

## 1 ISSUES, GOALS AND IMPLEMENTATION ACTIVITIES

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After identifying the priority concerns to be addressed in the Cannon River Watershed Management Plan, issue statements were defined, measurable goals were developed and implementation activities were assigned to address the goals. Local and regional management plans were used to identify measurable goals and implementation activities supplemented with local knowledge of the specific resource protection and restoration needs. Using existing studies and plans promotes implementation by highlighting previously identified, matching goals by counties, state and federal agencies, and other entities as well as potential project partners.

This section identifies the issues, goals and implementation activities for the Tier One priorities and issues and goals for the Tier Two priorities. The order in which this information is presented follows the same structure provided in previous sections of the Plan: issues are grouped by Watershed Management Component (Resources, Landscape Alterations, and Socioeconomic Factors). For each issue, the following information is provided:

1. **Introductory Paragraph:** Watershed-wide characterization of the overall issue.
2. **Priority Area Summary:** Identification of the priority area(s) for this issue and a brief description of why this area(s) was identified as a priority for the first 10-year timeframe of the Cannon River 1W1P.
3. **Issue Statement:** More refined description of each sub-issue as it relates to the priority area(s).
4. **Desired Future Condition (Long-term Goals):** Statement describing the desired long-term, future condition for the issue.
5. **Measurable Goals (Mid-term Goals):** Goal(s) needed to address the issue in the 10-year timeframe of the Plan.
6. **Implementation Activities:** Implementation activities that will achieve the measurable goal(s). These are countable projects, activities, services, or products that can be tracked as progress towards achieving the goals.

This same structure will be repeated in the 10-year Implementation Plan presented in Section 4 of the Cannon River 1W1P where estimated costs, schedule for implementation, project partners and measurable outcomes will be provided.

## 1.1 RESOURCE CONCERNS

### 1.1.1 LAKES, STREAMS, AND RIVERS

The Cannon River 1W1P planning area consists of two river systems: the Cannon River and the Straight River. From the South, the Straight River headwaters begin as a fan of smaller streams and ditches, connects with several larger creeks as it flows north, and then joins with the Cannon River in Faribault. The headwaters of the Cannon River begin as the outflow of Shields Lake on the western side of the watershed, flows through alternating chains of streams and lakes, and then flows east through the Cannon Lake Reservoir before joining with the Straight River in Faribault. The Cannon River then continues to travel east, through the Byllesby Reservoir, and through the bluffs in the Driftless Area near Welch. The Driftless Area has many coldwater springs that feed tributary streams to the Cannon River before it empties into the Mississippi River north of Red Wing. There are 191 lakes at least 10 acres in size, with most of the lakes concentrated in the Upper Cannon River Lobe located in the western portion of the planning area.

Commented [MF1]: Or list number of recognizable lakes – to be provided by MPCA

In 2016, there were 36 lakes and 46 stream reaches that were impaired for recreation or aquatic life uses in the Cannon River Planning Area. Reduction in pollution or improvement in habitat or other physical issues is needed to restore the recreational and aquatic life use functions of these lakes and streams. Pollution sources and stressors to impaired lakes and streams have been identified through TMDL studies including: excess phosphorus, excess turbidity/TSS, excess nitrate, excess ammonia, low dissolved oxygen, lack of stream connectivity/fish passage, lack of physical habitat, and flow alteration.

In addition to restoration efforts, there are 5 high quality lakes and several coldwater, trout streams in need of protection. These lakes and streams currently support recreation and aquatic life uses, but need measures in place to maintain or improve the current conditions to ensure these high quality waters do not become degraded in the future.

### PRIORITY AREA SUMMARY

#### Protection Lakes (T1)

Four high quality lakes (Dudley, Fish, Kelly, Roemhildts) are located in the Lakes Priority Area, and one high quality lake (Beaver) is located in the Straight River Tributary Priority Area. Four of the five lakes are ground-water dominated (see Groundwater Dependent Natural Resources – Protection Lakes).

#### Impaired Lakes (T1)

Most of the impaired lakes in the watershed are located in the Lakes Priority Area, including 3 lakes that are very close to meeting the water quality standards that also have had preliminary lake phosphorus modeling completed (Cedar, Fox, and Hunt).

#### Pollutant Impaired Streams (T1)

The impaired streams to be restored as part of the first 10-year plan were identified where implementation in the impaired stream drainage area would achieve multiple benefits: phosphorus and nitrate reductions, protection of groundwater in sensitive areas, and improving stream fish and macroinvertebrate communities. These streams are located in the Straight River Tributary and the Cannon/Mississippi River Bottom Priority Areas. Five of the impaired streams are coldwater, trout

streams: Pine Creek, Little Cannon River, Belle Creek, Spring Creek, and Rice Creek (aka Spring Brook).

**Non-Pollutant Stream Stressors (T2)**

Thirty-four streams in the Cannon River Planning Area were impaired for a lack of biological assemblage in the 2013 MPCA assessment. Given that these resources are located throughout the Planning Area, implementation activities to address the impairments will likely be watershed-wide. Future plan revisions may include a prioritized approach for addressing these impairments.

**Monitoring Data (T2)**

There is an existing watershed monitoring framework (IWM, pollutant load monitoring), but future plan revisions may include frequent monitoring in priority watersheds to assess progress towards achieving resource goals for Tier One lakes and streams.

**A. Protection Lakes T1**

**ISSUE STATEMENT**

There are five high quality lakes in need of protection: Beaver, Dudley, Fish, Kelly, and Roemhildts (Figure 1-1). These lakes are all groundwater dependent (except Roemhildts) with a very small surface contributing drainage area, which has kept phosphorus loading to these lakes low and preserved their high water quality. While these lakes currently support recreation, they could become degraded in the future if phosphorus loads increase or there are changes to the groundwater contribution to these lakes.

**DESIRED FUTURE CONDITION:**

Maintain or improve water quality (as measured by the growing season average in-lake phosphorus concentration, chlorophyll-a concentration, and Secchi depth) compared to observed conditions reported in Appendix 6.2 of the MPCA 2014 Cannon River Watershed Monitoring and Assessment Report (see Table 1-1).

**Table 1-1. Observed conditions for Tier One Protection Lakes in the Cannon River 1W1P (Source: Appendix 6.2 in MPCA 2014 Cannon River Watershed Monitoring and Assessment Report)**

Protection Lake	Observed Water Quality Conditions		
	Total Phosphorus (ug/L)	Chlorophyll-a (ug/L)	Secchi Depth (m)
Beaver	22	9	1.4
Dudley	28	14	2.2
Fish	15	4	4.0
Kelly	42	14	2.1
Roemhildts	17	6	3.1

**MEASURABLE GOALS:**

**Goal 1:** Maintain or improve water quality in the 5 high quality lakes by achieving all of the phosphorus reduction goals (lb/yr) identified in Table 1-2.

**Goal 2:** Maintain the quality and quantity of groundwater to groundwater-dependent protection lakes (see goal under Groundwater Dependent Natural Resources – Protection Lakes).

**Table 1-2. Existing Phosphorous Loads and Load Reduction Goals for Tier One Protection Lakes in Cannon River 1W1P (Source: 2016 Cannon River WRAPS)**

Protection Lake	Lake Phosphorous Load		
	Existing [lb/yr]	Goal [lb/yr]	Reduction [lb/yr]
Beaver	42	37	4
Dudley	322	282	40
Fish	46	40	7
Kelly	401	353	49
Roemhildts	701	617	84

**POTENTIAL IMPLEMENTATION ACTIVITIES:**

- Complete lake management plans to identify phosphorus sources (\$5,000 per lake)
- Protect or restore native riparian vegetation by implementing a 50-foot buffer on 10% of the lake shoreline (\$2,358)
- Convert 10% of vulnerable cropland to perennial vegetation via easements (\$58,254)
- Promote soil health through cover crops, tillage on 20% of cultivated cropland (\$2,044)
- Promote shoreline septic improvements and maintenance (0.25 staff hours per year)
- Maintain or increase perennial vegetation in watersheds via zoning overlap or easements (staff hours per year?)
- Require land in shore impact zone to be established, maintained, or restored in native/perennial riparian buffer at the time of development or at the time of permit issuance
- Adhere/increase shoreland setbacks.
- Coordinate with non-LGU partners to monitor these lakes every five years, and review progress towards meeting phosphorous load reduction goals.

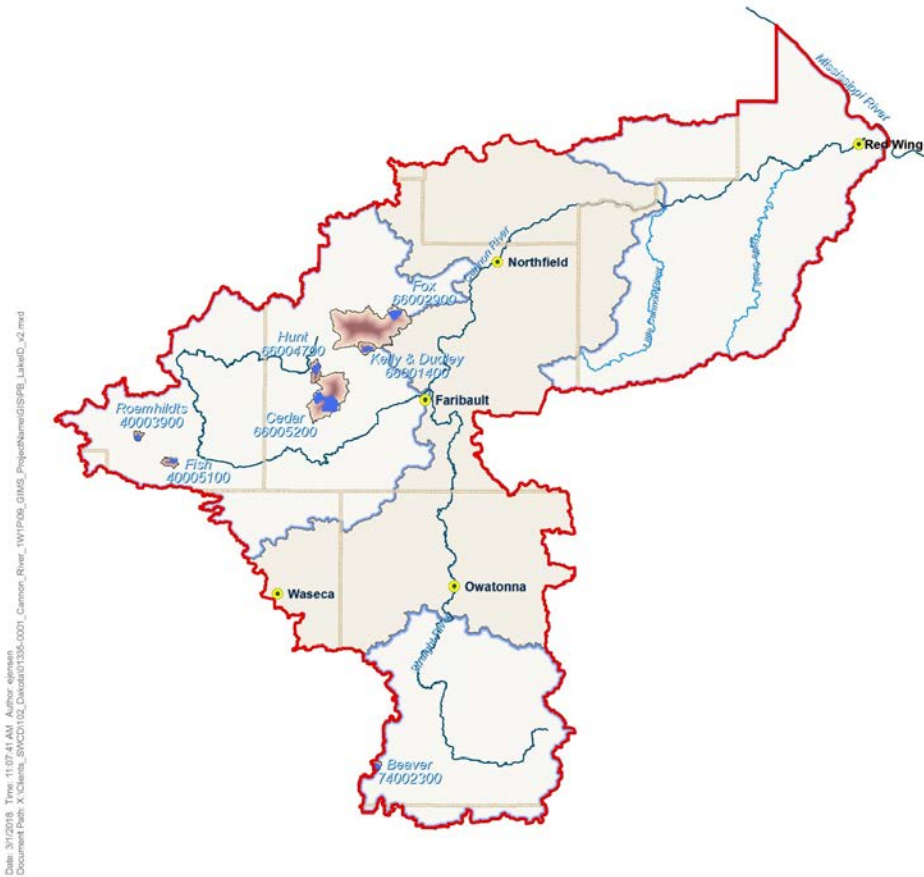


Figure 1-1. Drainage Areas to Tier One Lakes (Protection and Impaired)

**B. Impaired Lakes** **T1**

**ISSUE STATEMENT**

In 2016, there were 36 lakes that did not support aquatic recreation use due to elevated nutrients that cause unsightly algae blooms and can make swimming undesirable or unsafe. Some lakes are impaired because they receive excess phosphorus from watershed runoff, while other lakes are impaired due to legacy phosphorus (i.e. internal loading). Dissolved oxygen dynamics, fish communities and aquatic plants can all be a part of internal nutrient cycling. A BATHTUB framework was developed for the Upper Cannon Lakes, which provided the basic linkages among the lakes and allowed for development of water and TP budgets for the lakes. However, additional investigation is needed to address the high uncertainty in this initial modeling effort due to several

factors: high and variable in-lake TP, extreme shallowness of several lakes, high uncertainty in internal loading estimates, and limited stream TP and flow data.

**DESIRED FUTURE CONDITION:**

10-year growing season average in-lake phosphorus concentration, chlorophyll-a concentration, and Secchi depth that meet the water quality standards.

**Table 1-3. Observed conditions and water quality standards for Tier One Impaired Lakes in the Cannon River 1W1P (Source: Appendix 6.2 in MPCA 2014 Cannon River Watershed Monitoring and Assessment Report)**

Impaired Lake	Lake Type	Observed TSI Phosphorus	TSI Phosphorus Goal
Cedar	Deep	62	<57
Fox (strong evidence for decreasing trend in water clarity)	Deep	69	<57
Hunt	Shallow	65	<63

**TSI = Trophic State Index, a measure of the overall productivity (or greenness) of lake water. Higher TSI means more nutrients and more algae.**

**MEASURABLE GOALS:**

**Goal 1:** Achieve phosphorous load reduction goals identified in the lake management plans for the Tier One impaired lakes (Cedar, Hunt and Fox).

**POTENTIAL IMPLEMENTATION ACTIVITIES:**

- Complete lake management plans to identify phosphorus sources. Cedar, Fox and Hunt lakes are all part of a Science Museum of Minnesota project designed to improve the accuracy of lake phosphorus budgets in the upper Cannon watershed that were completed as part of the lake TMDLs study. The study will provide better estimates of watershed versus internal phosphorus loads, and identify reduction goals needed for the lakes to meet water quality goals. (\$0)
- Implement a 50-foot buffer on 10% of the lake shoreline (\$4,773)
- Convert 10% of vulnerable cropland to perennial vegetation via easements (\$405,286)
- Promote soil health through cover crops, tillage on 20% of cultivated cropland (\$27,869)
- Promote shoreline septic improvements and maintenance (0.25 staff hours per year)

**C. Pollutant Impaired Streams T1**

**ISSUE STATEMENT**

There are 45 impaired streams in the Cannon River Planning Area. Excessive bacteria that may make activities in or on the water unsafe were found in rivers and streams across the watershed, including the Straight River, Cannon River, and many smaller streams for a total of 41 impairments.

