



**4. CHALLENGES
AND GOALS**



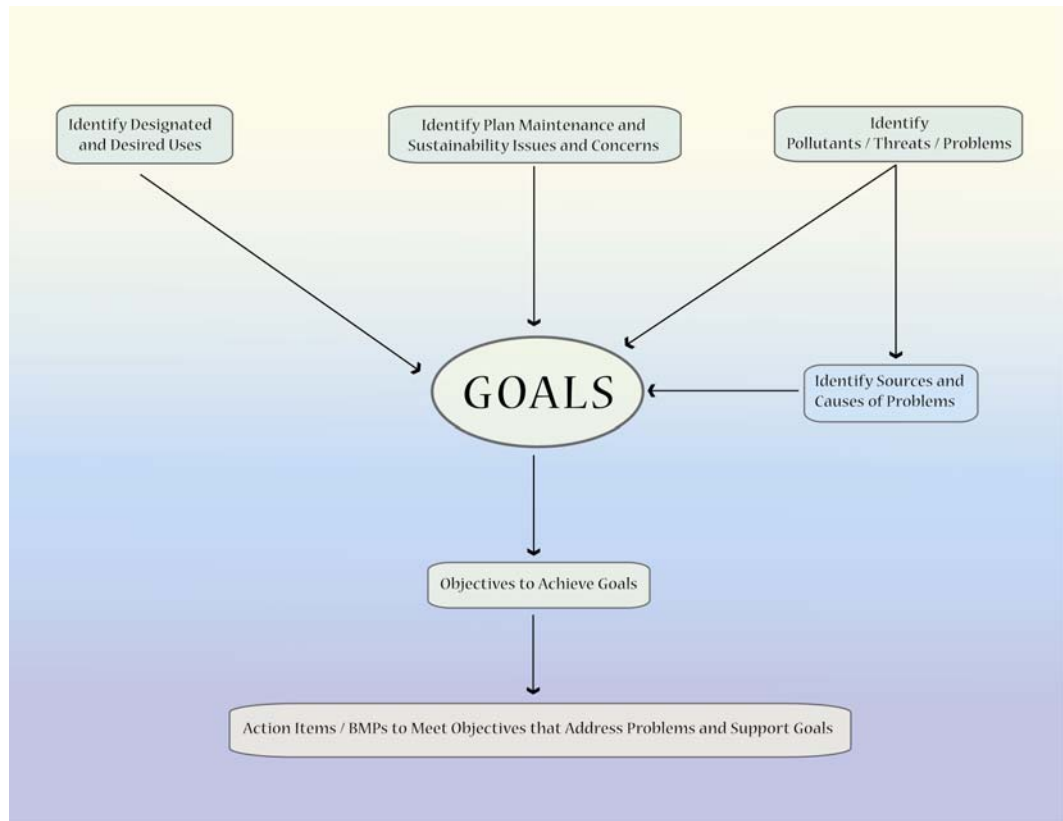
Chapter Contents

- Designated Uses
- Desired Uses
- Pollutants and Threats
 - Pollutants
 - Sources and Causes
- Goals and Objectives

Through the review of existing data and supplemental field inventory results, the watershed committee developed an understanding of the characteristics and condition of the watershed. With this understanding and knowledge, the CDWIC reviewed and developed designated and desired uses for the watershed. After identifying the applicable designated and desired uses for the watershed, the known and suspected causes of impairment and/or threats to these uses were identified. The CDWIC then developed goals and objectives for the watershed that are based on restoring and protecting the designated and desired uses and address the priority pollutants, sources, and causes.

Figure 4-1 shows the steps involved in developing goals and gives a preview of the next steps.

Figure 4-1. Goals Development Diagram





4.1 DESIGNATED USES IN THE COMBINED DOWNRIVER WATERSHED

Per the Michigan Department of Environmental Quality, water quality is primarily measured by whether the water body meets the designated uses as defined by the State of Michigan. In Michigan, the goal is to have all waters of the state meet the designated uses that apply to that body of water.

All surface waters of the State of Michigan are designated for and shall be protected for all of the following uses. Those that apply to the Combined Downriver (CDR) Watershed are in boldface:

Designated uses are recognized uses of water established by state and federal water quality programs.

