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Evaluation Of The Problems, Issues And Concerns

Purpose

To determine the capabilities and tendencies of the problems, issues, and concerns in order to evaluate the risk and exposure to the public and the productive capacity of the watershed.

To assist asset managers in decision making based on performing a systematic assessment of the level of business risk exposure a local water management organization faces from potential failures of its water resource assets.

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Outcomes

- Problem, Issues and Concern Data Files by Resource Type
- Location and Size of Problems, Issues and Concerns
- High Value Target List
- Threat Capability Statement

Characteristics of the Problems, Issues and Concerns

Character

Upon review, comments and legislative requirements are of three types:

1. **Problems:**

Definition: Are any indication, circumstance, or event with the potential to degrade, cause loss of damage water management assets. They tend to be tangible and controllable. They are directly related to an existing, facility or water resource.

Nature: To reduce the ability or functioning of those assets. They tend to be well defined conditions or situations with clear consequences. When analyzing regular problems, it is important to understand the complexities of the operating environment. Regular problems almost always have answers.

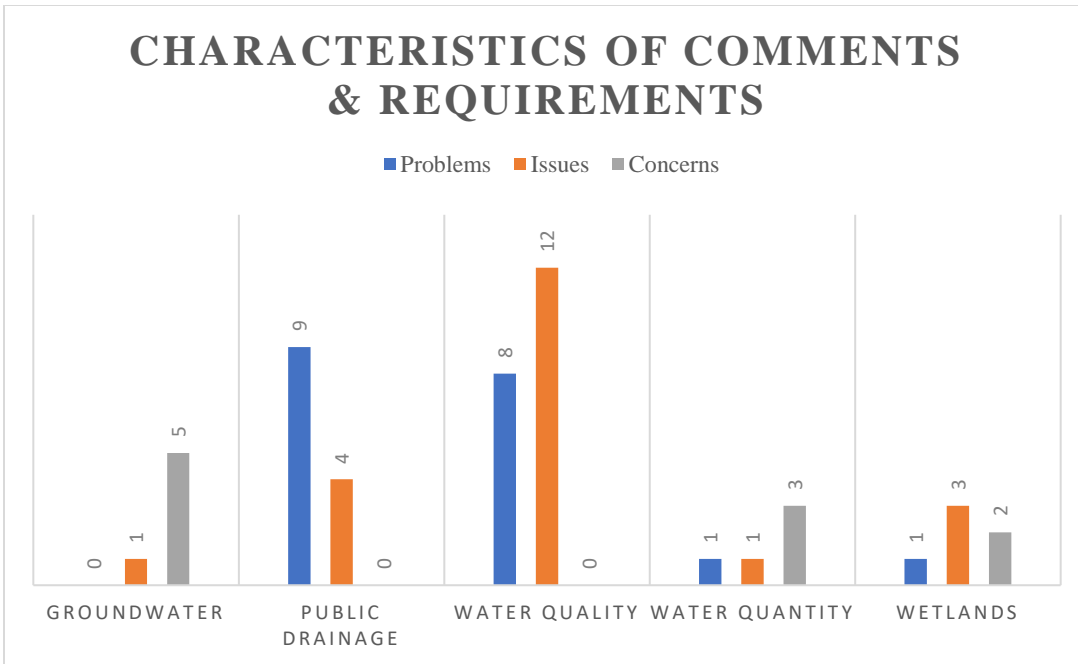
2. **Issues:**

Definition: Are trends, forces or factors that are adversely influencing or affecting water resources or management assets through unconventional, or asymmetric means such as unauthorized fill, drainage, or pumping; persistent but irregular complaining or sniping by a persistent individual or group; ideologically based initiatives and/or debates. Irregular problems have diverse capabilities and may change rapidly, outpacing what staff is accustomed to. They tend to be well defined, but the impact and importance of their consequences are not.

Nature: To eliminate or weaken the authority or function of an asset. They require continuous analysis to keep abreast of changes and the degree of impact and importance. They often have no answer but do have very clear consequences and their resolution is often colored by ambiguity and uncertainty that can be vigorously debated or discussed.

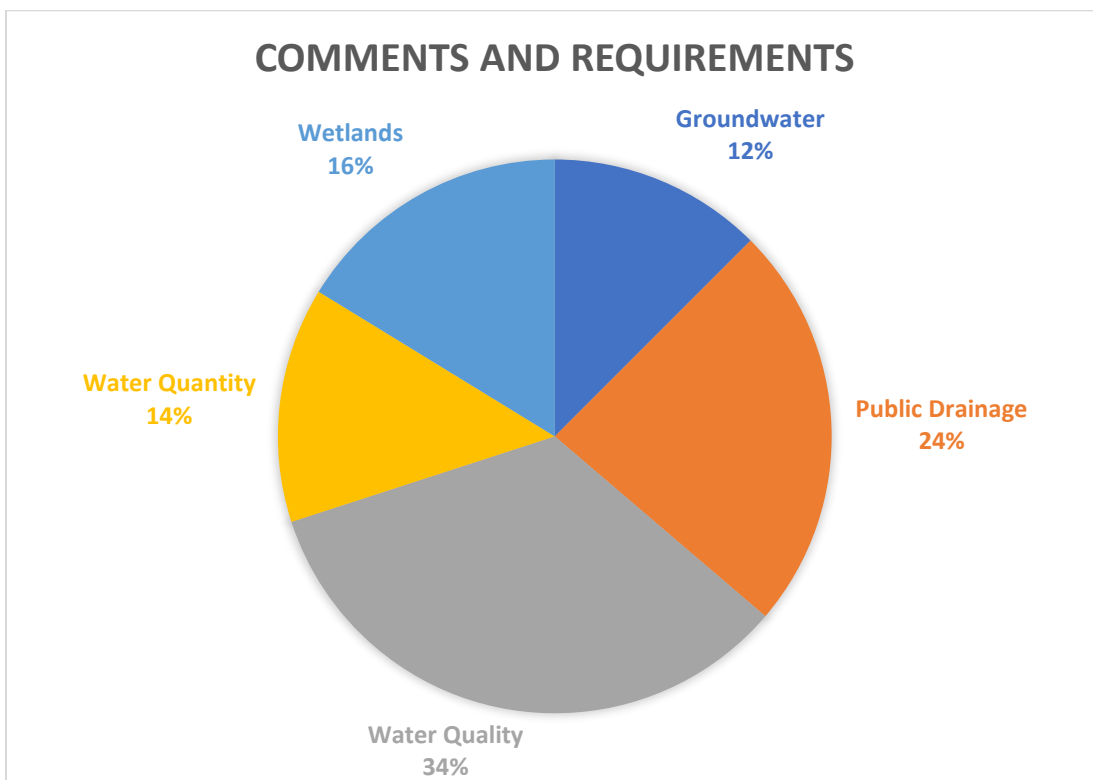
3. **Concerns:** Are a diverse and dynamic combination of regular and irregular problems that are important. They tend to be difficult to define or quantify and serve as a source for worry or anxiety. They are often expressed in terms of unarticulated or unquantified risk and/or uncertainty.

