff to occur without the drainage way being clogged by debris or overgrown vegetation. Vegetative cover still remains, allowing new growth in the spring and an opportunity to help filter irrigation water, and, to a much smaller degree, urban storm water runoffs during the late spring, summer and early fall.

#### **2.2.2.1 Hydromodification: Dams, Diversions, and Irrigation Districts**

Eagle Point Irrigation District and Little Butte Irrigation Company are within the geographic scope of this TMDL. Below are some of the activities that could lead to warmer stream temperatures.

- Diversion dams are used to divert water from a stream to an irrigation ditch or canal. Diversion dams affect stream temperature by dewatering the downstream reach of the river. Reductions in stream flow in a natural channel slow the movement of water and generally increase the amount of time the water is exposed to solar radiation. Stream temperatures downstream of diversion dams can be substantially warmer than those above.
- Canals and other unlined water conveyance systems generally are open ditches. These ditches are usually unshaded and increase the surface area of water exposed to solar radiation. Where canal waters are allowed to mix with natural stream flows, such as at diversion dams and at places where natural stream channels are used to convey irrigation water to downstream users, stream temperatures can increase.
- Irrigation return flows come off of fields or pastures after irrigation. These excess waters may end up in a stream or the irrigation ditch to be used by the next water right holder. These waters are generally warm and may be nutrient-rich as well.
- Operational spills are places in the irrigation delivery system where excess unused irrigation water in the canals is discharged back into either a downslope canal or lateral or a natural stream channel without being delivered to or used on a field. These waters may be picked up and used by the next downstream water right holder.

No diversion structures or channel modifications exist within the Eagle Point TMDL Study Area. The Butte Creek Mill Dam, constructed in 1872, and modified recently through efforts of Pacific Power, ODFW, BOR and the Rogue Basin Coordinating Council, is located just outside the Eagle Point Study Area. The dam, originally constructed for the diversion of a portion of Little Butte Creek Water to generate hydro-power to run the grinding equipment within the Butte Creek Mill, has now added a fish ladder and a jump pool in front of the dam. Both the water pooling effect in front of the dam, and the pool impacts upstream of the dam, deepen the natural flow of the creek, aiding in cooling impacts along the creek.

Within the last few years, several diversion structures have been removed upstream of Eagle Point. This has occurred through the cooperative efforts of land owners, Irrigation Company users and the Little Butte Watershed Council. Some alternative irrigation improvements have included on-site sprinkler systems for greater efficiency of water use. All improvements to the quality or quantity of water in Little Butte Creek upstream of Eagle Point have a significant, lasting impact on the water in the creek as it enters the City.

Open ditches, as described above, act as natural drainage channels for water to the north and west of Eagle Point to interface with the developed portions of the City. The ditch systems have a natural vegetative cover from small plants and grasses, but in many areas lack the heavy brush or tree cover to assist with water cooling. Implementation of the Eagle Point TMDL will assist in adding additional tree cover, in appropriate areas, to assist in the natural cooling effects of the current ditch systems.

### 2.2.2.2 Hydromodification: Water Rights and Stream Flows

Generally, the influence of river flow is inversely related to the daily maximum stream temperature, with higher flows moderating the swing of temperatures, while holding everything else unchanged. Diversion of water from the Rogue River and tributaries was generally shown, via water quality modeling, to decrease the ability of stream to assimilate heat load, resulting in warmer stream temperatures (see **Table 2.11** for more detail). The method of deriving of flows without withdrawals varied between streams but was generally based on water balances and OWRD water rights. Water withdrawal from the Rogue River at the R.H. Duff Water Treatment Facility, owned by the Medford Water Commission, is a common and necessary practice helping to serve the cities of Eagle Point, Central Point, Medford, Jacksonville, Phoenix, Talent and the Urban Containment Area of White City within Jackson County. The single point withdrawal method is the most efficient for the region.