1. **Agriculture**
2. **Industrial water supply**
3. Public water supply
4. **Navigation**
5. **Warmwater fishery**
6. **Other indigenous aquatic life and wildlife**
7. **Partial body contact recreation**
8. **Total body contact recreation between May 1 and October 31**
9. Coldwater fishery

The following definitions¹ apply:

1. Agriculture - a use of water for agricultural purposes, including livestock watering, irrigation, and crop spraying.
2. Industrial water supply - a water source intended for use in commercial or industrial applications or for noncontact food processing.
3. Public water supply - a surface raw water source that, after conventional treatment, provides a source of safe water for various uses, including human consumption, food processing, cooking, and as a liquid ingredient in foods and beverages.
4. Navigation - a water source suitable for navigation
5. Warmwater fishery - a waterbody that contains fish species which thrive in relatively warm water.
6. Other indigenous aquatic life and wildlife - the use of the surface waters of the state by fish, other aquatic life, and wildlife for any life history stage or activity and the protection of fish for human consumption.
7. Partial body contact recreation - any activities normally involving direct contact of some part of the body with water, but not normally involving immersion of the head or ingesting water, including fishing, wading, hunting, and dry boating.
8. Total body contact recreation between May 1 and October 31 - any activities normally involving direct contact with water to the point of complete submergence, particularly immersion of the head, with considerable risk of ingesting water, including swimming.
9. Coldwater fishery - waterbodies that contain fish species which thrive in relatively cold water.

¹Administrative Rules Part 4 Water Quality Standards, MDEQ <http://www.deq.state.mi.us/documents/deq-swq-part31-part4.doc>



Public water supply is not applicable since communities in the Combined Downriver Watershed do not use local surface water as a source for drinking water. Coldwater fishery is not supported in the watershed and streams within the watershed are not designated as a Michigan trout streams (MDNR Fisheries Division). Throughout most of the watershed, waterways are not suitable for navigation. However, the Detroit River and nearby canals are navigable. Navigation is not considered threatened in the watershed, however sedimentation can limit waterway capacity.

State and local monitoring of the condition of the watershed have determined that some uses are threatened or impaired. Impaired uses are those uses that are not being met, while threatened uses are those that currently meet water quality standards, but might not in the future. Table 4-1 summarizes the designated uses as impaired, threatened, or not applicable. Indigenous aquatic life and wildlife is impaired within the watershed, while warmwater fishery, partial body contact recreation and total body contact recreation uses are threatened.

The Watershed is also listed on the Michigan 303(d) list (non-attainment list) for poor macroinvertebrate community (Blakely Drain, Frank & Poet Drain and Brownstown Creek). These are to be addressed in a separate TMDL at a future date.² Therefore, Other Indigenous Aquatic Life and Wildlife was listed as impaired. Full and Partial Body Contact are listed as threatened uses. Although there is no direct data available for the Combined Downriver Watershed that indicates pathogens exceed water quality standards, the similarities between the Combined Downriver Watershed and adjacent watershed where pathogen data is available lead to the expectation that, at a minimum, both of these uses are threatened in the CDR Watershed. The warmwater fishery use is threatened due to flashy hydrology, lack of habitat, high suspended solids and sediment deposition. Flashy hydrology and sediment loads potentially threaten agriculture and industrial water uses as well.

² Creal, W. and J. Wuycheck. 2002. Clean Water Act Section 303(d) List – Michigan Submittal for Year 2002. MDEQ Report #MI/DEQ/SWQ-02/013.



Table 4-1 Designated Uses

Priority	Designated Use	Impaired	Threatened	N/A	Notes
1	Partial Body Contact Recreation		*		*There is no available data, however, data from adjacent watersheds indicates this use may be threatened
2	Other Indigenous Aquatic Life and Wildlife	●			
3	Warmwater Fishery		●		
4	Total Body Contact Recreation (between May and Oct)		*		*There is no available data, however, data from adjacent watersheds indicates this use may be threatened
5	Agriculture		*	*	*Potentially threatened by flashy hydrology and sediment loads, but not likely applicable
6	Industrial Water Supply		*	*	*Potentially threatened by flashy hydrology and sediment loads, but not likely applicable
7	Navigation				Detroit River and nearby canals are navigable, although sedimentation is an issue in areas
8	Public Water Supply at Point of Intake			●	
9	Coldwater Fishery			●	



4.2 DESIRED USES IN THE COMBINED DOWNRIVER WATERSHED

Desired uses are how communities may want to use the watershed or want it to look. The CDWIC members identified desired uses of the watershed based on factors important to the watershed community. Desired uses include restoring and/or protecting all of the applicable designated uses. The desired uses presented below are in addition to the designated uses, and may include current or potential natural resource concerns, such as loss of farmland and open space, or preserving unique habitat for wildlife. Many desired uses may not have a direct impact on water quality, but are still included in the watershed planning process.