Nature: Lead an organization toward the right answer to the wrong problem and/or threaten the organizations ability to operate. Addressing concerns requires an accurate perception of the goal and operating environment; an ongoing comprehension of the situation (research, monitoring, inspections); a projection of the future (an adaptive plan) and the ability to adjust or adapt while still pursuing the goal.



Composition of Comments and Requirements

The required and implied legislatively tasks, and the comments received from the public, review agencies and collaborators identified eighty problems, issues and concerns to be evaluated. Comments and requirements were organized and grouped by water resource category.



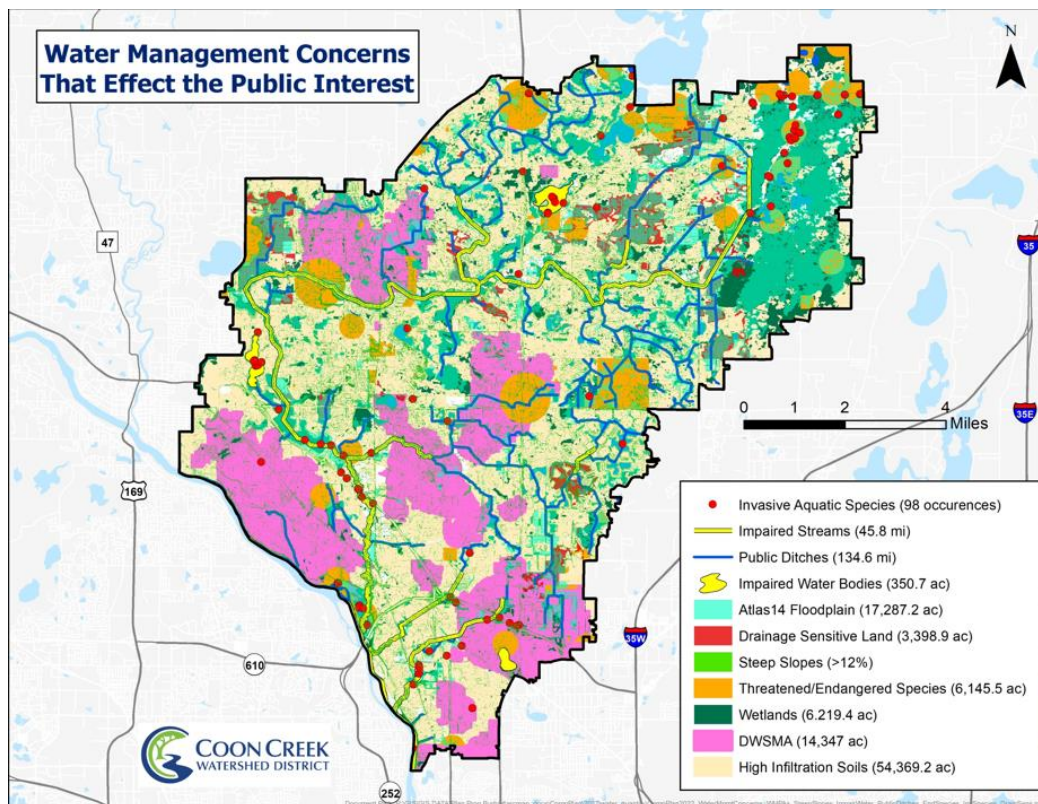
Each comment and requirement were evaluated using the following criteria:

- **Definition:** To specify the District’s operational understanding of the requirement or comment.
- **Concern:** The nature and disposition of the comment relative to the public health, safety and welfare and sustained beneficial use.
- **Character:** Description of the nature of the comment or requirement and its disposition within the watershed.
- **Composition:** Description of makeup and organization of the comment or requirement.
- **Trends and Tendencies:** Based on its character and composition how the Comment or requirements develop or evolve in the operating environment.