**Table 2.11. Impact of water withdrawals on maximum 7-DADM temperatures for various waterbodies as predicted by water quality modeling. Flows are from August 1 of the applicable model year and temperatures based on average changes to the portion of the stream modeled (i.e. not predicted change at the mouth) .**

Waterbody	Flow at mouth (cfs)			Predicted temperature increase due to decreased flow (°C)
	Current	Without withdrawals	% Change	
Little Butte Creek	17.5	56.2	304%	5.7
North Fork Little Butte Creek	13.7	36.1	264%	3.2
Antelope Creek	6.4	8.9	139%	1.4
Elk Creek	3.2	7.2	225%	1.6
Rogue River Mainstem	1957	2370	121%	0.9
Evans Creek	3.0	8.7	290%	0.5
South Fork Little Butte Creek	9.2	12.8	139%	0.5

The City of Eagle Point, through agreements with the Medford Water Commission, has been acquiring water rights to serve future municipal water needs for the past seven years. All municipal water for Eagle Point, and for much of the Bear Creek Valley, is

supplied by the Medford Water Commission through water rights controlled by the City of Medford. Eagle Point is in a process of acquiring its own water rights, independent of those rights held by the City of Medford. Current City policy has directed City staff to acquire water rights that are part of the Little Butte Creek System. Either manufacturing or irrigation rights deriving their water from the Little Butte Creek System are being acquired and converted to municipal use. The TMDL Management Plan significance of this policy comes from adding the acquired water to the yearly stream flows, and insuring that the water will be available to provide stream flow needs during the months of April through October. The late spring and summer flows prove to be the most critical to the health of the creek. Water rights currently acquired by the City include 3.8 cfs with an additional 1.88 cfs in process.

### **2.2.3 Urbanization and Runoff**

#### **2.2.3.1 Impervious Surfaces**

Upland and floodplain development has resulted in high percentages of impervious surfaces in some areas of the watershed. Increased impervious area results in greater stormwater runoff and diminished groundwater recharge. Studies have shown that base flows in small streams with substantial impervious area may be lower as a result of a loss of groundwater contribution during dry periods. Warmer stream temperatures and poorer water quality are associated with these diminished flows.

As the City of Eagle Point grows over time, a greater proportion of impervious surface area will be created. Although the storm runoff is required to be detained in detention ponds to prevent a surcharged natural drainage system from flooding, much of the existing storm water system continues to discharge into natural drainage ways, allowing for their filtration and absorption. This is particularly true for much of the south end of the community, in and around the Eagle Point Golf Community.

The Eagle Point Golf Course was specifically designed to include natural features with manmade wetlands, detention/irrigation ponds and natural drainage ways. All urban runoff from the Golf Course housing units (866) and all adjacent subdivisions, is detained and released to Little Butte Creek through wetland features and drainageways. Essentially, the Golf Course hazards act as a large detention facility and bio-swale for the southern end of Eagle Point.

#### **2.2.3.2 Storm Water Management**

The City of Eagle Point has begun the process to create a Storm Water Management Plan and Implementation Program. The final product will include the Plan and an implementation ordinance including strategies, capital projects and funding options. The Plan is expected to address the sources of water impact, issues of storm water flows and contamination created by irrigation return flows, urban discharge to irrigation ditches and construction runoff. The temperature and bacteria impacts to Little Butte Creek and Antelope Creek from the irrigation system influences will be part of Eagle Point's TMDL

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There are several large irrigation districts and numerous smaller ditch associations operating within the Rogue River Basin. Eagle Point Irrigation District, the Little Butte Irrigation Company and the Fryer Ditch Company operate irrigation systems within the City of Eagle Point. While irrigation district operations themselves are not a source of fecal bacteria, the laterals and canals that are used to convey water can play a major role in transporting bacterial contamination across the landscape and into surface waters. The distribution of bacteria throughout the Rogue River Basin and the City of Eagle Point as well as the timing of those levels may be impacted by the movement of irrigation water throughout the region and City by the irrigation practices. It has been shown elsewhere in the Rogue River Basin that the distribution of bacteria as well as the timing of the levels found in surface water can be greatly impacted by the movement of irrigation water (DEQ 2007). It should be emphasized that irrigation systems do not create bacteria but they can transport it.