Bacteria issues are widespread not only in the CRW, but much of the Lower Mississippi River Basin. Fish and macroinvertebrate communities across the watershed are showing a loss of sensitive species due to habitat loss and excess sediment and nitrate. All of the designated trout waters in the Lower Cannon Watershed lobe meet the criteria for the southeast Minnesota coldwater Fish Index of Biotic Integrity, however these streams are also impaired for nitrates, TSS, and/or Macroinvertebrate Index of Biotic Integrity. Changes in land use have the potential to adversely impact cold water fisheries (trout streams) due to increasing nitrate concentrations in groundwater, excess pollutant loads and increased water temperatures from stormwater runoff, and bank destabilization. For example, Rice Creek condition monitoring shows signs of stress from unstable banks and high nitrates, which may be contributing to degraded macroinvertebrate communities. Trout streams require cold water temperature regimes due to their high connectivity to groundwater.

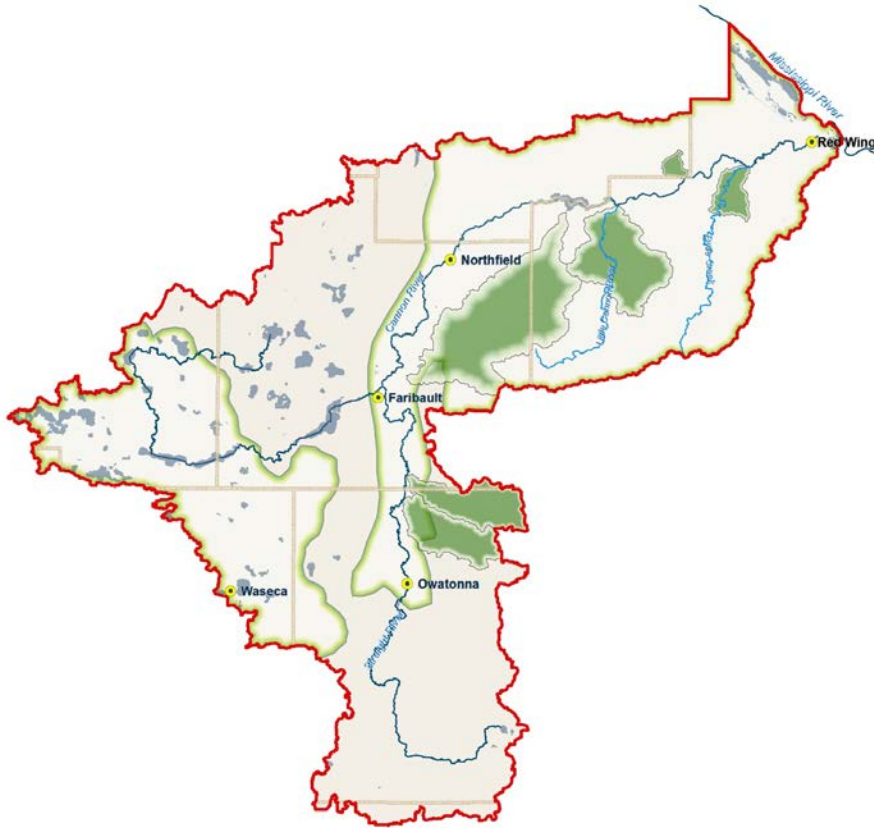
The impaired streams to be restored as part of the first 10-year plan were identified where implementation in the impaired stream drainage area would achieve multiple benefits: phosphorus and nitrate reductions, protection of groundwater in sensitive areas, and improving stream fish and macroinvertebrate communities (Table 1-4. These streams are located in the Straight River Tributary and the Cannon/Mississippi River Bottom Priority Areas. Five of the impaired streams are coldwater, trout streams: Pine Creek, Little Cannon River, Belle Creek, Spring Creek, and Rice Creek (aka Spring Brook).

Table 1-4. Tier One Impaired Streams

AUID	Name	Multiple Benefits
-735	Belle Creek	<ul style="list-style-type: none"> <li>• Groundwater sensitive area</li> <li>• Coldwater trout stream</li> <li>• TSS and <i>E. coli</i> impairments</li> <li>• Top 25% TN/TP yielding subwatershed</li> <li>• Drains to large river recreation area</li> </ul>
-526	Little Cannon	<ul style="list-style-type: none"> <li>• Groundwater sensitive area</li> <li>• Coldwater trout stream</li> <li>• Nitrate, TSS and <i>E. coli</i> impairments</li> <li>• Top 25% TN/TP yielding subwatershed</li> <li>• Drains to large river recreation area</li> </ul>
-567	Trout Brook	<ul style="list-style-type: none"> <li>• Groundwater sensitive area</li> <li>• Coldwater trout stream</li> <li>• Nitrate and TSS impairments</li> <li>• Top 25% TN/TP yielding subwatershed</li> </ul>
-504	Prairie Creek	<ul style="list-style-type: none"> <li>• Groundwater sensitive area</li> <li>• M-IBI, TSS and <i>E. coli</i> impairments</li> <li>• Top 25% TN/TP yielding subwatershed</li> <li>• Drains to large river recreation area</li> </ul>
-505	Rush Creek (trib. to Straight River near Faribault)	<ul style="list-style-type: none"> <li>• Groundwater sensitive area</li> <li>• TSS and <i>E. coli</i> impairments</li> <li>• Top 25% TN/TP yielding subwatershed</li> </ul>

One Watershed, One Plan-Cannon River Watershed

AUID	Name	Multiple Benefits
-547	Medford Creek (trib. to Straight River near Faribault)	<ul style="list-style-type: none"> <li>• Groundwater sensitive area</li> <li>• F-IBI and M-IBI impairments</li> <li>• Top 25% TN/TP yielding subwatershed</li> </ul>



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Figure 1-2. Drainage Areas of Tier One Streams with Multiple Benefits



One Watershed, One Plan-Cannon River Watershed

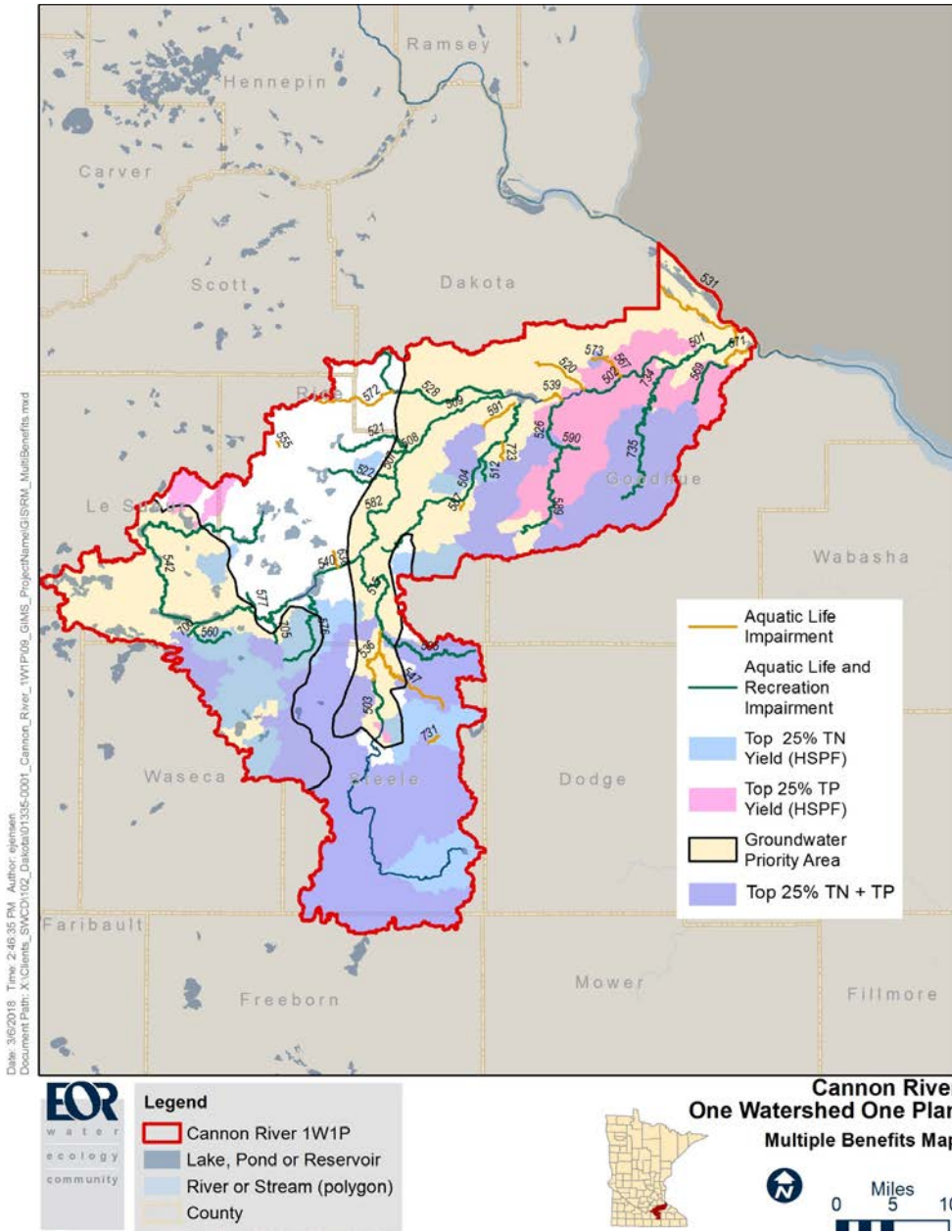


Figure 1-3. Areas with overlapping Multiple Benefits

DESIRED FUTURE CONDITION:

Fish IBI that meet water quality standards in all coldwater, trout streams. TSS, Nitrate, and M-IBI that meet water quality standards in all Tier One impaired streams.

**MEASURABLE GOALS:**

- Goal 1:** 10% reduction in the number of TSS samples exceeding the water quality standard (10 mg/L for coldwater, 65 mg/L for warmwater streams) at high (storm event) flows and no increase in the number of nitrate samples exceeding the water quality standard (10 mg/L) at low (baseflows) in the Tier One impaired streams.

**POTENTIAL IMPLEMENTATION ACTIVITIES:**

- One streambank stabilization project completed every two years on Tier One impaired streams with known problems (\$500,000).
- X number of feedlot management plans/year in Belle, Little Cannon, Prairie and Rush drainage areas (0.25 FTE)
- X number of septic system upgrades/year in Belle, Little Cannon, Prairie and Rush drainage areas (0.25 FTE)
- Convert 10% of vulnerable cropland to perennial vegetation via easements in Tier One stream drainage areas (\$2,925,630) – See Agriculture Runoff Implementation Activities
- Promote soil health through cover crops, tillage on 20% of cultivated cropland in Tier One stream drainage areas (\$441,441) – See Agriculture Runoff Implementation Activities
- Collect bi-monthly TSS, TP, and nitrate samples in the impaired streams to develop a long-term monitoring record.
- Cooperate with researchers and others to determine the routes of nitrogen transport from surface water to groundwater in the Trout Brook subwatershed by sharing data, sitting on advisory committees, and/or co-sponsoring or supporting research grants.
- Reduce bacteria/ *E. coli* concentrations by implementing rotational grazing and livestock exclusion on 25% of total acreage of grazed riparian areas across County.
- Protect baseflow via monitoring and application of water appropriation analysis

**D. Non-Pollutant Stream Stressors**

**T2**

**ISSUE STATEMENT**

Stream fish and macroinvertebrate communities across the watershed are showing a loss of sensitive species due to non-pollutant stressors, such as elevated stream temperature (1 stream), low dissolved oxygen (5 streams), degraded habitat (22 streams), physical connectivity (2 streams) and flow alterations (1 stream). These biological communities are also impacted by pollutant stressors (phosphorus, nitrate, and total suspended solids). Pollutant reductions needed to achieve goals for Lakes and Streams 3.1.1, Groundwater 3.1.3, and Agriculture 3.1.4 included in the first 10-year plan will also benefit stream biological communities.

**DESIRED FUTURE CONDITION:**

Fish and macroinvertebrate IBI scores that meet water quality standards in all streams.

**MEASURABLE GOALS:**

*Goals for this Tier 2 issue to be determined during next generation of the Cannon River IWIP and will be based on the recommendations included in the 2015 MPCA Stressor Identification Report.*

**E. Monitoring Data**

**T2**

**ISSUE STATEMENT**

There is an existing watershed monitoring framework (IWM, pollutant load monitoring), but future plan revisions may include frequent monitoring in priority watersheds to assess progress towards achieving resource goals for Tier One lakes and streams.

**DESIRED FUTURE CONDITION:**

Long-term water quality trends in Tier One lakes and streams to assess progress towards achieving resource goals.

**MEASURABLE GOALS:**

- Goal 1:** Develop a monitoring program in coordination with state-wide monitoring efforts to assess progress towards achieving resource goals for Tier One lakes and streams.

**POTENTIAL IMPLEMENTATION ACTIVITIES:**

- Develop monitoring program for the entire Cannon River Planning Area
- Adopt monitoring program as funding and staff capacity allow
- Collect one microbial source tracking sample during a low and high flow event in 25% of (or 10) streams with an *E. coli* impairment

**1.1.2 WETLANDS**

Wetlands provide many important functions in a watershed, such as nutrient reduction, pollutant filtering, and wildlife habitat. Wetland storage in the planning area promotes groundwater recharge and maintains baseflow in the otherwise, heavily drained agricultural region. The groundwater baseflow is critical for protecting high quality groundwater-fed lakes and trout streams (see Section 3.1.3 – Groundwater).