The detailed evaluations of the comments and requirements are organized by water resource category and can be found in the following appendix:

- Appendix C: Ground Water
- Appendix D: Public Drainage
- Appendix E: Water Quality
- Appendix F: Water Quantity
- Appendix G: Wetlands

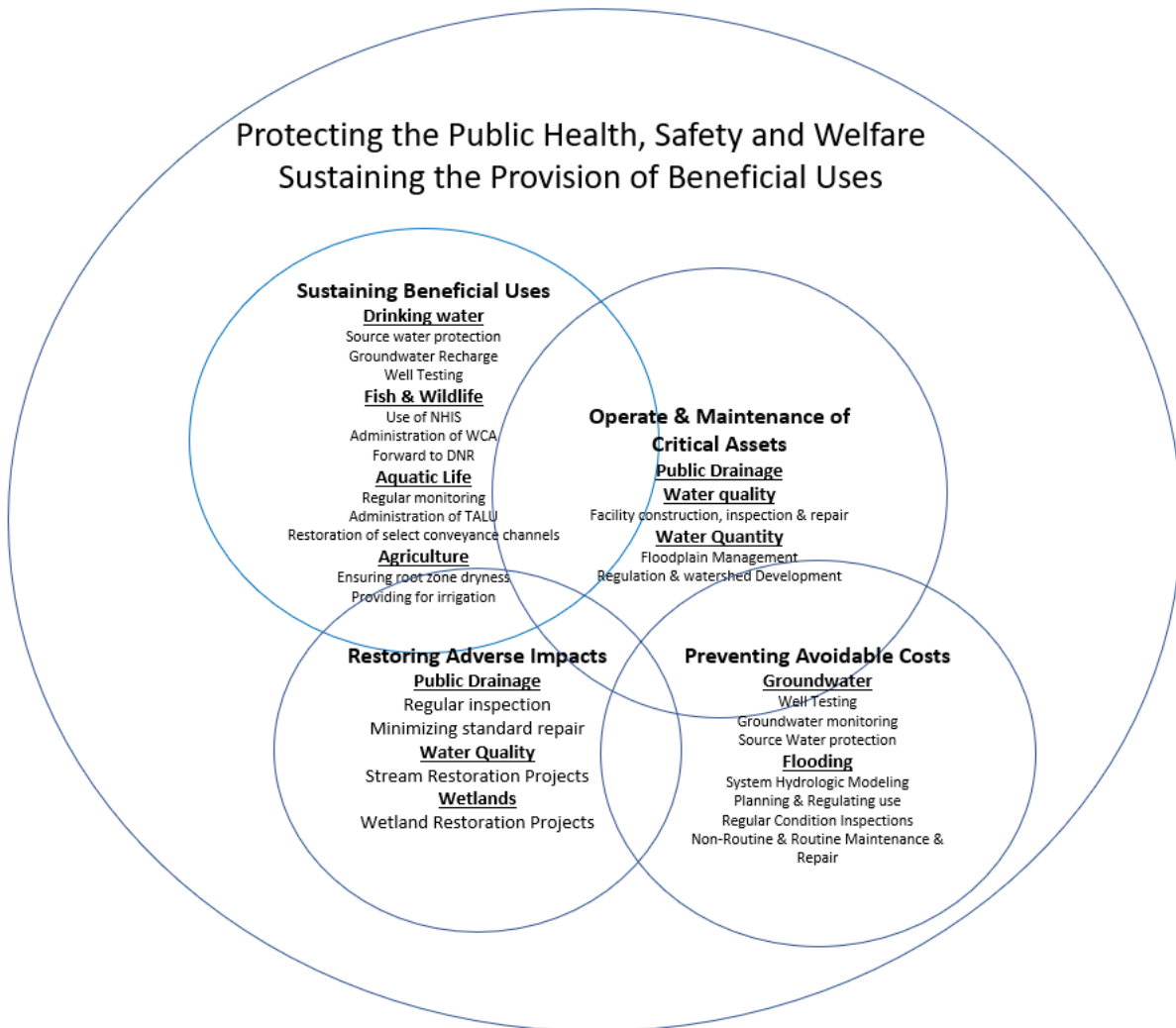
Size and Location of Problems, Issues and Concerns



Alignment with Legislative Goals

The District’s Mission and Legislative Goals were presented in Part 2. The Operating Environment and Asset Hierarchy were provided in Part 3. The review of the Natural, Hard and Soft assets in Part 3 advanced the idea that each asset group functions to meet one or more the Legislative goals. They are critical to District and city efforts to protect the public health, safety, and welfare, provide for the wise use of the natural resources, and minimize the public costs associated with repair, replacement, or restoration of property and water resources.

The following figure shows the alignment of legislative goals and the physical and programmatic assets.



The above figure shows that multiple legislative goals are met by certain programmatic assets. For example, Ditch inspections provide invaluable information on more than the physical condition of the channel and the potential need for non-routine maintenance or repair, but an opportunity to assess channel integrity and with-it fish and wildlife habitat, It also provides a close-up look at outfalls and illicit discharges.

Similarly, ditch, construction and permit inspections provide essential information to technical studies, structure BMP care and maintenance and projects and enhancements to further flood protection and water quality restoration. Engagement and outreach events, public information, encourage partnerships with the public, and protect safe, clean water by engaging the public to help in reducing pollution. Capital Improvement Planning and Management, Watershed Asset Management, and Integrated Planning Framework, are all programmatic assets that the Division maintains towards flood control and water quality goals. Programs that support early coordination, regulatory review and policy development, post construction stormwater control (both during design and post development), compliance monitoring program and special studies enable all of the MS4s to advance the goal of providing safe clean water.

Alignment of Management Assets with Floodplain Management Requirements and Water Quality Needs

The alignment of the cities and Districts' Assets for Floodplain and Water Quality Management provide restraints and constraints in the joint implementation of projects and programs to address the water quality enhancements needed to address the TMDLs within the watershed.

The relationship between the seven cities within the watershed and the watershed district concerning floodplain and water quality management revolves around different roles and goals and is bound together by mutual interests, technical sophistication, and complimentary knowledge, skills and abilities on problems, issues, and concerns that often cross municipal boundaries or have adverse impacts beyond municipal boundaries. A brief description of the floodplain management and water quality improvement efforts is provided below.

Floodplain Management Plan

Minnesota Statute 103F states that it is the policy of the state is to:

Reduce flood damages through floodplain management, stressing nonstructural measures such as floodplain zoning and floodproofing, flood warning practices, and other indemnification programs that reduce public liability and expense for flood damages.