A **desired use** is how you might want to use your watershed or how you might want it to look.

CDWIC members were asked to complete a survey identifying their community's desired uses of the watershed. These survey results were then compiled into a preliminary list and categorized as either impaired or threatened. Uses were determined to be impaired or threatened based on studies previously published by the Michigan Departments of Natural Resources and Environmental Quality or other agencies^{3,4,5,6,7} and upon measurements and observations made by ASTI, OHM, and/or Wade-Trim during their 2004 field investigations. Desired uses that were neither impaired nor threatened were categorized as unknown. Once compiled, the desired uses were brought before the CDWIC members for discussion, finalization, and prioritization. Table 4-2 summarizes the desired uses identified and lists them in order of priority.

³ Goodwin, K. 2002. Biological Assessment of the Detroit River Tributaries, Including the Ecorse River, Frank and Poet Drain, and Brownstown Creek Watersheds, Wayne County, Michigan. July-September 2001 Michigan Department of Environmental Quality, Surface Water Quality Division Staff Report MI/DEQ/SWQ-02/020, January 2002.

⁴ Jones, R. 1991. A Biological Survey of County Drains in the Vicinity of Detroit Metropolitan Airport, Wayne County, Michigan, July 12-13, 1990. Michigan Department of Natural Resources, MDEQ Report #MI/DNR/SWQ-91/059.

⁵ Jones, R.J. 1992. A Biological Survey of Frank and Poet Drain, Wayne County, Michigan, August 13-14, 1991. Michigan Department of Environmental Quality, Surface Water Quality Division Staff Report MI/DNR/SWQ-92/205, March 1992.

⁶ Mulcrone, M. 1995. Frank and Poet Drain Diurnal Dissolved Oxygen Study March 1995. Michigan Department of Environmental Quality, Surface Water Quality Division Staff Report MI/DEQ/SWQ-95/076, March 1992.

⁷ WCDOE (Wayne County Department of Environment). 2000/2001. Water Quality Results for Natural Bathing/Recreational Areas. *E. coli* sampling results for Ecorse Creek, June through August 2000 & 2001 spreadsheets. Wayne County Department of Environment, Division of Environmental Health.



Table 4-2 Desired Uses

Priority	Desired Use	Impaired	Threatened	Unknown
1	Flood Control	●	●	
2	Natural Features		●	
3	Native Vegetation/Unique Habitat/Natural Buffers		●	
4	Recreational Areas		●*	
5	Open Space		●	
6	Greenways		●	
7	Wetlands		●	
8	Agricultural Land		●	
9	Well Water Supply			●

**Note, Recreational Areas are considered threatened because more are desired*

Flood Control

Flooding is a concern of the communities in the watershed. There is limited hydraulic capacity within the drains, and flooding occurs when large rain events (and sometimes snow melts) occur. This use was listed as both impaired and threatened because only certain areas of the watershed are prone to flooding (see Chapter 2). All other areas are considered threatened relative to flooding.

Natural Features Preservation

Natural features such as riparian corridors, streams, lakes, wetlands, soils and vegetation are extremely important to the hydrologic cycle. Changes to natural features disrupt the hydrologic cycle that naturally exists. These changes cause adverse impacts, including increased storm water runoff rates and volumes, increased pollution (less filtration by vegetation), habitat destruction, and reduction in infiltration. Natural features can be preserved through careful planning.

Native Vegetation/Unique Habitat/Natural Buffers

Providing unique habitats can improve stream health, and invite wildlife not normally seen in an urban environment. Natural buffers allow for storm water infiltration as well as enhanced pollution removal by vegetation from storm water runoff. Natural buffers also slow down storm water runoff velocities, which is important in preventing stream bank erosion.