Approximately 81% of the historic wetlands have been lost from the Cannon River Planning Area including a 10,000-acre wetland in the Straight River Lobe. While some efforts to restore wetland acreage has occurred over the last few decades, additional restoration is needed to reduce flooding, improve water quality and provide for groundwater recharge. Wetland restoration projects are limited by a need for funding to provide financial and technical assistance to landowners.

**PRIORITY AREA SUMMARY**

### Straight River Tributary Area + Lakes Area (T1)

Wetlands are important watershed-wide to provide flood mitigation for larger communities. Until a watershed-wide hydrologic & hydraulic model is developed to more accurately characterize how runoff is generated and delivered throughout the system, but will be prioritized the priorities will be first in the Straight River Tributary Priority Area and the Lakes Area. Wetland improvements in both of these areas have secondary benefits, such as wildlife habitat, improving lake and stream water quality and groundwater recharge in heavily tilled, agricultural areas. Moreover, historic wetland loss rates were the highest in the Straight River drainage area.

#### A. Wetland ~~Storage~~Restoration

T1

##### ISSUE STATEMENT

The stormwater storage function is the highest valued wetland service because wetlands provide mitigation for property-damaging floods caused by high volumes of stormwater runoff exacerbated by land use alterations and extreme precipitation events.

##### DESIRED FUTURE CONDITION:

Wetlands are re-established in the landscape to provide multiple benefits including flood mitigation and stormwater attenuation services.

##### MEASURABLE GOALS:

- Goal 1:** Net gain of ~~X%~~ or ~~X~~ ac-ft of stormwater storage in wetlands in the priority areas 29 acres in the Upper Cannon HUC10 and the 23 acres in the Chub Creek HUC10 of restored wetland pool and buffer area per the 2016 WRAPS goal for restored wetlands. These goals were set to achieve nitrogen reductions but can serve as an interim goal for increasing water storage until more specific goals can be set from a more detailed H&H model is completed for the Planning Area.

##### POTENTIAL IMPLEMENTATION ACTIVITIES:

- Develop inventory of wetlands and identify areas storage-focused restoration projects.
- Add key remaining parcels from Straight River Marsh Restoration project. Highlight that project as a success.
- Promote and market 20 acres of wetland preservation and restoration programs such as CRP, WRP, RIM by holding 1 annual public meeting and by including discussion in the annual Farmer's Forum agenda.
- Signage for benefits of wetland restorations.

#### B. Wetland ~~Services~~Protection and Enhancement

T2

##### ISSUE STATEMENT

Existing wetlands deserve protection because they provide a host of services (functions) that are highly valued by society.

#### DESIRED FUTURE CONDITION:

All of the wetlands in the Cannon River Planning Area provide the following services (functions):

- Vegetative Diversity/Integrity
- Maintenance of Characteristic Hydrologic Regime
- Flood/Stormwater/Attenuation
- Downstream Water Quality
- Maintenance of Wetland Water Quality
- Shoreline Protection
- Maintenance of Characteristic Wildlife Habitat Structure
- Maintenance of Characteristic Fish Habitat
- Maintenance of Characteristic Amphibian Habitat
- Aesthetics/ Recreation/ Education/ Cultural
- Commercial Uses
- Groundwater Interaction

#### MEASURABLE GOALS:

- Goal 1:** Protect the current acreage of existing wetlands in the watershed and enhance the capacity for these wetlands to provide a full suite of services focusing on services that are most highly valued.

#### POTENTIAL IMPLEMENTATION ACTIVITIES:

- Conduct a watershed-based functional assessment to determine current level of services wetlands provided.
- Conduct a wetland values evaluation to determine which wetland services are most highly valued.
- Adopt standards that protect wetlands from stressors that negatively affect highly valued services.
- Implement wetland restoration and enhancement projects that provide functional lift.

#### 1.1.3 GROUNDWATER

Groundwater is an important resource for the communities in the Cannon River 1WIP planning area. Groundwater accounts for over 85 percent of the water that is pumped to meet agricultural, industrial, drinking water and other water-used needs. In fact, groundwater accounts for 100 percent of the region's drinking water. There are a number of Community Public Water Supply Wells that have high to moderate potential contaminant risk. Drinking water protection concerns include historic contamination of municipal well field with trichloroethene, high nitrate values and radionuclides and arsenic (which are both naturally occurring).

In addition, the Cannon River 1WIP planning area contains a number of groundwater-dependent natural resources including calcareous fens, designated trout streams and other unique and sensitive native plant communities. These groundwater resources are at risk from the introduction of pollutants

due to the high concentration of karst features along the Straight River and in the lower half of the planning area. For example, townships tested in Dakota County exceed the drinking water standard of 10 mg/L for nitrate in more than 10% of the samples. As a result, it is important to make sure that adequate supplies of high quality groundwater remain available for residents and businesses of the region as well as for some of the region's natural resources.

**PRIORITY AREA SUMMARY** (Refer to Groundwater Priority Area Figure)

**Drinking Water Protection (T1)**

Drinking water protection was identified as a priority for all of the residents of the Cannon River 1W1P Planning Area. Specifically, communities with moderate or high vulnerabilities and private well owners in areas of moderate or high pollution sensitivity are of particular concern due to the karst formations and highly permeable soils. These areas require a higher level of management to protect drinking water supplies.

**GW Dependent Natural Resources – Protection Lakes (T1)**

Of the five protection lakes located in the Groundwater Dominated Lakes Area, four are groundwater dependent (Kelly is not groundwater dependent). Maintaining the quantity and quality of groundwater to these resources will be a critical protection strategy for these lakes recognizing that the groundwatershed is likely larger than the drainage area (subwatershed) to the resources.

**Groundwater Recharge (T2)**

Local recharge will take place in the most sensitive areas where groundwater recharge occurs quickly: the Pollution Sensitivity Area.

**GW Dependent Natural Resources – Trout Streams & Calcareous Fens (T2)**

The Cannon River Planning Area is home to a number of high quality groundwater dependent natural resources including trout streams, groundwater dependent lakes and calcareous fens. These groundwater dependent natural resources are distributed throughout the Planning Area. As a result, maintaining the quantity and quality of groundwater to these resources is a watershed-wide issue.

**A. Drinking Water Protection T1**

**ISSUE STATEMENT**

Groundwater is the source of all drinking water in the Cannon 1W1P region. Public water suppliers provide 70% of the population's drinking water from over 200 different wells. 87 of these wells are located in highly vulnerable settings. Of these public water suppliers, 20 are larger municipal communities serving a large portion of the population. These systems are tested for over 100 contaminants, are responsible to provide treatment, and must implement an approved Wellhead Protection Plan.

30% of the residents of the Cannon River 1W1P area rely on a private well for the water they drink. However, because no public entity is responsible for water testing or management of a private well after drilling is completed, these well owners have the sole responsibility for the health and safety of their drinking water.

Contaminants of concern for all drinking water can be human sourced or naturally occurring. Of greatest concern is nitrate, which affects large regions. Other contaminants of concern include pathogens, arsenic, radium, and synthetic/organic chemicals in isolated areas. Aquifer vulnerability determines the level of management required to protect a drinking water supply and provides an opportunity to target implementation practices in accordance with the level of risk different land uses pose.

#### **DESIRED FUTURE CONDITION:**

Aquifers that provide drinking water are protected from surface contamination and provide safe and adequate drinking water for public and private wells. Natural sources of drinking water contaminants are minimized with management or treatment to meet or exceed drinking water standards.

#### **MEASURABLE GOALS:**

- Goal 1:** In partnership with public water suppliers, provide annual education/outreach opportunities to all communities with MDH approved Wellhead Protection Plans, and BMP technical assistance for all moderate and high vulnerable public water suppliers.
- Goal 2:** In areas of moderate or high pollution sensitivity, provide all private well owners access to well testing programs and education about water quality specific to drinking water.

#### **POTENTIAL IMPLEMENTATION ACTIVITIES:**

##### ***Management of Potential Contaminant Sources:***

- Well management - construction, sealing of unused wells, well inventories
  - Promote well sealing programs within WHP areas in one town each year.
  - Seek funding or utilize state cost-share funds to seal three unused wells within WHP areas in one town each year.
  - Promote well sealing programs to well owners in one LGU each year.
- Land use management and ordinance development through local governments
- Provide technical or regulatory assistance to public water suppliers in areas where the DWSMA extends beyond the municipal boundary.
- Land use changes – Promote the location of community solar gardens in wellhead protection areas, critical recharge areas or other sensitive areas.
- Develop tax credit program to reward landowners who participate in some designated water protection program or implement specified alternative practices in wellhead protection areas.

##### ***Education and Outreach:***

- Education and Outreach: hosting well testing or screening clinics, providing water testing kits, promoting household hazardous waste collection, providing best practices information to private well owners.

- Educate absentee landowners to promote understanding that the health of their land and local natural resources is part of an absentee owner's long-term investment. Create and communicate explicit guidance for incorporating conservation practices into farm lease agreements.
- Provide staff training in outreach and communication to more effectively communicate with landowners, crop consultants, private well owners, local decision-makers, and conservation partners. FWS
  - Road Salt - Investigate road salt removal or substitution
- Well testing – nitrate and bacteria every year and arsenic once for the life of the well [Partners: MDA] – Improve water testing lab access for private well owners (who are currently impeded by the challenge of mailing or hand delivering samples to a distantly located lab).
- Create tailored outreach/informational packets for individual homeowners in priority areas that educate on local WHPA boundaries and concerns, their private well and septic system, local policies and funding opportunities.
- Offer in-depth, personalized planning assistance to individual landowners in target areas (e.g. recharge area around Northfield).
  - Educate 30 landowners on overall groundwater quality in Rice County each year.
  - Educate 75 landowners on overall groundwater quality in Goodhue County each year.
- Utilize data obtained through EPA Class V Injection Well Inventory to help educate and protect groundwater, especially within groundwater management zones in wellhead protection areas.

**Technical Assistance:**

- Ag BMPs: manage nutrient loss, manage septic systems
  - Row Crop Production
  - Manure Application (e.g. Inspect all feedlots within DWSMAs in rotation every 4 years.)
  - SSTS
    - ✓ Identify all SSTS systems within DWSMAs and seek funding for non-compliant systems
    - ✓ Identify and seek funding for fixing five leaking underground storage tanks within DWSMAs. *Partners include: MPCA*
  - Nutrient Application – Partners include farmers, citizens, local government unites, crop consultants
    - ✓ Encourage and assist Icity each year to work with landowners and map nutrient applications in DWSMAs
    - ✓ Provide local match for grants and/or cost share assistance for nutrient management practices.
    - ✓ Implementation of BMPs based on the four R's (right fertilizer source, right rate, right time, right place)



– Irrigation Management

- Urban BMPs: proper storm water runoff management based on vulnerability, industrial/commercial hazardous waste management
- Increase funding for cost share or incentives specifically for low-income landowners in wellhead protection areas to update septic systems or implement BMPs
- Cooperate with the wellhead protection and source water assessment efforts of municipalities and others by reviewing wellhead protection plans and source water assessments for consistency with identified areas of contamination and recharge protection.
- BMPs should be implemented in groundwater recharge areas, specifically the surficial sands and gravels and outwash areas where the chance of groundwater contamination is highest.
- Promote existing conservation programs to one town each year and offer source water protection ideas to city council and water supply staff.
- Seek funding for easements or outright purchase of key parcels in sensitive wellhead protection areas or other vulnerable areas.
- MDA Nitrogen Fertilizer Partnerships

**Monitoring, Data Collection and Research:**

- Potential contaminant source assessment and inventory based on vulnerability
- Research correlations of surface-groundwater interaction, research sites of regional aquifer recharge for protection.
- Continue to support and administer the Volunteer Nitrate Monitoring program to obtain long-term water quality data on and determine trends for nitrates and other groundwater contaminants and water quality parameters.
- Coordinate with state agencies to determine most suitable entity for housing water quality data.
- Share annual ground water quality and well sealing data with other local and state partner agencies.
- Implement a groundwater monitoring program that provides staff with a better understanding of the local groundwater system so they can work more effectively with landowners, crop consultants, private well owners, local decision-makers and conservation partners. Groundwater monitoring program would address baseline condition of groundwater, the supply available for all community uses, and the costs associated with providing safe and clean drinking water, local sources and rates of contamination, more precise boundaries of vulnerable wellhead protection areas, flow directions, quality trends over time and groundwater impacts of BMPs.
- Prioritize SWCD staff getting Technical Approval Authority (TAA) certification to increase the capacity of SWCDs to provide technical assistance for conservation practices.
- Contaminants of Emerging Concern
- Investigate water quality monitoring sites that are in the vicinity of landfills.

- Locate and protect areas of regionally significant recharge areas, such as shale edges and deep aquifer recharge locations.
- Volunteer Monitoring Network
- Contaminants of emerging concern (such as pharmaceuticals)

## B. GW Dependent Natural Resources – Protection Lakes

T1

### ISSUE STATEMENT

Land-altering activities have the potential to impact groundwater resources as well as groundwater dependent natural resources. Without proper land-use and water resource management, the following impacts may occur: reduced groundwater recharge, reduced groundwater quality, and alterations to the functions and values of groundwater dependent natural resources. This is of particular concern to the protection lakes, many of which have been identified as being groundwater dependent.

### DESIRED FUTURE CONDITION:

Groundwater-dependent protection lakes located in the Cannon River Planning Area will have adequate supply of high quality groundwater.

### MEASURABLE GOALS:

- Goal 1:** Maintain the quality and quantity of groundwater to groundwater-dependent protection lakes.