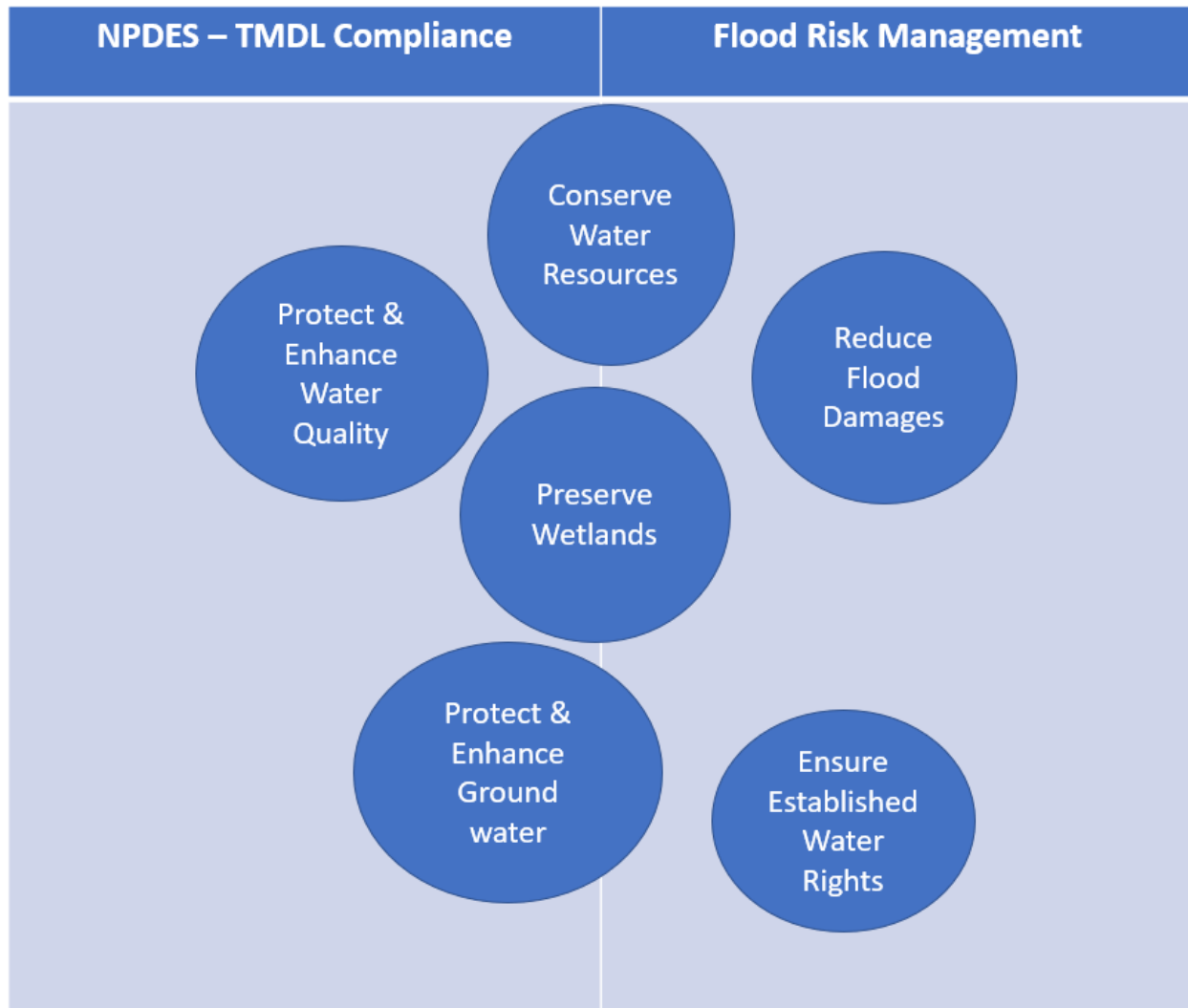
The state program requires cities to adopt floodplain ordinances as an incentive for enrollment into the National Flood Insurance Program. The Watershed District (through M.S. 103B and D) is also directed to address flooding, particularly where and when it serves as the Ditch authority.

The purpose of floodplain management within the Coon Creek Watershed has been to fulfill the requirements of the statute. The Watershed District's role has been to support the cities through regulation, modeling and calculations that protect people and property, facilitates transition to increased precision and accuracy of information and protects upstream and downstream properties and functions from the adverse effects of the use and development of floodplain lands.

Water Quality Improvement Plan

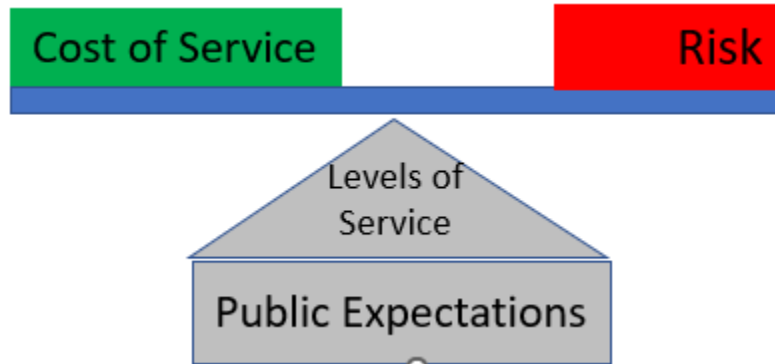
For the MS4s within the watershed, water quality management has focused on addressing the TMDLs of the impaired waters and preventing any further degradation from occurring and protecting the unimpaired waters.

In response to impairment designation, workgroups have been formed around the subwatersheds of the impaired streams and those stream which contribute major loadings and stressors to the impaired waters. In 2016, with completion of the WRAPS and the District and affected MS4s agreed to pursue addressing the impairments as categorical TMDLs, working jointly on a subwatershed basis. The goal of the subwatershed plans has been to quantify discharge and pollutant loadings in order to assess flooding more exactly and to protect, preserve, enhance, and restore the water quality and designated beneficial uses of waters of the state. This goal is accomplished through an adaptive planning and management process that identifies the highest priority water quality conditions within a subwatershed and implements strategies through the District's and cities operating and capital improvement budgets.