Native vegetation and naturalization of urban areas help to prevent pollution from reaching the streams. Native vegetation generally has deeper root systems than non-native species, which allows for greater filtration of pollutants and enhances the amount of storm water that is infiltrated. Native vegetation is beneficial both at the stream corridor and throughout the watershed. Native plants also can improve the aesthetic quality. Invasive species can quickly establish themselves replacing native plants. Environmental and economic problems caused by the dense growth of invasive species include the impairment of water-based recreation and navigation, and the degradation of water quality and fish and wildlife habitat.

Recreational Areas

Currently, there are limited recreation areas in the watershed. The CDWIC would like to see parks and trails along the stream corridor for recreational uses, as well as to maintain

property values. There is potential opportunity for recreation on some of the streams as well, through activities like kayaking and fishing. Bringing people closer to the streams will also raise the level of awareness and concern for watershed issues.

Open Space Preservation

Currently, approximately 41% of the watershed consists of open space and/or active agricultural areas. However, based on SEMCOG Future Land Use projections, by 2030 it is predicted there will be only 5% open space left. Open space is important for a variety of reasons, including habitat, increased potential for storm water infiltration, pollution prevention, aesthetics, and recreational opportunities. Impervious development is one of the greatest threats to the watershed. Preserving existing open space could be a critical factor in the health of the watershed in the future.

Greenway Preservation

Greenways can be described as connections between people and places to protect and enhance natural resources while providing opportunities for non-motorized recreation and a greater quality of life. Greenways protect open space that is vital to the health of the watershed and also provide habitat corridors for wildlife. Greenways often involve cooperative agreements among neighboring communities, which could lead to a better working relationship among communities within the watershed. Greenways can enhance property values

The Downriver Linked Greenways Initiative is already underway to connect the Downriver communities through a network of trails and greenways. Implementing and expanding this initiative in the Combined Downriver Watershed is desired by the CDWIC.

Wetland Preservation

Wetlands provide habitat for wildlife, absorption of pollutants, and flood control. As communities develop, wetland areas generally are removed or reduced. Mitigated wetlands often fail. The increase of urban runoff often overburdens remaining wetlands and greatly degrades the quality of the wetland. Preserving wetlands will help to maintain the existing benefits wetlands provide, such as enhancing water quality by filtering pollutants and flood control.

Agricultural Land

Development pressure in the CDR communities is intensifying and areas are becoming increasingly vulnerable to conversion from agricultural and natural landscapes to residential and/or commercial land uses. The CDWIC desires to preserve current agricultural uses in the watershed. Agricultural lands provide open spaces and can conserve riparian areas, wetlands, and wildlife habitat.

Well Water Supply

There are residents within the Combined Downriver Watershed whose water supply is from groundwater. Because groundwater and surface water are hydraulically connected, the CDWIC is concerned with how storm water and surface waters may impact the quality of groundwater that will be used for public use.





4.3 POLLUTANTS AND THREATS TO WATERSHED HEALTH, AND THEIR SOURCES AND CAUSES

After identifying the applicable designated and the desired uses for the watershed, the known and suspected causes of impairment and/or threats to these uses were identified.

4.3.1. Pollutants

Pollutants are defined as any substance of such character in such quantities that when it reaches a body of water, soil, or air, it contributes to the degradation or impairment of their usefulness or renders them offensive. Pollutants not only include the traditional types of pollutants - like sediment and nutrients - but also include such things as increased temperature and increased hydrologic flow⁸. Pollutants/issues were identified for each impaired or threatened use. At a regular CDWIC meeting, the committee discussed and prioritized the pollutants for each use. Table 4-3 summarizes the designated and desired uses that are impaired or threatened in the Combined Downriver Watershed, and the associated pollutants/issues that are known (k) or suspected (s).

