6 Achieving Water Quality Criteria

When striving to achieve water quality criteria, meeting Partial Body Contact is the first benchmark. Once it is shown that the Watershed is achieving Partial Body Contact, management measures will begin to focus more aggressively on achieving Total Body Contact.

6.1 Water Quality Improvement Goals

The goals for the WMP are to achieve designated uses and desired uses by meeting water quality standards that are not currently being met. The specific goals to achieve the designated uses are to:

1. Reduce E.coli from contaminating the surface waters for restoration of total and partial body contact recreation.
2. Improve dissolved oxygen levels for restoration of warmwater fishery and other indigenous and aquatic life and wildlife.
3. Reduce sedimentation from degrading other indigenous aquatic life and wildlife.
4. Establish whether or not designated uses are being met in the subwatersheds lacking *E.coli* concentration and BST monitoring.
5. Educate stakeholders about the Watershed: known pollutants, sources and causes and voluntary best management practices that will improve water quality.
6. Create a sustainable strategy for implementing the Watershed Management Plan.
7. Evaluate the effectiveness of management measures through a long term evaluation and monitoring strategy.

The following tables outline the links between the designated uses, pollutants, sources, causes and the objectives to achieve water quality improvement.

Table Notes:
Known (k) = documented and measured during any of the inventory methods

Suspected (s) = indications or impacts of them were observed, but the pollutants or sources themselves were not measured

Potential (p) = identified based upon land use conducive to serving as a source of that pollutant, but no visual observation or measurements were made

Table 32. Goals and Objectives

Prioritized Designated Use	Goal	Pollutants and Impairments to Designated Uses	Sources (in priority order)	Causes (in priority order)	Objectives
Partial/Total Body Contact Recreation	Restore and maintain waterbodies for partial and total body contact recreation use	Pathogens (*E.coli)*(k)	1. Bovine and Equine (k)	1. Uncontrolled livestock access (k)	Implement exclusion fencing
				2. Poor pasture management (k)	Implement pasture management planning and implementation
				3. Overland runoff (lack of buffer) &/or setbacks at holding facilities (k)	Implement vegetative best management practices such as buffer strips and cover crops
				4. Lack of manure storage/compost facility (k)	Implement appropriate storage/compost facility
			2. Cropland (where manure is applied) (p)	1. Improper manure application (p)	Implement manure management planning and implementation
				2. Overland runoff (lack of buffer &/or cover crops) (p)	Implement vegetative best management practices such as buffer strips and cover crops. Implement wetland restoration
				3. Tillage practices (s)	Implement cropland management practices and conservation tillage
				4. Tiled fields (p)	Implement tiled field and water management technology and practices
			3. Septic Systems (k)	1. Lack of system (p)	Implement cost share/loan program to install modern system
				2. Failing system (p)	Implement cost share/loan program for failing systems
				3. Improper maintenance (p)	Implement education program on proper septic maintenance
			4. Pet Waste (s)	1. Failing to properly dispose of waste (s)	Implement education program on proper pet waste disposal
			5. Wildlife (p)	1. Overpopulation (p)	Implement MDNR population management practices
				2. Access to surface water (p)	Implement vegetative buffering practices

Table 32. Goals and Objectives

Prioritized Designated Use	Goal	Pollutants and Impairments to Designated Uses	Sources (in priority order)	Causes (in priority order)	Objectives
Other Indigenous Aquatic Life and Wildlife	Restore and maintain waterbodies for other indigenous aquatic life and wildlife	Sediment (k)	1. Cropland (s)	1. Tillage practices (s)	Implement cropland management practices and conservation tillage
				2. Overland runoff (lack of buffer) (s)	Implement vegetative best management practices such as buffer strips and cover crops. Implement wetland restoration
				3. Drainage network (s)	Implement recommended drain maintenance practices
			2. Livestock (s)	1. Uncontrolled livestock access (p)	Implement exclusion fencing
				2. Overland runoff (lack of buffer) &/or setbacks at holding facilities (k)	Implement vegetative best management practices such as buffer strips and cover crops
			3. Stormwater (s)	1. Overland runoff attributed to impervious surfaces: parking lots, driveways, etc. (s)	Implement urban and rural residential best management practices such as pervious pavement, low impact development, green infrastructure
				2. Turfgrass lawns (s)	Implement education program on landscaping with native plants
				3. Lack of buffer &/or vegetation such as mature trees, native plants (s)	Implement urban and rural residential best management practices such as riparian buffers, tree plantings, rain gardens