Required Level of Service and Measures of Effectiveness

The Level of Service (LOS) is what the regulators require and what the citizens’ desire. It is a balance between citizen desires, citizen willingness to bear costs, and the City’s risk tolerance in the event of failure. This delicate balance is depicted below:



The District Comprehensive Plan and Municipal Local Water Plans derive their decision-value and capability from tracking the water management programs and activities towards meeting levels of service based on Legislative, program and local goals. Levels of Service are most valuable if they are measurable in order to completely realize the collaborative and decision-making value of the Comprehensive Plan. Additionally, it is better to have fewer LOS to reduce redundancy. More than one program or activity may be performed to meet the same LOS, and therefore, multiple programmatic assets may have the same LOS.

The LOS offered below is organized by NPDES Minimum Control Measure (MCM) and should be re-evaluated every five (5) to 10 years to ensure they reflect current regulatory requirements and the citizens’ desire.

Minimum Control Measure	Programmatic Asset	Level of Service/Measure of Effectiveness
Public Education and Outreach	City Newsletter Articles	Produce articles for city newsletters on what the public can do to prevent storm water impacts. These articles will be published at least quarterly for the first two years of the NPDES permit term.
	School Outreach	A minimum of 50 percent of all school children (K-12) will be educated in the watershed with materials, including videos, live presentations, brochures, and other media.
	Public education program	Outreach material on proper water management practices for homeowners will be annually reviewed and updated.
Public Participation & Involvement	Citizen Advisory Committee	A Citizen Advisory Committee comprised of a representative of the County, SWCD, Agriculture, Lake Association and citizen at large will meet monthly 10 times per year to review, discuss and

Minimum Control Measure	Programmatic Asset	Level of Service/Measure of Effectiveness
		advise the Board on water resource problems, issues and concerns.
	Public Input Meetings and Surveys	A public meeting and forum will be publicly noticed and convened annually to review and discuss water management and receive public input.
	Technical Advisory Committee	The Technical Advisory Committee will meet monthly to review physical, social and legislative and economic circumstances that have/are/will affect water management.
Illicit Discharge Detection and Elimination	Ditch Inspections	A survey during dry weather of 20% of the storm drain system per year will be conducted to identify condition and exception to the system. Potential violations will be reported to the water quality and enforcement personnel and the city where the issue was found. Findings will be inspected to detect suspected direct connections to the wastewater system and identify areas where wastewater might be leaking into adjacent storm drainpipes.
	Investigation and Sampling	To collect samples from all unknown/unidentified discharges for physical and chemical analysis to determine content and concentration of the sample and the appropriate course of action.
	Issues Hotline and Log	A hotline and log for citizens to report illegal dumping and suspicious discharges as well as other problems, issues and concerns will be established and maintained. The hotline will be advertised on the District website and by placement of one ad in the local newspaper every six (6) months.
	Storm Sewer and Outfall Map	A map of the District water resources, active construction and other permits and the location of issue reported and under investigation will be developed monthly and reported to the Board of Managers and on display in the Operations Center and office of the Watershed Development Coordinator.
Construction Site Stormwater Control	Environmental Review	Review and evaluation of all water appropriation and works in the bed permit applications potential for significant impact on the water and related land resources of the watershed.
	Permit Inspection	To ensure compliance with permit requirements and the goals, objectives, and rules of the District.

Minimum Control Measure	Programmatic Asset	Level of Service/Measure of Effectiveness
Construction Site Stormwater Control	Plan Review	<p>In addition to the BMP requirements for all development, require each proposed development to implement onsite structural BMPs to control pollutants in stormwater, and manage hydromodification that may be caused by stormwater discharged from a project.</p> <ul style="list-style-type: none"> • Require and confirm that prior to occupancy and/or intended use of any portion of the project, each structural BMP is inspected to verify that it has been constructed and is operating in compliance with all of its specifications, plans, permits, ordinances, and the requirements of the Municipal Permit.
	Pre-Application Meeting	to openly consider the proposals, concerns, and requirements of the applicant and the District.
	Rules & Standards for Land Disturbing Activities	<p>Prescribe general, source control, and LID BMP requirements, as outlined in the Permit, during the planning process for all development projects.</p> <ul style="list-style-type: none"> • Identify the roles and responsibilities of its various municipal departments in implementing the structural BMP requirements, including each stage of a project from application review and approval through BMP maintenance and inspections.
	Routine Maintenance	Inspections: The District is required to inspect the components of the watershed’s stormwater system that is within the District’s operational jurisdiction.
		<p>Litter & Debris Removal: Regular removal of debris and litter can be expected to help in the following areas:</p> <ul style="list-style-type: none"> • Reduce chances of clogging outlet structures and trash racks • Reduce chances of diverting or deflecting flow into ditch bank and causing erosion • Prevent damage to vegetated areas • Reduce mosquito breeding habitats • Maintain ditch or facility appearance • Reduce condition for excessive algae growth
Vegetation & Ground Cover Management: Most BMPs rely on vegetation to filter sediment from stormwater before it reaches the BMP and prevent erosion of the banks and the bottom of the facility.		
Access Management: Most District facilities are designed so that heavy equipment can safely and easily reach the facility for non-routine maintenance.		