Table 4-3 Combined Downriver Watershed Uses and Pollutants/Issues

Impaired Uses	Known and Suspected Pollutants/Issues (in order of priority for each use)
Other indigenous aquatic life/wildlife	Lack of stable flow (K) Sedimentation (K) Lack of habitat (K) Low dissolved oxygen (K) Nutrients (K)
Threatened Uses	Known and Suspected Pollutants/Issues (in order of priority for each use)
Total and Partial Body Contact Recreation	E. coli and other pathogens (S) Lack of stable flow (K)
Open space preservation Natural features preservation Wetland preservation Greenway preservation Agricultural land Native Vegetation/Unique habitat/Natural buffers	Inadequate protective measures (K)
Warm Water Fishery	Lack of stable flow (K) Sedimentation (K) Lack of habitat (K) Low dissolved oxygen (K) Nutrients (K)
Flood Control	Lack of stable flow/ excessive surface runoff (K) Lack of hydraulic capacity (sedimentation) (K) Inadequate protective measures (K)

Note: K refers to known pollutants and S refers to suspected pollutants

⁸ Developing a Watershed Management Plan for Water Quality, MDEQ



4.3.1.1. Known Pollutants

The urbanizing landscape of the Combined Downriver Watershed provides many challenges to improving the health of the waterways and watershed. The following is a list of known pollutants and causes of the problems within the Watershed.

Lack of stable flow

Natural base flow (dry weather base flow) in streams is fed mostly by groundwater. After a storm event, rainwater should infiltrate to the groundwater table, which in turn provides constant flow to the streams. Once urbanization occurs, “urban runoff” results as rainwater infiltration is impeded by impervious surfaces. Urban runoff is able to quickly travel to streams, resulting in higher (flashy) peak flows after storm events. In addition, the lack of infiltration results in lower groundwater recharge, with resulting lower stream base flows during dry weather as less groundwater is available to provide a constant source of flow. Higher peak flows after a rain event or snow melt can cause stream bank erosion and flooding while lower dry weather flows make it difficult for some aquatic species to survive.

Excessive surface runoff

As described above, the large increase in impervious surface and loss of open space or “green” space within the watershed has greatly reduced the amount of rainwater that is able to infiltrate to the groundwater table. Instead, this water becomes surface runoff and quickly travels to the stream. This results in both higher peak flows and a greater volume of runoff. Excessive surface runoff can cause stream bank erosion, flooding, and an increase in pollutants to the stream.

Sediment

Excessive peak flows can result in stream bank erosion, which in turn results in suspended solids and sediment deposition. Sediment in streams may also be a result of sediment being carried to the stream via urban runoff. As storm water travels across impervious surfaces, it is able to carry pollutants, including sediment. In addition, disturbed soils near impervious surfaces due to activities such as construction can contribute to the problem.

Suspended solids can result in turbidity, which is harmful to aquatic life. Waters can become warmer as suspended solids absorb heat from sunlight. Less dissolved oxygen can be retained by the warmer waters, which causes oxygen levels to fall. Photosynthesis decreases because less light penetrates the water. Since photosynthesis produces oxygen as a byproduct, this sediment induced drop in photosynthesis also can contribute to lower oxygen levels. Sediment also can clog the gills of fish. The sediment also can settle and deposit in areas necessary for aquatic insects and fish spawning.

Sediment deposition also changes the natural shape of the channel and can reduce the hydraulic capacity of the stream. This can contribute to flooding problems.

Lack of habitat

A lack of habitat results in a poor diversity of aquatic species. Poor habitat can be caused by sediment as it is deposited on substrate necessary for aquatic insects. The absence or downsizing of riparian buffer zones is the biggest cause of lack of habitat. Riparian buffer zones provide shade necessary for preventing heating of stream water. Riparian vegetation also results in woody debris that creates protection for aquatic life. In addition, urban runoff results in a loss of the pool and riffle structure normally found in natural streams. Pools are areas of relatively deep, slow moving water and are important

in providing deeper areas for aquatic species. Riffles are relatively shallow areas of fast moving water and are important for aerating the water.

Low dissolved oxygen

Sufficient dissolved oxygen levels are necessary for the survival of aquatic species. As the levels of dissolved oxygen decrease, the diversity of aquatic life also decreases, as sensitive species are no longer able to survive. Oxygen in the water is used as microorganisms break down organic and/or chemical pollutants (biological oxygen demand) and/or through chemical oxidation (chemical oxygen demand), resulting in less oxygen available for aquatic life. These biological pollutants typically include natural sources (leaf debris, grass, animal wastes) and algae blooms. As noted above, excess suspended solids can absorb heat from sunlight and reduce photosynthesis, which also causes oxygen levels to decrease. Urban runoff, which may become heated as it travels across impervious surfaces, also may contribute to thermal pollution (warming) of the streams, resulting in decreased dissolved oxygen levels.