### POTENTIAL IMPLEMENTATION ACTIVITIES:

- Maintaining and restoring perennial cover to encourage recharge and reduce pollutant loads to groundwater dependent natural resources – *prioritize using DNR’s pollution sensitivity of near surface materials*
- Better understand surface water – groundwater connections: continue to monitor MNDNR Observation Wells
- [Identify Groundwatershed to the protection lakes.](#)
- [Consider adding an Observation Well Network in this area. Could make this a component of a monitoring program for the Planning Area.](#)

## C. Groundwater Recharge

T2

### ISSUE STATEMENT

A significant portion of the Planning Area has karst features which make for more direct connections to the groundwater system. Protecting the groundwater from land-use activities that have the potential to introduce contaminants to the groundwater system will be important for drinking water as recharge to karst aquifers bypasses the filtering typically provided by soils. In a

karst setting, groundwater flows through conduits so that there is little opportunity for filtration or sorption of contaminants. Over time, maintaining an adequate supply of groundwater may be an issue as continued development creates additional water supply needs while reducing the infiltration capacity of the landscape. Lack of monitoring wells creates a data gap for water level trends.

**DESIRED FUTURE CONDITION:**

Groundwater recharge is protected from surface contaminants and maximized where water quality is the highest. Filtration of runoff is implemented in highly sensitive areas.

**MEASURABLE GOALS:**

- Goal 1:** Protect groundwater quality by educating landowners about surface water-groundwater connections in a karst setting.
- Goal 2:** Protect groundwater quality by ensuring septic systems are operating properly and Best Management Practices for karst settings are being utilized.
- Goal 3:** Promote water use conservation in the Pollution Sensitivity Area by reducing the amount of groundwater withdrawn from the system and promoting the infiltration of high quality water.

**POTENTIAL IMPLEMENTATION ACTIVITIES:**

- ~~• Maintaining and restoring perennial cover to encourage recharge and reduce pollutant loads to groundwater dependent natural resources—*prioritize using DNR's pollution sensitivity of near surface materials*~~
- ~~• Better understand surface water—groundwater connections: continue to monitor MNDNR Observation Wells~~

**D. GW Dependent Natural Resources – Trout Streams & Calcareous Fens T2**

**ISSUE STATEMENT**

Land-altering activities have the potential to impact groundwater resources as well as groundwater dependent natural resources. Without proper land-use and water resource management, the following impacts may occur: reduced groundwater recharge, reduced groundwater quality, and alterations to the functions and values of groundwater dependent natural resources.

**DESIRED FUTURE CONDITION:**

Groundwater-dependent resources, including trout streams and calcareous fens, located in the Cannon River Planning Area will have adequate supply of high quality groundwater.

**MEASURABLE GOALS:**

- Goal 1:** Maintain the quality and quantity of groundwater to groundwater-dependent resources such as trout streams and calcareous fens.

**POTENTIAL IMPLEMENTATION ACTIVITIES:**

One Watershed, One Plan-Cannon River Watershed

- ~~Maintaining and restoring perennial cover to encourage recharge and reduce pollutant loads to groundwater dependent natural resources—*prioritize using DNR's pollution sensitivity of near surface materials*~~
- ~~Better understand surface water—groundwater connections: continue to monitor MNDNR Observation Wells~~
- ~~Identify groundwater to trout streams and calcareous fens.~~

DRAFT

## 1.2 LANDSCAPE ALTERATION CONCERNS

### 1.2.1 AGRICULTURE

The health of the rural environment has a strong influence on the quality of watershed resources in the Cannon River Planning Area. The amount of water, nutrients and sediment that run off the rural landscape or leach into the groundwater system depends on the intensity of land uses, such as cropland, pasture, forest, or wetlands. Excess sediment and nutrients can leave the landscape due to untreated agricultural runoff, untreated feedlot runoff, erosion, and overgrazing. Approximately 90 percent of the Cannon River Planning Area is considered rural with 60 percent of the landscape dedicated to agricultural production. Improving sustainable agricultural production is important to the health of the rural economy, the rural environment, and the watershed as a whole.

Since the early 1900s, many wetlands were drained, stream courses were straightened, and tile lines were laid in order to increase the amount of land that could be cultivated in the Cannon River planning area. However, these actions also greatly changed the hydrology (amount and speed of water moving through land to waterbodies) of the watershed which has led to increased bank erosion, turbidity impairments, excess sedimentation, and reduced habitat quality in many streams throughout the watershed.

Today, agriculture is the most dominant land use (471,400 acres or 51% of the planning area), consisting of cropland (444,400 acres) and rangeland (27,000 acres). Cropland is used predominantly for growing corn and soybeans. Feedlots are scattered throughout the watershed with over 1,400 containing greater than 20 animal units consisting of pigs, birds (chicken, turkey), bovines (beef, dairy), goats, deer/elk, and llamas. Eight feedlots manage over 1,500 animal units; these larger operations manage primarily pigs, birds, and bovines.

### PRIORITY AREA SUMMARY

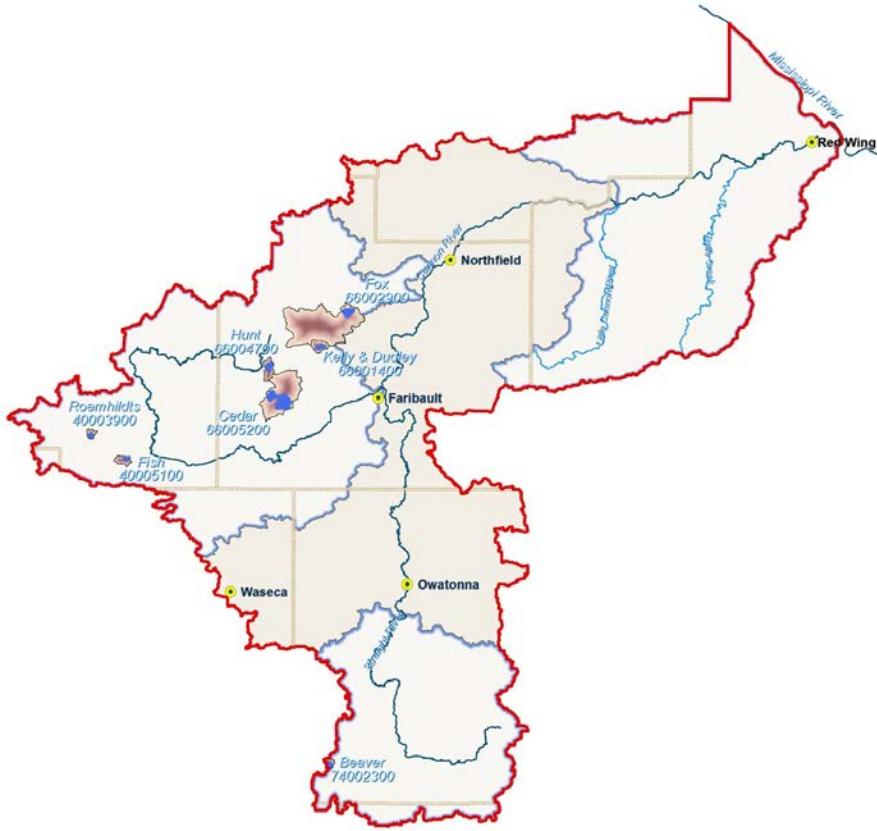
#### Agricultural Runoff (T1)

Due to the wide-spread nature of agricultural impacts throughout the Cannon River IWIP planning area, implementation on agricultural land will be focused in the first 10-years of the plan within the drainage areas of the Tier One lakes and streams identified in Section 1.1.1. Agricultural practices with phosphorus reduction benefits will be focused within the drainage area of Tier One lakes: three impaired lakes that are currently very close to meeting state water quality standards, and five high quality protection lakes (Figure 1-4). Agricultural practices with nitrogen reduction benefits will be focused within the drainage area of the Tier One impaired streams (Figure 1-5). These streams were chosen based on multiple, overlapping issues: HSPF top 25% TN and TP yield subwatersheds, coldwater trout streams, multiple stream impairments, and within the Groundwater Priority Area.

#### Soil Health (T1)

The soil organic matter content of agricultural soils was estimated through an analysis of SSURGO soil data. There are approximately X acres (or X% of the watershed) with low organic matter content (or low soil health). Implementation of practices that improve soil health in the first 10-years of the plan will be focused on soils with low soil health in the HSPF top 25% TN and TP yielding subwatersheds.

One Watershed, One Plan-Cannon River Watershed



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Figure 1-4. Drainage Areas to Tier One Lakes (Protection and Impaired)

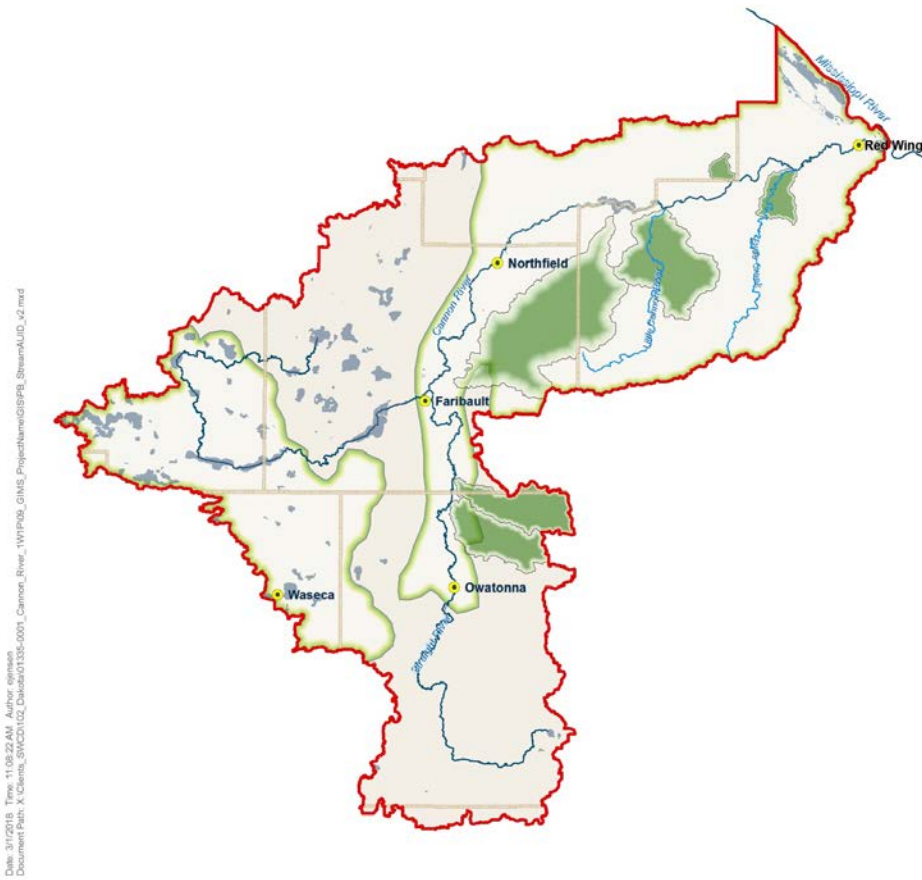


Figure 1-5. Drainage Areas of Tier One Streams with Multiple Benefits

**A. Agricultural Runoff and Leaching Loss** **T1**

**ISSUE STATEMENT**

Improper application of manure and fertilizer (rate, location, source and timing) are polluting surface water and groundwater in the Cannon River 1W1P Planning Area. The Cannon River HSPF model predicted that nutrient loss from cultivated lands accounts for 87% of the total nitrogen load and 89% of the total phosphorus load to surface water resources, highlighting the need for agricultural conservation and best management practices to reduce phosphorus and nitrogen pollution. Moreover, the MPCA 2013 Nitrogen in Minnesota Surface Waters and the 2014 Minnesota Nutrient Reduction Strategy reports state that cropland nitrogen losses through agricultural tile drainage (43%) and agricultural groundwater (31%, vertical leaching losses from cropland down to local groundwater) make up the majority of nitrogen sources in Mississippi River

Basin in Minnesota. It is important to note that the majority of nitrogen losses from cultivated lands is delivered vertically through the soil and not as overland runoff.

**DESIRED FUTURE CONDITION:**

Agricultural runoff and leaching loss that does not impair surface waters and groundwater with nitrogen and phosphorus pollution. The phosphorus and nitrogen reductions needed from agricultural runoff for the benefit of water quality will be based on achieving the 2014 Minnesota Nutrient Reduction Strategy goals of 12 percent reduction in phosphorus pollution by 2025 and 45 percent reduction in nitrogen pollution by 2050 from baseline conditions (mid-1990's) from cropland through improved agricultural practices management by producers. These goals may be modified in the future as other state initiatives are completed.

**MEASURABLE GOALS:**

- Goal 1:** Achieve Nutrient Reduction Strategy goals of 12 percent reduction in phosphorus in the Tier One impaired lake drainage areas and 20 percent reduction in nitrogen pollution from cropland from baseline conditions (mid-1990s) in the Tier One impaired stream drainage areas in the next 10 years (by 2029).
- Goal 2:** Create a stable funding source to increase local capacity and implement agricultural BMPs.

**POTENTIAL IMPLEMENTATION ACTIVITIES:**

- 2014 WRAPS phosphorus reduction implementation scenarios by HUC10

Table 14. Example scales of adoptions that attain phosphorus reduction goals.