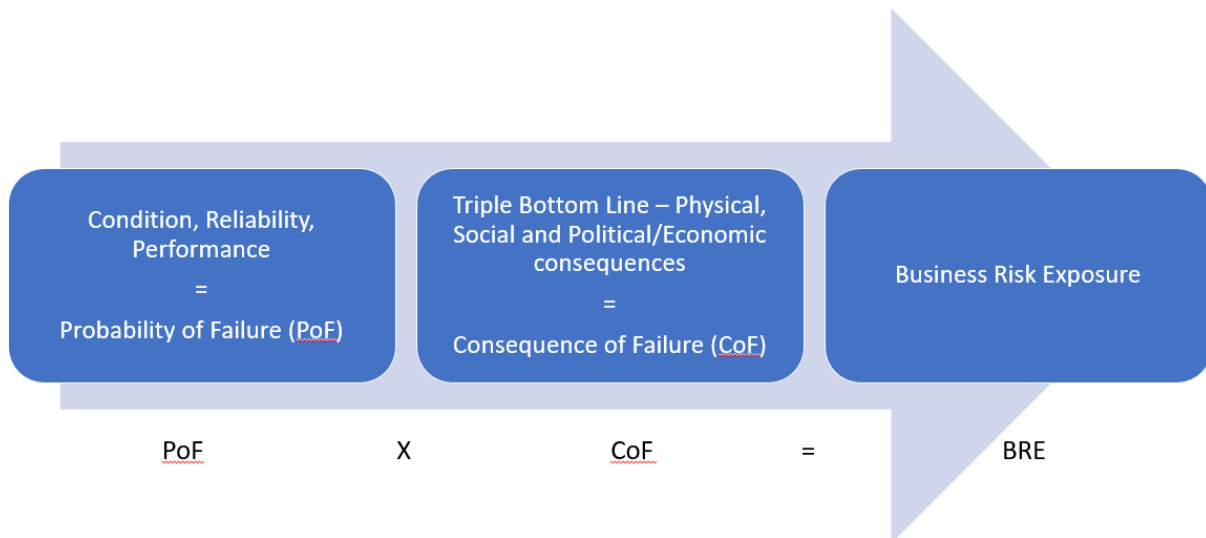
Minimum Control Measure	Programmatic Asset	Level of Service/Measure of Effectiveness
	Non-Routine Maintenance	Cleanout Trees and Sediment: Trees and sediment naturally accumulate in ditches and stormwater facilities and eventually need to be removed. Facilities and portions of ditch systems vary so dramatically in terms of removal requirements, that there are no fast “rules of thumb” to guide maintenance.
		Structural Repair: A stable embankment is important to ensure that erosion does not contribute to water quality problems and that embankments are not breached, resulting in downstream flooding.
	Repair and Rehabilitation	Eventually, like most infrastructure, system components will need to be replaced or reconstructed. System components/facilities may include: <ul style="list-style-type: none"> • Ditch Channel • Earthworks such as embankments • Ditch/stream banks and side slopes • Weirs and Ditch plugs • Inflow and outflow devices
	Construction Retrofit and Rehabilitation	New construction or modification of drainage or stormwater facilities or the increase in capacity of existing systems.
	Water Quality Outcomes	<ul style="list-style-type: none"> • Avoid and minimize sediment and pollution discharges from the work area • Prevent drainage systems, facilities and property from becoming pollutant sources • Avoid or minimize vegetation removal • Preserve native plants
	Infrastructure Maintenance Outcomes	<ul style="list-style-type: none"> • Protect public health and safety • Prevent catastrophic infrastructure failures • Maintain or restore the intended infrastructure function • Prevent or reduce flooding • Protect infrastructure • Meet public expectations for aesthetics

What Problems, Issues and Concerns are Critical

The criticality of any problem, issues or concern is a measure of the risk to the public health, safety, and welfare and/or productivity capacity of the watershed in the event of failure. The more critical the problem, issue or concern, the higher the risk to which the Cities and the watershed district are exposed. This risk may come in the form of flooding, reduced access to clean water, and impairment of water bodies in the case of:

- Natural assets such as drinking water or floodplain
- Physical assets such as pipes, BMPs, etc.

The risk in the case of programmatic assets is different, but significant regardless. This risk may manifest in the form of permit violations, illicit discharges, or non-routine maintenance that become a cumbersome and expensive liability. It is important to understand which problems, issues and concerns are critical to address; this involves an examination of the origin of the problem, issue or concern, how the problem, issue or concern developed, The likelihood of it developing and or developing, the cost to repair and what is the consequence of failure.



Variables used in evaluating the probability of failure included:

- Number of times problem/issue/concern has been raised and/or dealt with in the past 10 years.
- General condition of the asset(s) involved.
- Severity: Rate at which use is causing or creating problems or issues.
- Reliability of past intervention methods: Time between issues.
- Corrective Maintenance of intervention: Number and types of problems/issues/concerns (Impact/Import).
- Number of significant corrective events.
- Cost of correction/mitigation.

Variables used in evaluating the consequence of failure involved the physical, social, and economic impacts of the problem/issues/concern:

- The effect on Public Health and Safety
- Regulatory and Legal consequences
- Problem Complexity

- Control: Ability/Inability to isolate and recover
- Number of people affected.
- Mitigation cost
- Emergency repair cost
- Loss of public relations

Uncertainty, the inability to foretell consequences or outcomes because there is a lack of knowledge or bases on which to make any predictions is expressed as the standard deviation in the probabilities of failure and consequence.