Nutrients

Nutrients are considered a known pollutant because it is highly likely that nutrients are discharged to receiving waters based on similar watersheds. However the severity of nutrients as a pollutant is unknown as there is insufficient data to prove or disprove that nutrients are problematic in the Combined Downriver Watershed. Nutrients can come from several sources within the watershed. Excess fertilizer runoff, animal wastes, failing septic systems, and even permitted discharges can contribute to excessive nutrients in the streams. Fertilizer used by residents, businesses, and agriculture can be carried to the streams by storm water runoff, both in terms of soluble nutrients and attached to sediment (as suspended solids) in the runoff. Animal wastes also contribute to nutrient loading. Excessive geese populations along impoundments that are mowed to the banks can contribute significant loadings. Septic systems that are not maintained or inspected regularly and properly can result in the migration of human wastes that contains nutrients. Permitted discharges, such as those discharges from domestic and/or industrial wastewater treatment plants, can also be a source for nutrients. High nutrient levels, especially phosphorous, result in excessive growth of aquatic plants (often nuisance plants) and algae. Nuisance plants are able to out compete plants that may be more valuable for habitat. Excessive plant and algae growth also results in lower dissolved oxygen levels when they die and are degraded, which adversely affect aquatic life.

Inadequate Protective Measures

Development and land-use projections indicate that the majority of open space in the CDR watershed will be lost to development. Protection by local regulations can help reduce the amount of open space, natural features, wetlands, greenways, agricultural land, and natural stream buffers that is lost to development.





4.3.1.2. Suspected Pollutants

Because of a lack of available data, E. coli and other pathogens are considered suspected pollutants in the Watershed.

E. coli, other pathogens

E. coli contamination can harm wildlife as well as impair the use of the creeks for total and partial body contact uses. Sources of E. coli can include urban storm water, illicit connections, human waste from failing septic systems, and animal wastes. Urban storm water can collect pathogens from sources such as animal waste as it travels across impervious surfaces. Failing septic systems can leach contaminated water that may find its way to streams, contributing E. coli and other pathogens. Illicit connections in which sanitary sewers carrying human waste are improperly discharged to the storm water system can also be a source for E. coli and pathogen contamination.

4.3.2. Sources and Causes of Pollutants

In order to determine how best to reduce the identified pollutants, the sources contributing those pollutants must be identified. Sources are simply where the pollutants originate. The next step was to identify possible causes for the source of pollutants. The cause is the condition that is creating the source of the pollutant. For example, if sediment (pollutant) is resulting from stream bank erosion (source), the cause of the stream bank erosion may be unrestricted livestock access⁹.

Sources are where the pollutants originate.

Causes are the conditions that are creating the source of the pollutant.

Sources were determined using a variety of methods including a literature review, field observations, and input from the CDWIC. Sources were prioritized for each pollutant and causes were prioritized for each source. The committee discussed and prioritized sources and causes at a regular CDWIC meeting based on committee’s experience and knowledge of the watershed.

Table 4-4 summarizes the sources and causes of the pollution and issues in the watershed. The table provides more specific information to help explain the factors that face the communities in the watershed. Due to the limited specific supporting data (monitoring results, etc) for the CDR, the sources and causes have been categorized as known or suspected through engineering judgment based on information from similar adjacent watersheds (Ecorse Creek and/or Lower Huron River Watersheds)