The City has developed a contractual relationship with Little Butte Irrigation Company, resulting in joint management of the portion of the Little Butte System falling within the City limits. Limited portions of the drainage system receive small amounts of urban storm water. Primarily, fall and winter water sheeting off adjacent fields is collected the remaining portions of open ditch, and transported across several drainage basins to final outfall into Little Butte Creek.

The Eagle Point Irrigation District impacts the City northwest of the community as irrigation water from the District's west lateral discharges over land to join water from the Little Butte Irrigation Company ditch system. Eagle Point Irrigation is the primary supplier of irrigation water for the Eagle Point Golf Course, discharging through various ponds and manmade wetlands to Little Butte Creek on the southern edge of the City. A small portion of Eagle Point water is transported (piped) in a southerly direction, through several small subdivisions, to meet Antelope Creek south of town.

Since 2000, all new development within Eagle Point has been required to detain urban storm water, primarily in earthen detention ponds discharging to natural drainage ways (Buchanan and DeAnjou drainage systems), and eventually to Little Butte Creek. All detention of water in the southern end of Eagle Point is accomplished within the boundaries of the Eagle Point Golf Course.

### **2.2.3.3 Animal Waste Management**

The City has implemented Pet Disposal Systems at two community parks where pets are encouraged. Additional public education on pet waste disposal will be a part of the ongoing TMDL management plan for the community.

The City will continue to participate as a Little Butte Creek Watershed Council Board member, and with the Oregon Department of Agriculture, to improve Animal Waste Management on farms and ranches upstream of Eagle Point.

#### **2.2.3.4 Containment Discharge Management**

Nonpoint source pollution comes from diffuse sources as opposed to point source pollution which is discharged by an individual facility through a pipe into a waterbody. Potential nonpoint fecal bacteria sources include wildlife, livestock waste, pets, and illegal discharges. Fecal bacteria can be deposited directly into a water body or transported into water bodies by runoff or subsurface flow. The behavior of typical nonpoint source bacterial pollution follows certain well-established patterns. Fecal material accumulates on ground surfaces within the watershed and is carried into streams and rivers during rainfall events. This pattern of low bacterial numbers in the summer and high values in the rainy season with the highest values during the first fall freshets has been seen in other watersheds west of Oregon's Cascade Mountains (DEQ 2001; DEQ 2003). The sources of the fecal bacteria are not always obvious. Many of these sources overlap in space and time; for instance, rural residential areas may have a failing septic system, livestock, pets, and wildlife.

Eagle Point's TMDL will address efforts to discourage illegal dumping of materials, from various sources, into unprotected storm drains. Efforts will include ordinance review and creation of an Illegal Dumping/Illicit Discharge Detection and Elimination Program. Pet waste issues are discussed in the prior section. Livestock are not maintained within the City limits; however wildlife issues along Little Butte Creek, particularly at the Eagle Point Golf Course, create challenging waste issues. This is particularly true of migratory water fowl frequenting the Eagle Point area at various times of the year.

#### **2.2.3.5 Failing Septic Systems**

Failing and/or poorly situated, on-site sewage systems can produce significant loads of *E. coli*. An on-site system may not be visibly failing, yet be located too close to streams to allow proper sewage treatment. If failing or poorly situated on-site systems were the dominant source of bacteria loading, bacteria concentrations would likely remain constant in the winter between rainfall events when soil is saturated due to constant loading. This pattern has not been observed in the Rogue River Basin or within the Eagle Point Study Area. While there may be some contribution from failing on-site sewage systems upstream of the City, all habitable structures within the City are required to be connected to the domestic sewer system. Since Eagle Point is part of the Rogue Valley Sewer District, both RVSS and City of Eagle Point crews monitor sewer discharges and potential impacts on adjacent water bodies.