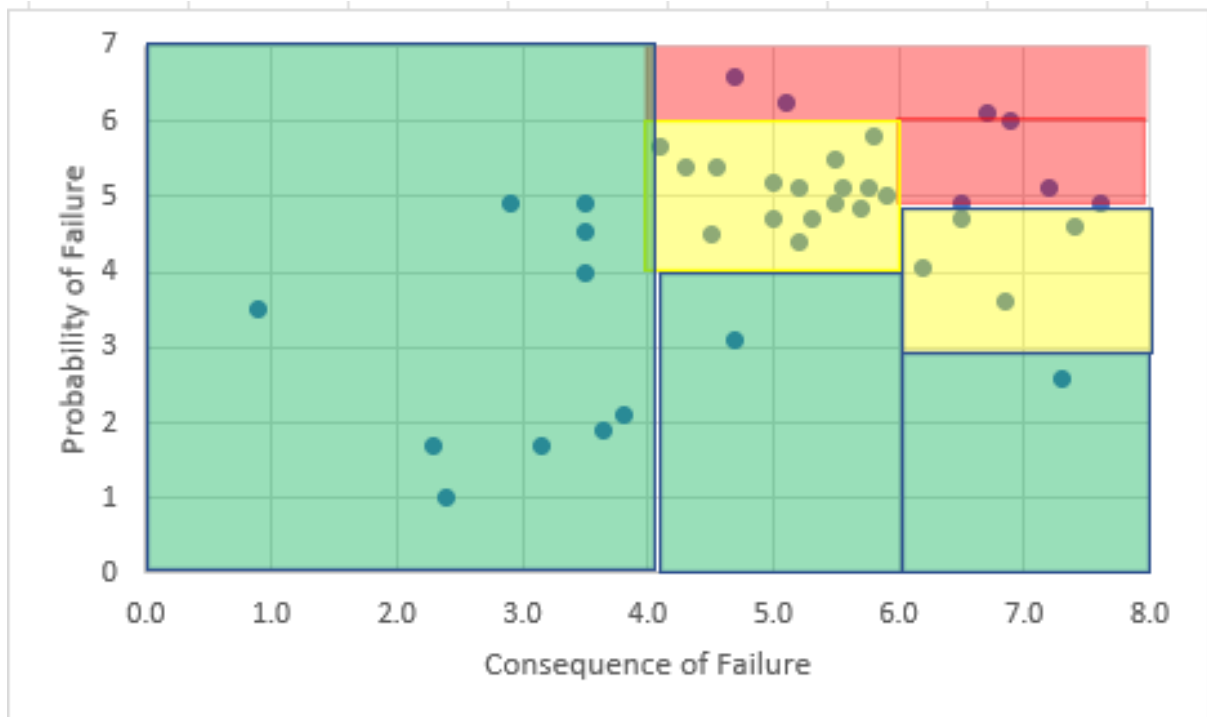
It should be noted that no tool can make risk analysis fool proof. While the tool can facilitate a proper and rigorous application, every application will require careful and systematic application and the application of good common sense at every step.

The table below shows a slightly different presentation of the BRE analysis.

- Green Zone: Problems, Issues and Concerns are deemed low risk,
- Yellow Zone: Problems, Issues and Concerns are deemed medium risk.
- Red Zone: Problems, Issues and Concerns are deemed High risk.

The assets in the upper right corner have the highest (Possibility of Failure) PoF and Consequence of Failure (CoF) scores. These problems, issues and concerns need immediate attention, and as such, resources should be prioritized accordingly.

1. The green shading represents the area where problems, issues and concerns have a low PoF and low CoF. Resources can be diverted from these assets as well because of the low consequence of failure.



Red Zone: High Risk Priorities

Wetlands	Problem
Water Quality	Issue
Chloride	Issue
Ground water - Surface water Interactions	Concern
Drinking Water	Concern

Yellow Zone: Medium Risk Priorities

Obstructions to flow	Problem
Flow velocity and rate	Problem
Ditch maintenance	Problem
Suspended Solids	Problem
Flooding	Problem
Altered Hydrology	Issue
Threatened and Endangered Species	Issue
Stage and discharge	Issue
Aquatic Life	Issue
Dissolved Oxygen	Issue
Fisheries	Issue
Phosphorus	Issue
E. coli	Issue
Groundwater	Concern
Water Supply	Concern

Green Zone Priorities

Poor Habitat	Problem
Silting and scouring	Problem
Channel vegetation	Problem
Channel Restoration	Problem
Bank stabilization	Problem
Channel size and shape	Problem
Channel irregularity	Problem
Channel alignment	Problem
Cross sectional geometry	Problem
Impact on Parks	Problem
Land Use	Problem
Lake Health	Issue
Riparian areas	Issue
Contaminants of Emerging Concern	Issue
AIS	Issue
Stream substrate	Issue
Source water protection	Issue
Detritus & vegetative debris	Issue
Precipitation changes (Intensity)	Concern
Seasonal change	Concern

Target Identification and Categorization

Domain	Problems	Issues	Concerns
Groundwater		<ul style="list-style-type: none"> • Source water protection 	<ul style="list-style-type: none"> • Ground water - Surface water Interactions • Precipitation changes (Intensity) • Drinking Water – Size of reserves • Groundwater • Water Supply • Wetlands
Public Drainage	<ul style="list-style-type: none"> • Ditch maintenance • Obstructions to flow • Channel vegetation • Flow velocity & rate • Channel alignment • Poor Habitat • Channel Restoration • Cross sectional geometry • Channel irregularity 	<ul style="list-style-type: none"> • Riparian areas • Stage and discharge • Detritus & vegetative debris • Stream substrate 	
Water Quality	<ul style="list-style-type: none"> • Bank stabilization • Channel alignment • Channel irregularity • Channel Restoration • Channel size and shape • Poor Habitat • Silting and scouring • Suspended Solids 	<ul style="list-style-type: none"> • AIS • Altered Hydrology • Aquatic Life • Chloride • Contaminants of Emerging Concern • Dissolved Oxygen • E. coli • Fisheries • Lake Health • Phosphorus • Riparian areas • Water Quality 	
Water Quantity	<ul style="list-style-type: none"> • Flooding 	<ul style="list-style-type: none"> • Stage and discharge 	<ul style="list-style-type: none"> • Ground water - Surface water Interactions • Precipitation changes (Intensity) • Seasonal change
Wetlands	<ul style="list-style-type: none"> • Wetland Identification/ Delineation 	<ul style="list-style-type: none"> • AIS • Riparian areas • Threatened and Endangered Species 	<ul style="list-style-type: none"> • Ground water - Surface water Interactions • Precipitation changes (Intensity) • Seasonal change

Threat Capability

Domain	Statement
Groundwater	The high conductivity and transmissivity and unknown reserves of drinking water present threats have the capability of affecting the health, safety, and welfare of all 166,716 people within the District.
Public Drainage	Threat has the capability to result in crop land whose crop damages would exceed \$422 million.
Water Quality	This threat has an extremely high potential to result in an increase in public costs for mitigation, Loss of specific beneficial uses of water, and damage to public infrastructure.
Water Quantity	This threat will damage to property, land & infrastructure due to inundation or prolonged saturation.
Wetlands	Threats are related to the direct loss of species or habitat and the indirect loss of species or habitat. Indirect impacts are the loss of landscape function and the “free’ infrastructure which is factored into the water management of the watershed.