⁹ Ibid

Table 4-4 Combined Downriver Watershed Pollutants/Issues, Sources and Causes

Known and Suspected Pollutants/Issues	Known and Suspected Sources (in order of priority for each pollutant)	Known and Suspected Causes (in order of priority for each source)	Affected Designated and Desired Use(s)
Lack of stable flow/excessive surface runoff (K)	Urban storm water (K) Reduced base flow/groundwater recharge (K)	Impervious surfaces (K) Development pre-dating storm water management requirements (K) Loss of wetlands (K) Inadequate storm water management (K) Loss of floodplain (K) Impervious surfaces (K) Development pre-dating storm water management requirements (K) Loss of wetlands (K) Inadequate storm water management (K) Loss of floodplain (K)	Flood Control Warm Water Fishery Other Indigenous Aquatic Life/Wildlife
Lack of habitat (K)	Sedimentation (K) Erosion (K) Reduced base flow/groundwater recharge (K) Limited woody debris (K)	Unstable hydrology/excessive runoff (K) Removal of streambank vegetation (K) Inadequate erosion/sedimentation controls (K) Impervious surfaces (K) Development pre-dating storm water management requirements (K) Loss of wetlands (K) Inadequate storm water management (K) Loss of floodplain (K) Removal of forested riparian buffer (K) Inadequate protective ordinances (S)	Warm Water Fishery Other Indigenous Aquatic Life/Wildlife Native Vegetation/Unique Habitat/Natural Buffers
Low dissolved oxygen (K)	Natural sources (leaves, grass, animal wastes) (S) Sediment oxygen demand (S) Elevated water temperature (K)	Inadequate storm water management (K) Unstable hydrology/excessive runoff (K) Removal of streambank vegetation (K) Inadequate erosion/sedimentation controls (K) Impervious surfaces (K) Limited riparian cover (K) Detention basins (S)	Warm Water Fishery Other Indigenous Aquatic Life/Wildlife Native Vegetation/Unique Habitat/Natural Buffers

Known and Suspected Pollutants/Issues	Known and Suspected Sources (in order of priority for each pollutant)	Known and Suspected Causes (in order of priority for each source)	Affected Designated and Desired Use(s)
Nutrients (K)	Fertilizer use (S) Illicit connections (K) Animal waste (S) Permitted discharges (current NPDES permits) (K) Failing septic systems (S)	Improper usage of fertilizers (S) Aging development sanitary sewer infrastructure (K) Insufficient sanitary sewer infrastructure maintenance (S) Improper management of animal waste (S) Excessive geese, improper management (S) - Insufficient septic system maintenance (S) Poor soils (K) Inadequate ordinances (S)	Other Indigenous Aquatic Life/Wildlife
Sediment (K)	Streambank erosion (K) Urban runoff (K)	Removal of streambank vegetation (K) Inadequate erosion/sedimentation controls (K) Impervious surfaces (K) Development pre-dating storm water management requirements (K) Loss of wetlands (K) Inadequate storm water management (K) Loss of floodplains (K)	Flood Control Warm Water Fishery
Inadequate protective measures (K)	Development and land use projections (S)	Inadequate natural features protections in local regulations (S) Inadequate historical public understanding and knowledge (K) Insufficient funding for land acquisition and protection (S)	Open space Preservation Wetland Preservation Greenway Preservation Native Vegetation/Unique Habitat/Natural Buffers Agricultural Land

Known and Suspected Pollutants/Issues	Known and Suspected Sources (in order of priority for each pollutant)	Known and Suspected Causes (in order of priority for each source)	Affected Designated and Desired Use(s)
E. coli, other pathogens (S)	Animal wastes (S)	Improper management of animal waste (S) Excessive geese, improper management (S)	Total Body Contact Recreation
	Illicit connections (K)	Aging development sanitary sewer infrastructure (K) Insufficient sanitary sewer infrastructure maintenance (S)	Partial Body Contact Recreation
	Urban storm water (K)	Impervious surfaces (K) Development pre-dating storm water management requirements (K) Loss of wetlands (K) Inadequate storm water management (K) Loss of floodplain (K)	
	Failing septic systems (S)	Insufficient septic system maintenance (S) Poor soils (K) Inadequate ordinances (S)	

Note: K refers to known pollutant/sources/causes and S refers to suspected pollutant/sources/causes

4.4 GOALS AND OBJECTIVES

The designated and desired uses identified by the CDWIC were the basis for the goals developed. Once the committee came to a consensus on the designated and desired uses of the watershed, they developed goals to help restore, enhance, and/or protect these uses. Goals are a qualitative description of a desired future condition, purpose or end stated in general terms without criteria of achievement. Prioritization of the goals was done by the CDWIC at a committee meeting. The committee discussed each goal and prioritized them based off of the committees' experiences in the Watershed. The prioritization of the goals was finalized once the committee was in agreement.

In contrast to goals, objectives outline how the goal will be reached. In terms of the Watershed Management Planning process, an objective is how you will reduce pollution from a source to protect or restore a designated or desired use.

- Goals of CDWIC**

 - ✓ Reduce Stream Flow Variability
 - ✓ Reduce Flooding
 - ✓ Increase Public Education, