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Introduction

Priority Management Zones are an important focus in this watershed strategy. In the past conservation efforts have tended to consist of broad efforts, spread across larger geographic areas or local government jurisdictions. Utilizing the priority management zone concept envisions more focused watershed restoration and protection activities, targeting specific lakes, streams, ditches, etc. The goal of determining priority management zones and making them the focus of efforts to protect and restore the waters of the Cannon River Watershed is to make better use of the finite staff and monetary resources available and increase the likelihood of achieving measurable water quality improvements.

Priority Management Zone Background

Definition

Areas or practices that contribute disproportionately high pollutant loads or have a capacity to greatly buffer pollutants or stressors are often referred to as Priority Management Zones (PMZs) or Critical Source Areas (CSAs). Non-point source pollution is diffuse in nature, but some areas or practices contribute significantly more pollutants to a watershed system than others, while some areas and practices are especially important because they can mitigate or offset pollution or other landscape and water body stressors. Additionally, some areas or practices are critical to maintaining ecological balance and stability in a watershed. A method to identify and prioritize these areas or practices is an important step in watershed restoration planning.

Nonpoint source pollution is difficult to address because no one site is responsible for the entire water quality impairment. By definition, it is the accumulation of many small discharges that added together creates the water quality impairment. Concentrating land treatment or conservation efforts, sometimes referred to as *precision conservation*, in these critical areas or zones, helps ensure that available resources are used as efficiently as possible and increases the likelihood water resources are improved and beneficial uses supported. The objective is to target areas or practices or consequences of practices responsible for discharging or have the potential to discharge the largest pollutant volume or have the greatest capacity to buffer or mitigate stressors, thereby making the best use of limited restoration and protection dollars.

In non-impaired areas, it is important to identify sensitive or vulnerable areas that must be protected to maintain system integrity. PMZ identification is a critical component in the creation of county and watershed scale water resource protection plans.

Scope or scale

PMZs can be delineated at a variety of scales from small to large. They may consist of broad areas of highly erodible soils or a particular geologic landscape like karst that transports pollutants quickly. PMZs might include particular land use practices scattered throughout a watershed or concentrated in a particular subwatershed or farm site. In addition to identifying priority management zones at a small scale, it can also be effective and economical to work on priority pollutant source reduction over a large scale, such as a multiple watershed basin.

Zone, Concept, Practice

Management priorities can be focused on a geographic area, an important concept or a particular practice:

(1) Geographic area: the headwaters of a stream are targeted with erosion control measures;
(2) Geographic area: stream channel instability downstream of an urban area is addressed;
(3) Concept/practice: nutrient management is focused on a karst region that exhibits high nitrate concentrations in streams;
(4) Concept/practice: stream buffers are installed at any location that shows inadequate riparian vegetation, per southeast Minnesota buffer inventory;
(5) Specific focus: a wastewater treatment plant's phosphorus load is reduced via permit.

Priority Management Zones and Concepts in the Cannon River Watershed

Priority Management Zones for the Cannon River watershed are broken up by the four watershed lobes: Upper Cannon River (Chapter 8), Straight River (Chapter 9), Middle Cannon River (Chapter 10), and Lower Cannon River (Chapter 11). The PMZs and Priority Management Concepts (PMCs) for each lobe were determined by local water resource professionals and citizens involved in water quality work in that lobe. Cannon River Watershed Partnership (CRWP) staff compiled a list of "assets" for each lobe. These "assets" are water quality data, studies, reports, and TMDL implementation plans which provide information about the condition of the lakes, streams, and rivers, identify issues or problems, or recommend management strategies. Many of the PMZs selected for each of the watershed lobes were clearly defined in existing assets. The assets for each lobe can be found in the Watershed Library on the CRWP's website (www.crwp.net). CRWP plans to keep the Watershed Library current with new assets for each watershed lobe as they are completed.