#### **2.2.4 Agricultural Lands**

Approximately 8% of the Rogue River Basin is considered agricultural land use (NLCD 2001). Bacteria from livestock waste can be transported to the stream during rainfall/runoff events and bacteria in livestock waste can be directly deposited to streams while livestock are drinking. Septic systems, pets, and wildlife are also commonly associated with agricultural land. Differing management practices, especially those that

may result in irrigation return flows, may impact the delivery of fecal bacteria to water bodies from agricultural lands.

There are no agricultural lands within the City limits of Eagle Point, and, therefore, no rainfall or runoff issues directly related to the TMDL Study Area. However, the associated ranches and properties upstream of Eagle Point impact both Little Butte Creek and Antelope Creek, and have significant rainfall/runoff events distributing waste and bacteria in both creek systems. The resulting downstream impacts are significant to Eagle Point and the Rogue River. The diversion of stream water, reducing volumes by 300 +%, coupled with flood irrigation practices associated with upstream ranches and properties, make the resulting impacts to Little Butte and Antelope Creeks the most significant events affecting spring, summer and fall creek health.

### **2.2.5 Outreach and Education**

The City will continue to work with DEQ, Rogue Valley Council of Governments and the rest of the Regional Partnership on collective efforts to define the common educational problems and solutions. The City expects to utilize local publications, including brochures, the local newspaper and venues such as Harnish Wayside Park Visitor and Interpretive Center, to assist in educating local citizens and visitors about water quality and the health of Little Butte Creek. Partners, such as the Little Butte Watershed Council and the Medford Water Commission, have, and will continue to assist in promoting the value of a clean and healthy Little Butte Creek. The City and Watershed Council have also incorporated the assistance of local school officials in promoting 6<sup>th</sup> grade programs to teach the students about salmon health and water quality.

Current facilities at Harnish Wayside Park offer educational displays, real time water quality and quantity monitoring along with other educational facts about Little Butte Creek and the Little Butte Creek Watershed.

Water quality monitoring will continue, as it has for the past decade, through summertime sampling and testing. This established practice will be combined with new, on-line monitoring and testing at Harnish Wayside Park and Visitors Center. The aforementioned equipment was installed by the Jackson County Water Master, with funding assistance from the Medford Water Commission and the City of Eagle Point.

### **2.2.6 Regional Water Quality**

The City will continue participating with DEQ, RVCOG and other DMA's working towards better regional water quality through the TMDL Management Plan for Little Butte Creek.

### **2.2.7 Funding**

As resources become available, the City will continue to fund programs and specific actions through Parks and Recreation and Storm Water budgets. Grants and other funding

options will be explored with the help of regional partnerships, the Little Butte Watershed Council and the Medford Water Commission.

### **2.2.8 Monitoring and Reporting**

The City of Eagle Point will track TMDL implementation activities (implementation monitoring) and submit an annual report of activities completed using the matrix as a template. Reports will be submitted by September 30<sup>th</sup> for the July through June reporting period.

The TMDL Implementation Plan must include a way to assess its ability to meet the benchmarks set in the Plan to ultimately meet targeted water quality goals. Existing and new programs will be used as the basis to track program effectiveness.

### **2.2.9 Ongoing Plan Management**

Adaptive management is a vital component of meeting the TMDL requirements. At the end of each 5-year cycle, or at anytime within the 5-year cycle, the WQIP may be amended to address strategies failing to meet pollution reduction goals, or to enhance existing ones as new technologies and/or funding become available. Changes may also be made to accommodate unforeseen challenges in the Plan's implementation. As changes are made, the DMAs will provide explanatory summaries to the Department of Environmental Quality outlining the reason(s) for the alteration request.

## **2.3 MANAGEMENT STRATEGIES**

The following section provides summary information on general management strategies that can be used for each pollutant. Management strategies for the DMAs are described in detail in the implementation matrixes attached to this document.