Phosphorus (P) BMPs	Upper Cannon HUC 10 (01), % Adoption	Straight River HUC 10 (03), % Adoption	Chub Crk. HUC 10 (04), % Adoption	Prairie Creek HUC 10 (05), % Adoption	Little Cannon HUC 10 (07), % Adoption	Belle Creek HUC10 (08), % Adoption	Lower Cannon HUC 10 (09) % Adoption
Acres of Cropland	112,000	150,000	32,000	33,000	33,000	34,000	47,000
Target P205 rate				80%	80%		80%
Fall corn fertilization to pre-plant/starter			100%	60%	50%	45%	100%
Use reduced tillage on corn, soy, and small grains >2%	10%	25%	10%	50%	50%	50%	10%
Riparian Buffers, 50ft wide	95%	95%	100%	100%	100%	100%	100%
Perennial crop % of marginal corn and soybean land	75%	10%	20%	5%	7%	2%	40%
C-B acres w/ cereal rye cover crop	15%	10%	10%	10%	15%	20%	10%
Short season crops planted to a rye cover crop	80%	80%	80%	50%	65%	65%	80%
Inject/incorporate manure				85%	85%	60%	20%
Control drainage			10%				10%
Cropland P load reduction with these adoption rates	13.8%	12.1%	12.8%	19.5%	21.2%	22.0%	12.2%
Treatment Cost/yr.	\$1,730,000	\$1,470,000	\$490,000	\$350,000	\$370,000	\$430,000	\$890,000
P fertilizer cost savings from reduced inputs	\$0	\$0	\$0	\$380,000	\$430,000	\$410,000	\$0
Net BMP Treatment Cost	\$1,730,000	\$1,470,000	\$490,000	\$30,000	\$60,000	\$20,000	\$890,000

- 2014 WRAPS nitrogen reduction implementation scenarios by HUC10



One Watershed, One Plan-Cannon River Watershed

Table 15. Example scales of adoptions that attain nitrogen reduction goals.

Nitrogen (N) BMPs	Upper Cannon HUC 10 (01), % Adoption	Straight River HUC 10 (03), %Adoption	Chub Creek HUC 10 (04), % Adoption	Prairie Creek HUC 10 (05), % Adoption	Little Cannon HUC 10 (07), % Adoption	Belle Creek HUC10 (08), % Adoption	Lower Cannon HUC 10 (09), % Adoption
Acres of Cropland	112,000	150,000	32,000	33,000	33,000	34,000	47,000
Corn acres receiving N rate, no inhibitor/timing shift	40%	70%	50%	75%	75%	75%	50%
Fall N applications switched to Spring	40%	30%		60%	60%	60%	100%
Fall N switch to Spring/side dressing		30%	50%	20%	20%	20%	
Restored Wetlands	10%		30%				
Saturated Buffers	20%			2%	2%	2%	10%
Riparian Buffers, 100/2= 50ft wide [model adjmt.]	48%	48%	50%	48%	48%	48%	50%
Corn and soy acres w/ cereal rye cover crop	15%	10%	10%	10%	15%	20%	10%
Short season crops planted to a rye cover	80%	80%	80%	50%	65%	65%	80%
Perennial crop % of marginal c-b land	100%	10%	20%	5%	7%	2%	20%
Cropland N load reduction with these adoption rates	20.9%	20.2%	19.9%	19.2%	19.6%	21.8%	20.7%
Treatment Cost/yr.	\$2,110,000	\$1,660,000	\$400,000	\$330,000	\$490,000	\$620,000	\$680,000
N fertilizer cost savings from reduced inputs	\$590,000	\$710,000	\$90,000	\$170,000	\$200,000	\$220,000	\$260,000
Net BMP Treatment Cost	\$1,520,000	\$950,000	\$300,000	\$160,000	\$290,000	\$400,000	\$410,000

- Increase funding for incentive programs (Source: Advisory Work Group)
- Monitor BMPs to demonstrate economic benefits (to farmers) of implementing conservation practices (Source: Advisory Work Group)
- Regulate agricultural practices in highly erodible soils. These are good locations for perennial vegetation which can be implemented via working land easements, incentive programs (CRP), regulations. Can this be achieved through existing regulations (e.g. county soil loss regulations)? (Source: Advisory Work Group)

**Source Control:**

- Convert 10% of vulnerable cropland to perennial vegetation via easements in Tier One stream drainage areas – See Pollutant Impaired Stream Implementation Activities
- Promote soil health through cover crops, tillage on 20% of cultivated cropland in Tier One stream drainage areas – See Pollutant Impaired Stream Implementation Activities
- Perennial crops applied to all marginal (cultivated lands with Crop Productivity Index <60) corn/soybeans (source: WRAPS)
- Establishment of and compliance with Nutrient Management Plans on 10% of cropland in Tier One stream drainage areas
  - Soil grid testing for TP and TN
  - Promote the use of the Nitrogen Rate Calculator (available through University of Minnesota and Iowa State University), an on-line tool for producers to use in planning crop nutrient programs.

- Promote the use of University of Minnesota Target BMP P205 RATE for phosphorus fertilizer and the University of Minnesota Maximum Return to Nitrate Rate for nitrate fertilizer
- Shift fall N applications to spring on 40% of suitable (definition?) land
- Establishment of and compliance with Manure Management Plans on 10% of cropland in in Tier One stream drainage areas
  - Promote proper winter application of manure
  - Reduce manure application rates using the four “Cs” (Content, Calibration, Consistency, and Critical areas) in manure application plans.
  - Develop manure management education programs.
  - Consider setback requirements for surface waters, tile inlets and sensitive areas.
  - Consider site selection rules for application and storage of manure.
  - Timely incorporation using tools that result in minimal residue disturbance.
  - Reference manure application rates to phosphorus uptake needs of the following crop.
  - Promote manure composting and other methods that reduce pathogens.
  - Monitor tile line discharge under a variety of conditions, different manure application practices and different tillage practices.
  - Encourage the private producer who applies manure to have a flow meter so application rates can be documented.
  - Use of mini-manure management plan for small producers not required to have full plans.

**Structural Practices:**

- Implement PTMAApp identified practices in the drainage areas to Tier One lakes and streams
- Saturated buffers
- Structural impoundment BMPs

**Monitoring:**

- [Be smarter about monitoring water quality by testing at different points in the system. This will help identify where pollutants are entering the system. By looking at different parameters \(e.g. fluoride\) can pinpoint sources as rural or urban.](#)

## B. Soil Health

T1

### ISSUE STATEMENT

Soil health is typically measured by the amount of organic matter in the soil. Soil organic matter is necessary for storing water, increasing water infiltration, preventing compaction, and breaking down pesticides and other pollutants (USDA 2016 *Health Soil for Life*. <https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health>). Soil health can be degraded due to poor agricultural practices (such as no tillage, cash crop monocultures, and soil compaction from

large equipment) which limits the role soil plays in clean water and groundwater recharge. Increased soil organic matter will improve the quality of surface water and groundwater, [decrease runoff and flooding, in addition to sustaining and sustain](#) long-term crop yields from the land. The study of soil health is an emerging field in agricultural science, therefore, it is expected that recommended goals and implementation activities for improving soil health will advance considerably during the 10-year timeframe of the Plan. [Preliminary findings from the Tillage and Erosion Survey Project found an increase in 2,000 acres of cover crops between 2016 and 2017.](#)

#### DESIRED FUTURE CONDITION:

Improved soil health with increased soil organic matter content in all cropped soils. Research suggests that an increase in soil organic matter in sand and loam from 0.5 to 3.0 percent more than doubled the available water capacity of the soils (Hudson 1994 Soil Organic Matter and Available Water Capacity. Journal of Soil and Water Conservation, Vol. 49, No. 2, p. 189-194. USDA-NRCS).

#### MEASURABLE GOALS:

- Goal 1:** [Improve soil health by increasing organic matter on 15% of corn and soybean acres \(69,719 acres\) and 80% of short-season crop acres \(24,507 acres\) watershed-wide. Cover crops should be implemented first within the Tier One lake and stream drainage areas.](#)
- Goal 2:** [Establish a Soil Health Team that promotes the monitoring, research, demonstration and outreach of soil health practices in the watershed to work towards a cultural change in agricultural practices.](#)

#### POTENTIAL IMPLEMENTATION ACTIVITIES:

- [Track and monitor cover crops into the future using satellite imagery data based on the outcomes of the Tillage and Erosion Survey Project \(BWSR and the University of Minnesota\). Minnesota Valley Testing Lab tracks long-term state-wide trends in soil organic matter over time based on all of their soil testing data. Could possibly ask them to re-evaluate the trends for just the Cannon River Planning Area.](#)
- [Develop a farmer-led Soil Health Team that will promote:](#)
  - [Monitor a few farms over time already implementing cover crops to demonstrate how cover crop practices increase organic matter.](#)
  - [Develop a long-term education curriculum for farmers with multiple levels of training to move beyond simple cost-share to cultural change.](#)
  - [Establish cover crop demonstration sites over a range of agricultural conditions \(soil types, crop rotations, topography\) within the Planning Area to address site-specific questions and concerns for implementing cover crops by farmers. For example, canning crop areas, flat areas, and highly productive areas in Goodhue County.](#)
- [Plant cover crops on 15% of corn/soybean acres \(or 69,719 acres\) watershed-wide, as set as a goal in the 2016 Cannon River WRAPS. Cover crops should be implemented first within corn/soybean acres within the Tier One lake and stream drainage areas.](#)

- [Plant cover crops on 80% of short season crop \(corn silage, small grains, peas, sweet corn, potatoes, dry edible beans, and sugar beets\) acres \(or 24,507 acres\) watershed-wide, as set as a goal in the 2016 Cannon River WRAPS. Cover crops should be implemented first within short season crop acres within the Tier One lake and stream drainage areas.](#)

## 1.2.2 DEVELOPMENT

Approximately 10 percent of the Cannon River Planning Area is considered urban. The health of the urban environment has a significant impact on the quality of the natural resources in the Cannon River Planning Area. Urban landscapes tend to have high levels of point source pollution from municipal and industrial wastewater, and high levels of non-point source pollution due to altered drainage patterns, volume, timing, and chemical composition of stormwater runoff. A number of the communities in the Planning Area are also subject to flooding during extreme precipitation events. As these communities grow, it will be important to consider the impacts future land use decisions have on the surface water and groundwater resources. Improving stormwater management and developing community-based solutions that have multiple benefits are important to residents and users of the Cannon River Planning Area's quality of life and the environmental systems within the built environment.

### PRIORITY AREA SUMMARY

#### Flooding of Communities (T1)

Flooding of larger communities is a priority within the 10-year timeframe of this 1W1P. [Until a watershed-wide hydrologic & hydraulic model is developed to more accurately characterize how runoff is generated and delivered throughout the system](#), implementation strategies to address flooding will take place in the contributing drainage area to these larger communities.

#### Shoreland Management (T1)

Shoreland management is a priority in the Lakes Area to protect the high quality lakes and provide treatment for impaired resources.

#### Ordinance Development (T1)

Watershed-wide in Non-MS4 communities.

#### Subsurface Sewage Treatment Systems (T1)

Areas of concern for SSTS design and maintenance are the Groundwater Priority Areas Pollution Sensitivity and Groundwater Dominated Lakes.

## A. Flooding of Communities

T1

### ISSUE STATEMENT

The hydrology of the watershed has been altered due to actions such as straightening stream channels, ditching, tiling, draining [or filling of](#) wetlands or depressional areas, and adding impervious surfaces. These land use changes have a number of impacts including a net increase in flows moving through the watershed and more extensive flooding events. These land use alterations, as well as changes in precipitation patterns and more extreme events, are increasing the

frequency and magnitude of flooding experienced by communities in the Cannon River Planning Area.

**DESIRED FUTURE CONDITION:**

There is minimal flooding in the Cannon River Planning Area as a result of adopting a watershed management approach that seeks to mimic pre-development conditions. By understanding pre-development hydrology and hydraulics of the watershed there is adequate storage capacity upstream of communities, stormwater management requirements that mimic pre-development conditions are in place, and stormwater infrastructure and flood-proofing minimizes flood-related damages in urban portions of the watershed.

**MEASURABLE GOALS:**

**Goal 1:** Decrease the rate and volume of water that contributes to flooding of downstream communities to limit property damage and protect public safety.

*NOTE: Additional flood reduction goals can be found under Wetlands (storage), Agriculture (soil health), Public and Private Drainage Systems (storage) and Climate Change (resiliency).*

**Commented [CC2]:** When are these communities developing their models? What do their LSMs say about flooding and the need for storage?

**POTENTIAL IMPLEMENTATION ACTIVITIES:**

- Conduct a Long-Term Flood Solution Study (LTFSS) to provide planning partners with the tools needed to mitigate the effects of flooding in the Cannon River Planning Area and make the communities more resilient. Components of the LTFSS would include: development of a hydrologic & hydraulic study; evaluation of existing flows and storage lost due to tiling, ditching, and agricultural production; evaluation of existing storm sewer capacity; evaluation of flood reduction strategies (including *non-structural strategies* such as development standards and protecting growth to a higher standard and *structural solutions* such as strategically located storage to help reduce peak flows) and cost-benefit analysis.
- Install and implement flood reduction practices within the Watershed as identified in the Long-Term Flood Solution Study.
- Le Seuer River water diverted (piped) to the Cannon River WD. Several 100 acres on the south end/industrial end of Waseca. A lot of impervious area and agricultural runoff. How developed is this Industrial Park? Implementation strategy to disconnect the flow.
- Continue to implement RIM easements both to restore natural corridors and to act as flood attenuation mechanisms. Aim to implement a minimum of 75 additional easements by 2018, with 10% of this total amount existing as perpetual easements.
- Actively market local/state/federal conservation programs which provide incentives to 30 landowners interested in reducing flooding and erosion each year.
- Establish grass or forested buffers throughout the watershed can help slow the flow, increase water retention and infiltration, reduce erosion, filter sediment and nutrients, stabilize streambanks and lakeshores, provide wildlife habitat, and connect habitat patches.
- Make monitoring data more accessible to the public so they can access stream flow and lake level information to prepare for flood events.