CRWP staff reviewed the assets in each lobe and created a table summarizing the highlights for each waterbody in the lobe. These summary tables can be found in Appendices F through I. To determine the PMZs and PMCs for each lobe, CRWP staff organized a meeting of local water resource professionals and citizens. In advance of each meeting CRWP staff sent out the summary tables and offered suggestions for PMZs and PMCs. These suggestions and additional ideas offered by attendees were discussed at the lobe meeting. Based on notes from the discussion and written comments CRWP drafted PMzs and PMCs in each lobe. The draft PMZs and PMCs were sent out for final comment to local water resource professionals and citizens and then finalized by CRWP staff.

Below are the PMZs and PMCs for each lobe. They are not listed in order of priority. See the respective lobe chapters for descriptions and action strategies for each PMZ and PMC.

Upper Cannon River Priority Management Zones and Concepts (Chapter 8)

1. Protection of the Lakes with Good Water Quality: Roemhildts Lake, Fish Lake, Kelly-Dudley, Perch Lake, and Charles Lake
2. Shields Lake: Phosphorus loading reduction
3. Lake Volney: Phosphorus loading reduction
4. Whitewater and Waterville Creek watersheds: Phosphorus, sediment, and *E.coli* bacteria loading reductions
5. Buffers: 50 foot perennial buffer installation on public waters using existing inventory and one rod (16.5 foot) perennial buffer installation on all public ditches
6. Upper Cannon River Green Corridor: Increase land protected along the Cannon River

Straight River Priority Management Zones and Concepts (Chapter 9)

1. Maple Creek: Flood reduction
2. Turtle Creek: Sediment loading reduction
3. Owatonna: Urban stormwater management
4. Straight River at Clinton Falls: Improve channel stability
5. Continued focus on fecal coliform/*E.coli* bacteria pollution reduction
6. Judicial Ditch 2 and Judicial Ditch 2-Lateral 2: Riparian buffer installation

Middle Cannon River Priority Management Zones and Concepts (Chapter 10)

1. Circle Lake: Phosphorus loading reduction
2. Rice Creek: Protection of brook trout habitat
3. Faribault and Northfield: Urban stormwater management
4. Middle Cannon River Green Corridor: Increase land protected along the Cannon River

Lower Cannon River Priority Management Zones and Concepts (Chapter 11)

1. Lower Cannon River Green Corridor: Increase land protected along the Cannon River
2. Trout Brook, Belle Creek and Little Cannon River: Erosion control with a focus on Highly Erodible Land (HEL)
3. Trout Brook: Nitrate management in karst areas
4. Little Cannon River and Belle Creek: Sediment load reduction with a focus on the stream channel and gullies
5. Little Cannon River: *E.coli* bacteria loading reduction

Refining PMZs in the Cannon River Watershed

The PMZs for each watershed lobe in this strategy were determined based on the best information available at the time. As more is learned about pollution sources, the PMZs in each lobe may change or be further refined. In each PMZ there are varying levels of knowledge about specific locations for restoration projects. For example, a TMDL study is in draft form for Lake Volney which provides specific recommendations for wetland restoration and other projects to reduce phosphorus loading to the lake. In contrast, there is not information for the Little Cannon River or Belle Creek about specific sediment sources yet, but a project is planned to begin this summer to gather that information.

Research Underway

In the Cannon River watershed there are several research projects that will provide useful data to refine the PMZs.

1. Lower Cannon River Turbidity Reduction Project (2011 – 2015)
   This project is slated to begin in summer 2011 pending funding from a 319 grant from the MPCA. The University of Minnesota and CRWP will work on sediment source identification in the Little Cannon River and Belle Creek subwatersheds to develop a list of potential projects. Landowners will provide input on the projects and help to carry them out.

2. Intensive Watershed Monitoring and Stressor Identification (2011-2013)
   The Minnesota Pollution Control Agency, with assistance from CRWP and volunteers, will be carrying out their once a decade intensive watershed monitoring to study the biology and conditions of the rivers, streams, and lakes of the Cannon River watershed. For more information on intensive watershed monitoring see appendix B.