### **Temperature**

#### **Near-Stream Vegetation Disturbance/Removal**

##### **Potential Management Strategies/Steps (Tools)**

1. Inventory existing programs and resources. This includes key personnel and departments, staff, existing programs, ordinances, comprehensive plans, and volunteer and watershed organizations conducting similar programs.
2. Identify and inventory key areas to protect and plant.
3. Protect key areas (using ordinances, conservation easements, acquisition, riparian garden program, forestry programs, and buffers).
4. Provide technical assistance, resource guides, and native plants.
5. Develop and/or support riparian planting programs focusing on tributary streams and the Rogue River.

6. Evaluate, expand, and strengthen riparian ordinances as needed.
7. Education and outreach to the community.
8. Training of City Staff.
9. Control invasive species. Develop and/or refine maintenance programs and incorporate planting of natives in place of removed invasives.
10. Identify and partner with existing programs.

## **Channel Modifications and Widening**

### **Potential Management Strategies/Steps (Tools)**

1. Inventory existing programs and resources. This includes key personnel and departments, staff, existing programs, ordinances, comprehensive plans, and volunteer and watershed organizations conducting similar programs.
2. Education and outreach to the community.
3. Training of City Staff.
4. Maintenance and operations protocol – roads, bridges, etc.
5. Implement Erosion prevention and sediment control for construction projects.
6. Use low impact development strategies.
7. Promote water conservation to keep more flows instream and reduce heated return flows.
8. Look at methods to keep more water in stream, e.g., the City of Eagle Point purchases industrial and irrigation water rights that have not been allocated to either the industrial or irrigation use and convert the use to municipal. The conversion process has allowed 1.25 cfs to be added to Little Butte Creek for additional summer water flow.

## **Bacteria**

### **Rural Residential and Urban Lands**

#### **Potential Management Strategies/Steps (Tools)**

1. Inventory existing programs and resources. This includes key personnel and departments, staff, existing programs, ordinances, comprehensive plans, and volunteer and watershed organizations conducting similar programs.
2. Education and outreach to the community. Focus on proper disposal of pet and animal waste, RV and gray water discharge, and the connection of storm drains and roadside ditches to streams and the Rogue River.
3. Training of City staff.
4. Provide bags for dog owners to pick up pet waste.
5. Work with SWCDs, watershed groups, and Oregon State University Extension to work with rural land owners including farmers and ranchers to manage livestock and other animal waste.
6. Promote water conservation and efficient use of water to reduce the amount of runoff and pollutants including bacteria from entering water ways.

7. Establish and/or refine illegal dumping/illicit discharge detection and elimination programs.
8. Identify best management practices and methods/treatment technologies that reduce bacteria levels in runoff.
9. Identify septic management programs including inspections, requirements, ordinances, staffing, etc. Evaluate and update program as needed.
10. Notify DEQ of failing septic systems when found.
11. Erosion prevention and sediment control for construction projects.
12. Promote the use of methods and practices that reduce urban runoff – Phase II Stormwater management programs, low impact development strategies, best management strategies.
13. Use the Rainstorming Binder to develop programs.

### **Potential Management Strategies: Bacteria and Temperature**

The following strategies are general programmatic strategies that address both bacteria and temperature TMDL requirements.

#### ***General Management Strategies:***

1. Develop an outreach strategy that identifies specific outreach/education projects, associated costs and distribution methods to address water quality parameters addressed in the TMDL. Consider regional coordination on some or all educational strategies.
2. Hold, participate in, and/or promote annual water quality events.
3. Participate in regional TMDL meetings.
4. Funding. Evaluate the costs of program implementation each program year and associated sources of funding including staff time, grants, general operating budgets, state clean water revolving loan funds, and other sources.
5. Identify funding opportunities, a strategy, and timeline for acquiring/providing funding.
6. Monitoring. Develop a program and/or use existing programs to track program effectiveness.
7. Reporting. Use the matrix as a template to track implementation plan activities. Submit reports annually.