**Commented [CC3]:** Use H/H model to define flood mitigation strategies in drainage area to larger communities subject to flooding and use the SWAT model to define storage goals for the rest of the planning area.

**Commented [CC4]:** Waseca County

**Commented [CC5]:** Goodhue County

**Commented [CC6]:** MNDNR

## B. Shoreland Management

T1

### ISSUE STATEMENT

Shorelands typically contain important habitat and erodible soils. As a result, many of these areas are highly sensitive to development. Conversion of seasonal to year-round dwellings, developments and resorts has the potential to adversely impact shoreland and the adjacent waterbody.

### DESIRED FUTURE CONDITION:

Citizens of the Cannon River Planning Area value clean water, canoeable streams and the natural scenic beauty of native shoreline habitats. Each county has the resources needed to implement an effective shoreland management program that helps protect these valuable shoreland resources for generations to come.

### MEASURABLE GOALS:

- Goal 1:** Achieve no net loss of existing natural shoreline which provides water quality benefits as a result of its rich diversity of plants, animals and microorganisms.
- Goal 2:** Achieve a natural shoreline gain from 2018 through shoreline restorations.
- Goal 3:** Provide education to counties, cities and townships to help communities make well informed shoreland management decisions and to reduce the number of variances granted annually.

### POTENTIAL IMPLEMENTATION ACTIVITIES:

- Conduct inventory of existing natural shoreline quantity and quality within the Lakes Area.
- Conduct buffer evaluation. Review shoreland areas to determine whether storm water runoff is discharging through a buffer system or artificial wetland.
- Review local shoreland ordinances looking for ways to improve the protection of shoreland focusing on construction activity on bluff sides and steep slopes and ensuring shore impact zone and shoreline are protected from impacts including recreational activity and newly installed docks.
- Identify where active development pressure is occurring in order to target where implementation activities should occur first within the Lakes Area.
- Complete XX shoreland improvement projects by 20XX.
- Encourage preservation of sensitive shoreland, bluff and steep slope areas through alternative measures, such as easements, acceptance of donations, purchase, etc.
- Educate homeowners and lake associations on how to better manage lake property and the need to restore shoreline to a more natural state through news releases, workshops, presentation to organizations.
- Education and outreach for county's and government officials (e.g. Board of Adjusters).

## C. Ordinance Development

T1

### ISSUE STATEMENT

Polluted stormwater runoff is often transported to municipal separate storm sewer systems (MS4) and ultimately discharged to local rivers, streams and lakes without treatment. EPA's Stormwater Phase II Rule establishes an MS4 stormwater management program that is intended to improve the Nation's waterways by reducing the quantity of pollutants that stormwater picks up and carries into storm sewer systems during storm events. Lack of stormwater management, regulations, and construction inspections in non-MS4 communities is having an adverse impact on surface water resources in the Planning Area. Of the 21 cities in the Cannon River Planning Area, only ~~five~~ four are MS4 communities (Elke, Faribault, Northfield, Owatonna, and Waseca). The remaining ~~16~~ 17 cities and ~~63~~ 64 townships need to adopt stormwater management requirements to protect the surface water and groundwater resources in the Cannon River Planning Area. These smaller ~~have~~ communities lack the staffing, funds or the resources to develop or implement ordinances and a permitting program.

**Commented [CC7]:** Will request that MPCA quantify the pollutant loads coming from these smaller communities from HSPF model outputs to add to the issue statement.

### DESIRED FUTURE CONDITION:

Each community has developed a model ordinance and has an effective permitting program in place.

### MEASURABLE GOALS:

- Goal 1:** Utilize the MIDS Community Assistance Package to develop ordinances that include the Minimal Impact Design Standards (MIDS) performance goals for all of the communities (including the MS4 communities) in the Planning Area by 2021.
- Goal 2:** Work closely with local staff of non-MS4 communities to develop a program for administration, plan review, inspections and enforcement.

### POTENTIAL IMPLEMENTATION ACTIVITIES:

- Many of the communities in the Cannon River Planning Area are experiencing increasing development pressure. Current ordinances, including zoning, land division, stormwater management, and shoreland ordinances insufficiently protect land and water resources. This project will include the following tasks:
  - Review each community's current ordinance package looking for opportunities to improve and update to meet current standards and protect water quality and natural resources.
  - Develop a draft ordinance for each community to address stormwater management and erosion and sediment control.
  - Meet with city staff to review the draft ordinances and gain a better understanding of the unique needs of each community.
  - Provide a series of workshops with elected and appointed officials and city staff to introduce the concepts and importance of stormwater management for new development and redevelopment. If possible, these meetings would be offered to

multiple communities at once as a three hour session on Saturday mornings, providing breakfast for attendees. Once the introduction workshop is completed, work with each community's staff, planning commission and city council in individual workshops to tailor the ordinances and meet the needs of each community.

- Provide support at planning commission and council meetings to introduce the ordinances to the public.
- Working closely with local staff to develop a program for administration, plan review, inspections and enforcement or explore the option of creating a Joint Powers Agreement between the SWCD's, WMO, WD and communities to perform these services on behalf of the non-MS4 communities.
- Review local zoning/land development regulations to identify barriers or disincentives to Low Impact Development.
- Consider the need to adopt additional stormwater management requirements to address snow management and impacts to wetlands including wetland bounce and duration requirements.
- Evaluate the need to have different design standards for stormwater management requirements/ordinances to address more extreme events.
- Make sure water quality standard apply to homeowners to ensure proper management of fertilizer application in an urban setting.

## D. Subsurface Sewage Treatment Systems (SSTS)

T1

### ISSUE STATEMENT

Non-compliant or failing septic systems pose a threat to public health and natural resources. The 2016 SSTS Annual Report, produced by the MPCA, indicates that statewide 80% of subsurface sewage treatment systems are in compliance while 15 percent are Failing to Protect Groundwater (FTPGW) and five percent are posing an Imminent Threat to Public Health and Safety (ITPHS). Replacement of a failing septic system can be costly and an unexpected expense for residents.

### DESIRED FUTURE CONDITION:

Residents will replace failing septic systems and all new subsurface sewage treatment systems are designed, installed and managed so that they are not a threat to public health or safety and the environment.

### MEASURABLE GOALS:

- Goal 1:** ~~All septic systems brought into compliance~~Identify and address water quality problems stemming from inadequate wastewater treatment systems in the Cannon River Planning Area.
- Goal 2:** ~~Increase the number of SSTS upgrades to reduce the number of non-compliant systems by 20% annually~~Create more uniformity within existing SSTS programs across the Cannon River Planning Area to ensure consistency in implementation and enforcement.
- Goal 3:** ~~Conduct a minimum of 50 maintenance inspections per year.~~



**POTENTIAL IMPLEMENTATION ACTIVITIES:**

- Conduct SSTS Inventory in the Pollution Sensitivity Area and Groundwater Dominated Lakes Area.
  - Collection and digitization of paper records including those from cities and townships
  - Where are septic systems?
  - Map areas where non-standard SSTS (i.e. mound systems) are required and areas with clusters of non-compliant systems. Focus funding and staff resources in these areas.
  - When were they installed?
  - Inspection/maintenance dates
  - Where are non-compliant systems located (identify imminent public health threats and failing systems)?
- Inventory existing programs
  - Jurisdiction
  - Administration
  - Inspections
  - Enforcement
  - Record Keeping
  - Reporting
  - Allowance of type V systems (experience with compliance issues), no reduced separation. 3' separation for all systems
  - Greater setbacks for type 3-8 wetlands
  - 1 year to update for systems deemed not protecting ground water
  - All abandonments done by a licensed installation business
  - Compliance on systems for repairs, modification, expansions, or when requested by staff
- Identify programmatic gaps and develop solutions to fill the gaps
- Require compliance check on all property transfers, permits for work on main structure, for variance request, permits in shoreland districts, all permits (permit triggers to work towards).
- Monitor, maintain, and/or upgrade SSTS to assure proper operation and treatment.
- Assure SSTS are constructed properly and require regular maintenance of the systems (i.e. biannual pumping).
- Continue to provide a Septic Upgrade Loan Program
  - Coordinate with Realtors, Attorneys, Financial Institutions and closing Agents to inform and educate on the county ordinance requirements for a property deed transfer.
  - Educate property owners on septic system maintenance, operation and impacts to surface and ground water resources.
  - Host periodic educational workshops for licensed Septic Professionals.
  - Employ a full time Septic Program Staff person to manage County septic program.

## E. Floodplain Management

T2

**Commented [CC8]:** PWG/TAG discussed adding this section at the February TAG meeting. Education and Outreach and Enforcement are the big issues. Can this be addressed in the Education and Outreach goals instead of adding a separate issue?

## F. Small Community Stormwater Management

T2

### ISSUE STATEMENT

A number of the smaller, growing communities and communities in the rural portion of the Planning Area were developed without taking stormwater management into consideration. Land use changes in the contributing drainage area to these communities, aging and failing infrastructure and increased precipitation patterns point to a~~need~~ to retrofit smaller communities with stormwater BMPs.

### DESIRED FUTURE CONDITION:

~~Text~~The rural communities of the Planning Area are more sustainable in terms of their water systems. They have the financial and technical assistance needed to properly plan for water and wastewater utilities as well as stormwater management.

### MEASURABLE GOALS:

- Goal 1:** ~~TBD~~Utilize the Hydrologic & Hydraulic Model of the Cannon River Planning Area to prioritize stormwater management retrofit needs in the smaller, more rural communities.

## G. Maintenance of Existing Stormwater BMPs

T2

### ISSUE STATEMENT

As more and more communities adopt stormwater management requirements, local stormwater managers have concerns about the long term maintenance implications of these requirements. For new development, stormwater management practices designed to meet stormwater management requirements are owned and operated by a Homeowners Association (HOA). Since the municipalities are ultimately responsible for flows directly entering municipal stormsewer systems, there are concerns with the ability of HOA's to manage these stormwater management facilities. Lack of education/capacity/funding to maintain stormwater BMPs.

### DESIRED FUTURE CONDITION:

~~Text~~HOAs in the Cannon River Planning Area have the knowledge, funding and staff needed to properly operate and maintain the stormwater management facilities located on their properties.

### MEASURABLE GOALS:

- Goal 1:** ~~TBD~~Identify the HOA land holdings to develop a list of HOAs in the Planning Area and make connections with these HOAs by conducting educational meetings and inviting them to partner on projects.

### 1.2.3 DRAINAGE SYSTEMS

There are a number of drainage systems in the Cannon River Planning Area that provide important stormwater conveyance and subsurface drainage services that support agricultural production. The public drainage systems are managed by the individual Counties on behalf of the private properties receiving drainage benefits from the system. Public drainage systems are not publically owned they are publicly-administered, privately owned. Implementation of projects on the public drainage system requires coordination with benefitted properties and often involves public proceedings under the Minnesota Drainage Code M.S. 103E. In the Cannon River Watershed, public drainage systems are often associated with public waters regulated by MNDNR (e.g. lakes and wetlands) that creates another layer of complexity to implementation of projects.

Maintenance of the public drainage system is required to provide continued service to the benefitted properties that are typically assessed for any necessary maintenance or repairs. Benefitted property owners also frequently connect private drainage systems including both open ditches and subsurface tile lines to public ditches. These lawfully connected private drainage systems are paid for and managed by the individual landowner. Conducting a redetermination of benefitted properties is often necessary when changes to the drainage system proposed..

Subsurface perforated tile lines are very common throughout the arable lands within the planning area, with pattern tile becoming more prevalent. Drain tile systems remove excess water from agricultural land and can thereby increase yields. In some cases, these systems function as efficient nitrogen conduits from the soil column to aquatic resources. Rapidly removing water from the soil column can also reduce groundwater recharge. Recent advances in drainage water management provide producers an opportunity to control the release of excess water and limit the transport of nitrogen downstream. This ability to retain water in the tile systems minimizes the need for irrigation and reduces volume of water routed to downgradient drainage systems that may be aging or undersized to handle current precipitation events.

#### PRIORITY AREA SUMMARY

The artificial drainage system is concentrated in the western and southern portions of the Planning Area. The Straight River Area and the Lakes Area have the highest density of public drainage systems.

## A. Drainage System Management

T1

### ISSUE STATEMENT

While drainage systems were installed to remove excess water and lower the water table for agricultural production and/or development, there were unintended consequences to the hydrologic system including changes in peak flow, water quantity, water quality and groundwater recharge. In addition, existing drainage systems and/or aging infrastructure may not be sized to handle volume and rate changes that cause localized flooding issues.

### DESIRED FUTURE CONDITION:

Drainage systems will provide the drainage necessary to support the agricultural industry and protect property from flooding without causing impacts to aquatic resources stemming from hydrologic alteration and excessive nutrient loading. The condition and capacity of the existing

drainage system will be understood such that drainage enhancement projects can be implemented with a full understanding of benefits, costs and consequences.

**MEASURABLE GOALS:**

- Goal 1:** Complete inventory of the entire public drainage system to inform project implementation and ultimately a hydrologic and hydraulic model of the Planning Area.
- Goal 2:** Create four multi-benefit drainage management plans with a focus on the Lakes Area and the Straight River Area.
- Goal 3:** Conduct a multi-benefit drainage demonstration project in the Lakes Area and the Straight River Area.