   Stressor identification is a formal and rigorous process that identifies stressors causing biological impairment of aquatic ecosystems, and provides a structure for organizing the scientific evidence supporting the conclusions (EPA, 2000). In simpler terms, it is the process of identifying the major factors causing harm to fish and other river and stream life. Stressor identification is a key component of the major watershed restoration and protection projects being carried out under Minnesota's Clean Water Legacy Act.

   Together, intensive watershed monitoring and stressor identification will provide more focus for priority management zones and concepts.

3. Little Cannon River SWAT Model
   A simulation study using the SWAT (Soil Water Assessment Tool) model in the Little Cannon watershed has been initiated by the MPCA to gain a better understanding of water quality issues – including sediment sources – in the watershed. In SWAT, a watershed is divided into multiple subwatersheds, which are then further subdivide into hydrologic response unit (HRUs) that consist of homogeneous land use, management, and soil characteristics. Flow generation, sediment yields, and nonpoint-source loadings from each HRU in a subwatershed are summed, and resulting loads are routed through channels, ponds, and/or reservoir to the watershed outlet. Key components of SWAT include hydrology, plant growth, erosion, nutrient transport, and transformation, pesticide transport, and management practices.

4. Straight River GSSHA Model (2009 – 2011)
   As part of the process to develop the Straight River Turbidity TMDL the Minnesota DNR has developed a Gridded Surface Subsurface Hydrologic Analysis (GSSHA) model for selected subwatersheds of the Straight River watershed. The model will be used to test Best Management Practice scenarios that could be implemented to achieve goals of the turbidity TMDL.

Future Needs

Past conservation efforts have been primarily about voluntary conservation; practices and structures installed where there was the desire of the landowner for something to be done. As we make the transition to targeted conservation and PMZs more and better information will be helpful. The following is a list of some of the research, tools and skills needed in the Cannon River watershed to help us do a better job of identifying the PMZs.

- GIS Data: Geographic Information Systems data can be a powerful tool in helping understand land and water processes. In 2010 a buffer inventory was completed to assess the land use on rivers and streams considered public waters in Southeast Minnesota. This gives us information as to what areas need to have buffers to comply with shoreland rules. Additional GIS needs include:
    a. Develop a digital inventory of the public ditch systems to identify conditions of the system, areas that need to be repaired, and areas buffers are needed.
    b. Shoreland inventory of the lakes to identify problem areas.
    c. Training and equipment for staff at county and SWCD offices on how to use GIS, LiDAR data, conduct Terrain Analysis, and put the results of that analysis to work identifying areas where BMPs can be most effective. Alternatively, it may be that a regional staff person(s) could be provided by BWSR or another entity that could help to fill this need.
- Modeling: The SWAT and GSSHA modeling should be applied in their respective watersheds. Developing these models in other parts of the Cannon River watershed would help provide further BMP targeting.
- Hydrology Assessment: Research is needed to better understand flooding and the best solutions for keeping water in place and reducing peak flows.
- Sediment Source Identification: As we are planning to do in the Lower Cannon Turbidity Reduction project, studying other subwatersheds to better understand sediment sources is a priority.
- Civic Engagement : As noted above, the people living in the watershed must make change happen if we are to see improvements in our water. Supporting and facilitating this process of change is the job of the water quality professionals and partners. We need to find means to engage people and provide to them opportunities to take action. The TMDL process to date has not provided sufficient opportunities for civic engagement. Staff and community leaders in the watershed need training and guidance on how to do this differently and better.

  In addition to the water monitoring, field measurements and technical data there is a need to understand the ability and capacity of the people living in the watershed communities to make changes needed to reach water quality goals. CRWP and other partners have some anecdotal data about this but there have been no real community assessments to date to help us understand what the capacity is within the watershed.

  More information regarding Civic Engagement process and needs is in Chapter 7.