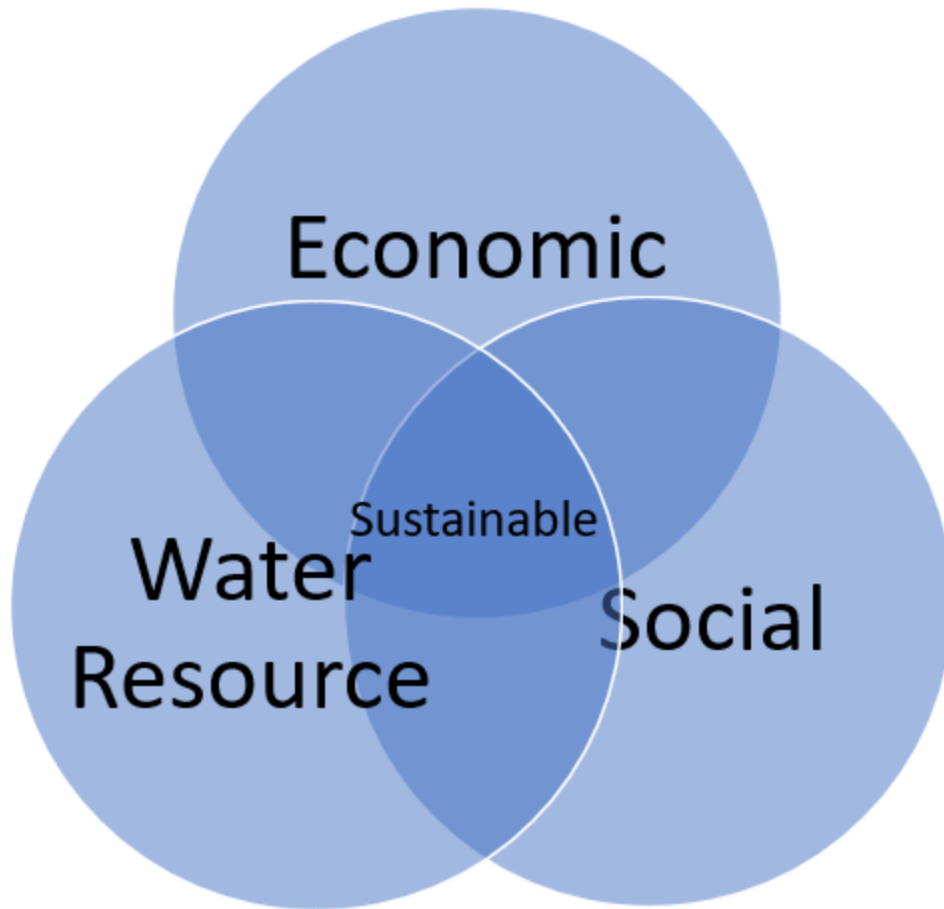
Future Investment Decision Making

Decision making on the prioritization of problems, issues and concerns involves understanding the risks and the criticality of the situation and determining at what point water managers should intervene to avoid a failed condition with an unacceptable cost and/or consequence.

It is important to note that condition assessment alone does not provide any benefit in risk reduction. The follow-up decision making process that leads to prioritization ranking and rehabilitation ranking followed by action to fix problems and upgrade the system is what leads to risk reduction.

The purpose of this section is to highlight and summarize the decision-making process, the final step in the condition assessment process.

The triple bottom line approach was used to guide the process of determining CoF. Using the triple-bottom-line approach makes projects sustainable in that the decisions made in selecting and developing projects, prioritizing investments, and developing actions are less likely to be resisted, and more likely to be funded, maintained, and used. For this analysis, a balanced approach was used to weigh the environmental, social, and economic consequences of failure.



Triple Bottom Line

Two environmental criteria, two social criteria, and one economic criterion were identified against which the consequences of failure were evaluated. Economic criteria differ for existing non-channel assets, existing ditches, and other government assets, and future assets. The table below presents a summary of the evaluation criteria.

Category	Subcategory	Description
Social	Public Perception	Public perception, public trust in local water management declines.
	Public Health and Safety	Injuries, death, or property damage occurs. This includes external or non-quantifiable potential economic costs associated with increased health or safety risks to citizens.
Water Resource	Regulatory	State and Federal regulators take action for non-compliance with the MS4 permit. This includes external or non-quantifiable

Category	Subcategory	Description
		economic costs associated with a deterioration in trust of the regulators for which local management is taking appropriate actions to achieve compliance with a NPDES permit and TMDLs that is not explicit.
	Water Quality	Measurements of water quality show declines (e.g., stream or watershed health or condition declines, standards are no longer met). This includes external or non-quantifiable economic costs associated with a degrading or degraded quality or condition. Such economic costs could include reduction in property values, loss of jobs, and resulting reductions in tax revenues.
Economic	Financial	Cost to manage physical assets whether by replacement or being new to the asset register. Increased regulatory compliance costs, increased water management requirements, increased costs to pay for fines, settlements, and third-party lawsuits.