**POTENTIAL IMPLEMENTATION ACTIVITIES:**

**Goal 1:**

- Define the needs of the inventory to facilitate the development of a hydrologic and hydraulic (H/H) model in the future (e.g. pipe sizing, elevations, flow direction, drainage divides, etc.)
- Complete conditioned terrain analysis for the Straight River portion of the Planning Area.
- Modernization of drainage records (convert profiles to known elevation datum; update benefitted parcels mapping, etc.)
- Create website that includes publically available drainage system records.
- Identify hotspots for project implementation by consulting with ditch inspectors and reviewing drainage reports.
- Conduct semi-annual meetings with all drainage authorities in the Planning Area to provide the group an update on each entity's drainage system management program and to discuss advancements in drainage science.

**Goal 2:**

- Conduct multi-benefit drainage management (MDM) plans that provide both private drainage benefits and public water management benefits in conjunction with benefitted property owners and other stakeholders. These plans will guide the SWCDs and landowners in the identification of projects that will create storage and reduce peak flows, trap sediment, reduce nutrient loads and improve water quality.

**Goal 3:**

- Target drainage networks best fit for conservation-practice placement utilizing the PTMA app developed for the Planning Area.
- Continue to implement BMPs and drainage water management projects that provide water quality and volume reduction benefits including pollutant transport preventative measures and runoff volume control measures.

- Identify funding sources and connect those programs to landowners.
- Regulate flood waters associated with drainage systems through the construction and maintenance of structures including water and sediment retention basins, 2-stage ditches or other structures that lower drainage water levels. Install flood mitigation structures on 2.5% of total Le Sueur River Watershed and 2.5% of total Cannon River watershed.

Commented [CC9]: Waseca County

## B. Drainage Education

T1

### ISSUE STATEMENT

There is a lack of understanding of and/or funding for retrofitting existing drainage systems for multi-purpose and multi-benefit drainage management.

### DESIRED FUTURE CONDITION:

Producers and agencies in the Cannon River Planning area will understand how to properly manage drainage water and will implement projects that provide multifunctional benefits.

### MEASURABLE GOALS:

- Goal 1:** Develop a program that educates and incentivizes multi-benefit drainage management projects by utilizing demonstration projects to illustrate the level of effort involved in planning, design and implementation as well as effectiveness.

### POTENTIAL IMPLEMENTATION ACTIVITIES:

- Host two co-op workshops per year per County regarding multi-purpose and multi-benefit drainage management
- Identify local agricultural producers who have already installed multipurpose drainage management practices and ask them to share how they manage water and drainage in their fields during an annual drainage field tour and workshop.
- Highlight new demonstration projects in the Planning Area by including on annual drainage field tour and workshop, publishing news articles and featuring at the local soil and water conservation district or NRCS office.
- Provide educational, technical, and financial assistance to landowners for alternative drainage demonstration projects (ex. blind intakes that replace open tile intakes). Assist with installation of one project annually.

## D. Drainage System Buffers

T2

### ISSUE STATEMENT

There is a lack of functioning buffers on private drainage systems.

### DESIRED FUTURE CONDITION:

All drainage systems will have buffers appropriate for filtering runoff prior to entering surface water resources.

**MEASURABLE GOALS:**

**Goal 1:** Enhance treatment of runoff and drainage water on private drainage systems by providing technical and financial assistance to landowners for treatment measures such as filter strips and buffers.

**E. Operation and Maintenance**

**T2**

**ISSUE STATEMENT**

Many of the public drainage systems are not routinely maintained and lack an operation plan.

**DESIRED FUTURE CONDITION:**

All public drainage systems that are important for managing excess water are maintained regularly as described in an operation plan.

**MEASURABLE GOALS:**

**Goal 1:** Inventory all public drainage systems and develop an Operation and Maintenance Plan for all systems that provide a drainage function.

**1.2.4 CLIMATE CHANGE**

Changes in climate and the frequency of severe storm events and droughts may have economic, ecological, and human health impacts in the Cannon River Planning Area. Average annual precipitation in Southeastern MN has been 14 percent wetter over the last 20 years than it was over the last century, and the average annual precipitation by decade has been higher for the last three decades than it has been for any decade since the 1890's. In recent years, communities in the Cannon River Planning Area have flooded on multiple occasions. Flooding frequency is now so regular along the Cannon River that communities expect the river to flood in some fashion almost annually. The Cannon River Planning Area was subject to severe storms and flooding in the fall of 2016. Governor Mark Dayton requested a major disaster declaration for Individual Assistance for four counties, Public Assistance for nine counties and Hazard Mitigation statewide. This declaration made Public Assistance available for emergency work and the repair or replacement of facilities in Goodhue, Le Sueur, Rice, Steele and Waseca Counties. It also provided individual assistance for 1,144 residences impacted by the disaster.

**PRIORITY AREA SUMMARY**

Climate change is a regional meteorological phenomenon, and should be addressed watershed-wide.

**A. Community Resilience to Climate Change**

**T1**

**ISSUE STATEMENT**

Rising global temperatures have been accompanied by changes in weather and climate. As a result, many areas are seeing changes in precipitation patterns including more floods, droughts and/or intense precipitation events. A trend analysis of local climate data indicates that the Cannon River Planning Area is experiencing changes in precipitation and temperature which presents challenges to watershed management decision-making.

**DESIRED FUTURE CONDITION:**

Communities in the Cannon River Planning Area are more sustainable in the future: they have developed resilience to reduce the risks inherent in a changing climate and take advantage of opportunities which enhance environmental, social and economic well-being. The needs of present and future generations are met.

**MEASURABLE GOALS:**

- Goal 1:** Develop a better understanding of climate change, its impacts to the Planning Area's land and water resources, and adaptive strategies to address this emerging issue.
- Goal 2:** Increase the resiliency of the Cannon River Planning Area by adapting to climate change, including adopting the recent update of NOAA Atlas 14 and other climatic data to ensure that design standards are kept current with the most recent climate data.

**POTENTIAL IMPLEMENTATION ACTIVITIES:**

- Collect local climatological data
- Conduct a vulnerability assessment in each of the communities experiencing flooding due to extreme precipitation events to identify infrastructure needs and develop adaptation strategies to make communities more resilient to the effects of a changing climate. Coordinate with other communities developing climate action plans including Red Wing and Northfield. Identify what they are doing to address water resource impacts.
- Utilize Green Infrastructure to build resiliency into the stormwater management system.
- Adopt a Triple Bottom Line framework to evaluate project performance in meeting social, environmental (or ecological) and financial goals on projects implemented by Local Units of Government.
- Develop and adopt dynamic design practices based on better science (constant flow monitoring, high and low flow management, climate change modeling).
- For new development and redevelopment activity, upgrade design standards to NOAA Atlas 14 – Precipitation Frequency estimates and consider adopting language requiring the use of Low Impact Development, Better Site Design, Green Infrastructure and Water Conservation.
- For flood control, address new techniques for dam operation and stormwater management for a broader range of precipitation events (e.g. back-to-back rainfall events, more extreme precipitation events, etc.).
- Support increased infiltration, stormwater reused and water conservation.
- Apply risk management techniques while increasing naturalization; expand professional and public education; champion the improved integration of infrastructure management into land use planning.

- Farming practices like soil health is a good way to increase resiliency in the system.

DRAFT



### 1.3 SOCIOECONOMIC FACTORS

Human interaction with the environment causes complex, often substantial impacts that affect the entire watershed. Watershed management can address human-environment interactions by reviewing legal systems, promoting best practices, encouraging natural resource-conscious land use decisions and alterations and promoting stewardship.

#### PRIORITY AREA SUMMARY

##### Education and Outreach (T1)

Environmental education, water resource awareness, and watershed stewardship should be promoted throughout the entire Cannon River 1WIP planning area. These efforts should target all ages, races, and socio-economic statuses.

##### Coordination and Partnerships (T1)

Watershed management efforts are most successful when stakeholders develop robust, coordinated collaborations that exploit synergies, leverage efficiencies, work through peer-to-peer relationships, and create multiple incentives to actively manage the watershed's water and natural resources.

##### Recreation and Livability (T1)

A significant portion of the Cannon River is designated as a State Wild and Scenic River. The many tributary creeks, streams, rivers, lakes, trails and parks located throughout the watershed provide abundant opportunities for outdoor recreation and enhance livability. Community livability, tourism and the outdoor recreation economy is dependent upon the quality of the Cannon River Planning Area's water and natural resources.

#### 1.3.1 EDUCATION AND OUTREACH

There are numerous stakeholder groups in the Cannon River Planning Area. Engaging these groups in watershed management would promote stewardship and assist in meeting the goals of the 1WIP. Watershed management programs and projects should provide opportunities to gather and share information, engage stakeholders in the planning and design of restoration and protection activities, promote watershed stewardship, and educate stakeholders on issues critical to protecting and conserving the Cannon River Planning Area.

#### A. Educating Local Land Use Decision Makers

T1

##### ISSUE STATEMENT

Decision makers (government officials) need to improve their understanding of watershed management to better understand how land-use decisions impact the watershed and its resources.

##### DESIRED FUTURE CONDITION:

Local governments, including elected officials and staff, have a basic understanding of watershed management and the Cannon River 1WIP which facilitates more sustainable land use decisions which support the goals of the Plan.

##### MEASURABLE GOALS:

**Goal 1:** Educate local elected and appointed decision-makers who have a role in addressing the relationship between land use and natural resource protection on watershed management/ stormwater management by conducting Nonpoint Education for Municipal Officials with each of cities and townships in the Planning Area.

**Goal 2:** Provide local elected and appointed decision-makers education and information materials on rural and agricultural land use issues including federal/state laws regulating agricultural activity, performance of Best Management Practices, and local implementation success stories.

**POTENTIAL IMPLEMENTATION ACTIVITIES:**

- Annually lead one community conversation on stormwater management BMPs that focuses more on more brainstorming and solution development.
- Meeting with the County Boards, County Departments (Administration, Attorneys, Planning and Zoning, etc.) and City Councils to express the importance and potential benefits of Plan implementation and providing an annual update on Plan progress.
- Encourage local government unit staff and local agency staff to attend trainings on newly developed technology and tools relevant to water resource management.
- Require LGUs to report on activities and incorporate into a report (either annually or at check points during the 10 year plan).
- Incorporate water quality updates into city progress updates such as a “State of the City Address”.
- Host annual field day or tour for policy makers
- Develop factsheets on projects completed within the Planning Area
- Educate decision- and policy-makers about the existence “non-traditional” stakeholder groups, including low-income citizens, tenants (non-landowners), immigrant groups, and ethnic minorities.
- Peer-to-peer networking & training.
- University of Minnesota Watershed Game.

**B. Citizen Engagement**

**T1**

**ISSUE STATEMENT**

Citizens in the Planning Area need to improve their water literacy and gain a basic understanding of watershed management to be better stewards of the watershed and its resources.

**DESIRED FUTURE CONDITION:**

Citizens understand and value the watershed’s resources, actively conserve watershed resources, and participate in the implementation of the Cannon River 1W1P by volunteering, being watershed stewards and advocating for more sustainable land use decision-making.

**MEASURABLE GOALS:**

**Goal 1:** Support progress towards achieving the goals of the Cannon River 1W1P by encouraging behavioral changes from all sectors of the public including area youth, residents, landowners, and producers through meaningful education and outreach experiences.

**Goal 2:** Increase adoption of BMPs by increasing engagement and communication with residents, local landowners and agricultural producers to better understand implementation issues, fiscal and operational barriers and communicate the benefits of implementation.

#### POTENTIAL IMPLEMENTATION ACTIVITIES:

- Develop an education and outreach plan for the Cannon River Planning Area that recognizes existing efforts, past successes, is implemented in conjunction with other entities, and takes a regional approach (if deemed appropriate). Define stakeholder groups and create specific content for each group.
- Identify community leaders and partner with those individuals on projects and programs.

#### **Urban (cities/townships) Audiences:**

- Conduct workshops through partnerships to explain benefits of conservation and encourage implementation.
- Educate public on drainage, AgBMP, feedlot, wetlands, nutrient management, and various topics relating to water quality ~~at the event.~~ Tailor content to the audience.
- Educate landowners on ways to reduce stormwater runoff by holding an annual Stormwater Management meeting. Distribute copies of the Minnesota Stormwater Manual at this event. Incorporate presentation on issues associated with observed increased severity storm events. Tailor content to the audience.
- Support public education and outreach initiatives that teach citizens to take action or alter traditional behaviors and practices. This could include the implementation of education and outreach programs to raise awareness on: impacts of runoff on our natural environment and water resources, identify BMPs and support of programs that help citizens to implement practices (in rural and urban areas) to reduce runoff volumes, reduce erosion and sedimentation, stabilize stream banks and shorelines, and reduce pollutant loads discharging to water resources; and properly manage and dispose of wastes. Tailor content to the audience.
- Support public education and outreach initiatives that specifically target “non-traditional” stakeholder groups, including low-income citizens, tenants (non-landowners), immigrant groups, and ethnic minorities. Disseminate culturally sensitive, and language appropriate information regarding local natural resources and conservation. Tailor content to the audience.
- Develop ~~one~~ urban storm water BMP demonstration sites in population centers to display the water quality benefits of practices that reduce runoff and treat storm water.
- Educate the public through rain garden promotion, as well as other low impact development and better site design techniques, infiltration and runoff reduction.

- Conduct a LID/Green Infrastructure Demonstration Project.
- Conduct one public education event showcasing a demonstration project on new and innovative BMPs, each year.
- Provide 1 brochure and 1 news releases on yard waste rules and pick up days each year.
- Promote reduced use of natural resources, such as energy (energy conservation, renewable energy sources) and water (water recycling, use reduction programs).
- Offer homeowners workshops on shoreline erosion control and BMPs.
- Distribute educational materials to one hundred homeowners annually informing what can and cannot be dumped, and how to properly dispose of certain materials.
- Create or enhance existing awards and recognition programs for those that have contributed to water quality improvements.
- Partner with Community Education for a family event (with childcare).