Table 32. Goals and Objectives

Prioritized Designated Use	Goal	Pollutants and Impairments to Designated Uses	Sources (in priority order)	Causes (in priority order)	Objectives
Other Indigenous Aquatic Life and Wildlife	Restore and maintain waterbodies for other indigenous aquatic life and wildlife	Sediment (k)	4. Construction (s)	1. Overland runoff attributed to lack of silt fencing/management practices in place (p)	Implement education program on connection between best management practices and water quality
				2. Bare soil/sparse vegetation after completion of project (p)	Implement best management practices such as native plants, trees, rain gardens, etc
				3. Lack of low impact development practices in place (p)	Implement best management practices such low impact development, pervious pavement
			5. Streambanks (s)	1. Altered morpohology and hydrology (s)	Implement channel stabilization and erosion control techniques
				2. Overland runoff (lack of vegetation) (s)	Implement stream bank stabilization, bio-engineering and erosion control
			6. Rill and gully erosion (s)	1. Concentrated flow from roadside ditch and agricultural land (s)	Implement education program on land use practices and connection to water quality
					Implement stabilization and erosion control techniques

Table 32. Goals and Objectives

Prioritized Designated Use	Goal	Pollutants and Impairments to Designated Uses	Sources (in priority order)	Causes (in priority order)	Objectives
Warmwater fishery and other indigenous aquatic life and wildlife	Restore and maintain waterbodies for warmwater fishery use and other indigenous aquatic life and wildlife	TSS (Dissolved Oxygen) (k)	1. Septic Systems (k)	1. Improper maintenance (p)	Implement education program on proper septic maintenance
				2. Failing system (p)	Implement cost share/loan program for failing systems
				3. Lack of system (p)	Implement cost share/loan program to install modern system
			2. Construction (s)	1. Overland runoff attributed to lack of silt fencing/management practices in place (p)	Implement education program on connection between best management practices and water quality
				2. Bare soil/sparse vegetation after completion of project (p)	Implement best management practices such as native plants, trees, rain gardens, etc
				3. Lack of low impact development practices in place (p)	Implement best management practices such as low impact development, pervious pavement
			3. Stormwater (s)	1. Overland runoff attributed to impervious surfaces: parking lots, driveways, etc. (s)	Implement urban and rural residential best management practices such as pervious pavement, low impact development, green infrastructure
				2. Turfgrass lawns (s)	Implement education program on landscaping with native plants
				3. Overland runoff (lack of buffer &/or vegetation such as mature trees, native plants) (s)	Implement urban and rural residential best management practices such as riparian buffers, tree plantings, rain gardens
			4. Pet Waste (s)	1. Failing to properly dispose of waste (s)	Implement education program on proper pet waste disposal
			5. Fertilizers (p)	1. Over application &/or improper use of fertilizers (p)	Implement education program on proper use of fertilizers, especially targeting landscaping companies, residents, garden centers, etc.

6.2 Objectives for the Watershed Goals

The pollution reduction goals of the WMP will be accomplished by implementing the outlined objectives in Table 32. Achieving the objectives will require partnerships, raising community awareness and focusing on Best Management Practices (BMPs) that will reduce the sources of nonpoint source pollution.

The goal to educate stakeholders about the Watershed will be addressed with the implementation of the information and education (I/E) strategy. A more detailed discussion of the goal, along with objectives is discussed in Chapter 8 (Information and Education Strategy).

The goal to create a sustainable strategy for implementing the WMP will be addressed in Chapter 10 (Sustainability) with an outline for where technical assistance and funding can be sought.

The goal to evaluate the effectiveness of BMPs through a long term evaluation and monitoring strategy will be addressed in Chapter 9 (Measuring Progress). This chapter will discuss an evaluation, *E.coli* reduction achievement and monitoring strategies.

Prioritized Best Management Practices

As a result of the identified priority designated uses, sources and causes related to the primary pollutant, *E.coli,* BMPs were selected to meet the reflecting goals and objectives. To meet all of the outlined criteria, prioritized BMPs reflect data collected during *E.coli* monitoring, and bacterial source tracking as well as, the agricultural practices survey. Based on our inventory, livestock and cropping are the primary sources followed by septic systems. Pets and wildlife are also included as suspected sources. Within each source BMPs that will result in the most direct reduction of *E.coli* loading were prioritized. It is also important to note that stakeholder buy-in, as reflected in the social indicator survey was considered. Meaning, to be successful with implementation of BMPs stakeholders have to be willing to voluntarily adopt a practice.

Critical zones have been established within Columbia Creek, Skinner-Extension Drain and Silver Creek subwatersheds to further prioritize implementation. BMPs within these critical zones will have the highest impact.

In subwatersheds (second and third phase) where *E.coli* monitoring is nonexistent, BMPs were prioritized based on defining parameters. Second phase subwatersheds defining parameters are high livestock density, septic areas of highest likely impact, and HIT model sedimentation results. Third phase subwatersheds defining parameters are other analysis, absence of TMDL, and identified gaps in data. To review the explanation of subwatershed ranking and defining parameters see Chapter 5.