**Agricultural Audiences:**

- Educate at least 30 landowners per year on Minnesota's Feedlot rules and the Goodhue County Feedlot Ordinance.
- Provide education to watershed residents by partnering with other entities and/or seeking funding to educate and engage agricultural producers, agricultural groups, and other residents about water resources, water conservation, and BMPs, including new and innovative practices, septic system maintenance, nutrient management, lakeshore and shoreline restoration, and buffers; through avenues such as field days, watershed councils, township officers' meetings, township newsletters, etc.
- Disseminate information on Minnesota Department of Agriculture's current and future guidelines for nitrogen application rates and timing through avenues such as township newsletters, township officers' meetings, correspondence from agricultural product suppliers to producers, etc.
- Identify agricultural producers who are watershed heroes—adopters and supporters of nutrient reduction BMPs that can serve as a champion for these practices and convey the benefits of nutrient reductions to other agricultural producers in the watershed. An award program for watershed-specific leaders in the agricultural community could inspire more agricultural producers to demonstrate innovative practices and share this information with other producers in the same or nearby watersheds.
- Increased knowledge of cost-effectiveness of agricultural BMPs.
- Educate landowners on the benefits of conservation and working lands easements.
- Create or enhance existing awards and recognition programs for those that have contributed to water quality improvements.

**K-12:**

- Partner with County schools to hold annual Protect Our Waters Day K-12 education and match with core curriculum.

- Partner with science teachers to incorporate water quality into their curriculum.
- Stormwater stencils (ex from Faribault Co where students even presented to council)
- Create content for students to bring home and share with their parents.
- Demonstrate the effects of negative impacts on surface water quality and how they affect the community by utilizing the EPA's Surface Water Quality Science Fair projects.

**Volunteer Activities:**

- Promote and encourage volunteer water monitoring, including the use of college students.
- Support river cleanup projects that remove waste from riparian areas

**Media:**

- Utilize multiple formats for education beyond meetings including articles in newspapers, social media, or a Cannon River Newsletter.
- Evaluate the use of new web based technologies and opportunities to inform the public.
- Request that Dakota County Transportation Department install stream identification signs at all major stream crossings on Dakota County roads.
- Advocate and partner with Dakota County and others for the development and installation of interpretive information on natural resources and water quality, such as signs, in Miesville Ravine Park Reserve and Lake Byllesby Regional Park. Activities may include writing a letter or discussing the matter by phone or in person, or assisting with development of sign content.
- Conduct one (1) stormwater intake stamping day within municipalities in Goodhue County.
- Conduct workshops through partnerships to explain benefits of conservation and encourage implementation.
- Evaluate the use of new web based technologies and opportunities to inform the public.
- Educate public on drainage, AgBMP, feedlot, wetlands, nutrient management, and various topics relating to water quality at the event.
- Educate landowners on ways to reduce stormwater runoff by holding an annual Stormwater Management meeting. Distribute copies of the Minnesota Stormwater Manual at this event. Incorporate presentation on issues associated with observed increased severity storm events.
- Partner with County schools to create a Protect Our Waters! day, and have it held annually. Demonstrate the effects of negative impacts on surface water quality and how they affect the community by utilizing the EPA's Surface Water Quality Science Fair projects.
- Promote and encourage volunteer water monitoring, including the use of college students.
- Provide education to watershed residents by partnering with other entities and/or seeking funding to educate and engage agricultural producers, agricultural groups, and other residents about water resources, water conservation, and BMPs, including new and innovative practices, septic system maintenance, nutrient management, lakeshore and shoreline restoration, and buffers; through avenues such as field days, watershed councils, township officers meetings, township newsletters, etc.

- Disseminate information on Minnesota Department of Agriculture's current and future guidelines for nitrogen application rates and timing through avenues such as township newsletters, township officers meetings, correspondence from agricultural product suppliers to producers, etc.
- Request that Dakota County Transportation Department install stream identification signs at all major stream crossings on Dakota County roads.
- Advocate and partner with Dakota County and others for the development and installation of interpretive information on natural resources and water quality, such as signs, in Miesville Ravine Park Reserve and Lake Byllesby Regional Park. Activities may include writing a letter or discussing the matter by phone or in person, or assisting with development of sign content.
- Educate at least 30 landowners per year on MN 7020 Feedlot rules along with Goodhue County Feedlot Ordinance.
- Conduct 1 stormwater intake stamping day within municipalities in Goodhue County.
- Support public education and outreach initiatives that help drive a change for citizens to take action or alter traditional behaviors and practices. This could include the implementation of education and outreach programs to raise awareness on: impacts of runoff on our natural environment and water resources, identify BMPs and support of programs that help citizens to implement practices (in rural and urban areas) to reduce runoff volumes, reduce erosion and sedimentation, stabilize stream banks and shorelines, and reduce pollutant loads discharging to water resources; and properly manage and dispose of wastes.
- Friendship Tours: efforts should be made to increase direct interaction of local watershed managers with communities downstream that are being impacted. Friendship Tours which involve direct interactions of folks have been shown to help create the "small world" community perspective needed to make good stewardship decisions. Facilitation of these interactions may be needed to make this possible.
- Identify agricultural producers who are watershed heroes—adopters and supporters of nutrient reduction BMPs that can serve as a champion for these practices and convey the benefits of nutrient reductions to other agricultural producers in the watershed. An award program for watershed-specific leaders in the agricultural community could inspire more agricultural producers to demonstrate innovative practices and share this information with other producers in the same or nearby watersheds.
- Increased knowledge of cost-effectiveness of agricultural BMPs.
- Develop one urban storm water BMP demonstration site to display the water quality benefits of practices that reduce runoff and treat storm water.
- Educate the public through rain garden promotion, as well as other low impact development and better site design techniques, infiltration and runoff reduction.
- Conduct a LID/Green Infrastructure Demonstration Project.
- Educate landowners on the benefits of conservation easements.
- Conduct one public education event showcasing a demonstration project on new and innovative BMPs, each year.

- Provide 1 brochure and 1 news releases on yard waste rules and pick up days each year.
- Promote reduced use of natural resources, such as energy (energy conservation, renewable energy sources) and water (water recycling, use reduction programs).
- Offer homeowners workshops on shoreline erosion control and BMPs.
- Distribute educational materials to one hundred homeowners annually informing what can and cannot be dumped, and how to properly dispose of certain materials.
- Support river cleanup projects that remove waste from riparian areas
- Signage on lakes and rivers with waterbody names. Concern that signage is expensive and dollars are better spent on projects
- Signage on BMPs such as raingardens that explain the function and purpose of the project. Concern that signage is expensive and dollars are better spent on projects
- Create graphics based information to include in city water bills.

### 1.3.2 COORDINATION AND PARTNERSHIPS

Watershed management efforts are most successful when stakeholders develop robust, coordinated collaborations that exploit synergies, leverage efficiencies, work through peer-to-peer relationships, and create multiple incentives to actively manage the watershed's water and natural resources.

Many local, regional, and state public and private entities have a vested interest in water resource management and the protection of our water resources and natural environment. Although the source of interest may differ, many of these entities often have overlapping or common goals.

## A. Watershed Partnerships

T1

### ISSUE STATEMENT

Opportunities for existing partnerships need to be enhanced and utilized in the Cannon River Planning Area.

### DESIRED FUTURE CONDITION:

Stakeholders across the watershed and from a diverse background, develop robust partnerships that build on synergies, leverage efficiencies, use peer-to-peer relationships, and facilitate incentives to actively manage the watershed's water and natural resources.

### MEASURABLE GOALS:

- Goal 1:** Increase collaboration with the Cannon River Watershed Partnership to leverage activities currently being performed by each other.
- Goal 2:** Cultivate partnerships with agencies and organizations (including Lake Improvement Districts and Lake Associations) that have similar goals including collaborating on programs and co-sponsoring grant applications.

- Goal 3:** Expand partnerships with the North Cannon River Watershed Management Organization and the Belle Creek Watershed District to support progress towards achieving the goals of the IWIP.
- Goal 4:** Increase collaboration amongst stakeholders and leveraging strategic partnerships for coordinated project, program and strategy implementation by connecting with trusted individuals.
- Goal 5:** Increase the use of volunteers to implement projects and programs.
- Goal 6:** Continue to coordinate with cities and townships to achieve the goals of the IWIP.
- Goal 7:** Cultivate partnerships with universities and research institutes that have similar goals including collaborating on projects, programs and co-sponsoring grant applications.

**POTENTIAL IMPLEMENTATION ACTIVITIES:**

- Assist watershed residents and landowners in the development of Watershed Advocacy groups with a focus on developing these groups within Tier One Priority Areas.
- Develop voluntary conservation programs that encourage landowner participation while maintaining appropriate use of public funds.
- Partner with and provide technical assistance to the Rice County Coalition of Lake Associations (COLA) and other lake associations/groups on projects to reduce water pollution and improve water quality.
- Cooperate with state and local government agencies to help achieve septic compliance throughout the watershed.
- Incorporating one-on-one education activities using trusted messengers is important to successful NRS implementation. Combining multiple educational approaches will be needed for a successful strategy outcome. Nonprofits, such as the Sustainable Farming Association, and conservation organizations, such as Ducks Unlimited and Pheasants Forever, can connect with land owners and identify opportunities to promote BMPs such as wetland restoration and buffers that have multiple benefits including nutrient reduction and waterfowl habitat.
- Develop collaborative relationships between organizations conducting research related to agricultural BMPs in Minnesota including local, state, and federal agencies, land grant universities, and industry.
- In partnerships with the CRWP, create a brand for the Cannon River Planning Area that can be used on interpretive signage throughout the area (on watershed break and stream crossings).
- In partnership with CRWP, give awards for outstanding work that supports the goals of the IWIP (i.e. Outstanding Conservation Farmer, Outstanding Wildlife Conservationist, and Outstanding Windbreak). Goal is to not eliminate existing awards and not to duplicate efforts; possibly create new award categories.
- Create a directory of water related organizations.
- Volunteer appreciation dinners/events/awards.



## B. Internal Capacity

T1

### ISSUE STATEMENT

Improve internal capacity and planning coordination of new organizational structure of Planning Work Group.

### DESIRED FUTURE CONDITION:

TBD

### MEASURABLE GOALS:

- Goal 1:** Ensure a transparent organization that offers opportunity for public participation and feedback.
- Goal 2:** Provide leadership, education, and resources to assist contractors, landowners, LGUs, etc., in developing and implementing sound Best Management Practices.
- Goal 3:** Increase partnerships with municipal staff awareness of the Cannon River 1WIP, strengthen technical capacity and provide education on the regulatory framework.

### POTENTIAL IMPLEMENTATION ACTIVITIES:

- Cooperate with other agencies to promote soil and water conservation awareness, and to research solutions for related resource problems.
- Website with required postings as well as ability to receive public input via comments or survey
- Welcome packets for new homeowners on who to contact for water resource related questions
- Host an annual contractor meeting and provide incentives for attending
- Training for staff on how to build relationships with those outside of the Planning Work Group

### 1.3.3 RECREATION AND LIVABILITY

A significant portion of the Cannon River is designated as a State Wild and Scenic River. The many tributary creeks, streams, rivers, lakes, trails and parks located throughout the planning area provide abundant opportunities for outdoor recreation and enhance livability. Community livability, tourism and the outdoor recreation economy is dependent upon the quality of the Cannon River Planning Area's water and natural resources.

Additionally, the Cannon River Planning Area includes two regional parks in Dakota County: Lake Byllesby Regional Park Miesville Ravine Park Preserve, both of which the Council has made a substantial investment in through its park implementing powers. These parks offer opportunities for public recreation on the Cannon River and its tributaries. Improvement of water quality in the watershed would likely have a positive impact on the parks, whether by improving fisheries and wildlife, by reducing risks to public health, and by improving river aesthetics.

## A. Recreational Value

T1

### ISSUE STATEMENT

There is a need to maintain existing and create new high-quality opportunities for recreation in the Planning Area that balance the restoration and protection needs of the resources. In addition, there is a need to improve environmental stewardship to ensure people recreating in the Planning Area are caring for the resources they are using for recreational purposes.

#### DESIRED FUTURE CONDITION:

Parks and recreation opportunities improve overall quality of life and make communities livable and desirable for businesses and homeowners. The parks and recreation areas in the Cannon River 1WIP Planning Area are exceptional: people can swim, fish, and recreate without worry. Green space connections with trail connections make it possible for everyone to use and enjoy the parks and recreate.

#### MEASURABLE GOALS:

- Goal 1:** Improve public access to natural environments.
- Goal 2:** Enhance public recreation opportunities by promoting clean water, connecting habitat, and preventing invasive species.

#### POTENTIAL IMPLEMENTATION ACTIVITIES:

- Enhance Northwest Nature Park with amenities as follows:
  - Convert all agricultural land into permanent prairie grasses and tree plantings
  - Construct specific connecting low impact trail routes
  - Determine locations for and construct 2-4 bridges over water canals
  - Conduct flora/fauna and other environmental studies
  - Construct parking lot
  - Construct interpretative center
  - Stock ponds with pan fish
- Complete watershed assessments for several water bodies. The assessments will identify opportunities on County-owned land for addressing existing or anticipated future impairments.
- Maintain Cannon 1WIP website
- Publish a newsletter
- Publish a conservation calendar.
- Increase the number of access points.
- Address barriers in the river to recreation.
- Promote recreational rental businesses.
- Promote waterfront parks/community spaces.
- Inventory condition of existing access points
- Install webcams to allow viewing of nature
- Aquatic invasive species education through inspections, education materials and signage

- Define areas for recreation through use of maps or online resources

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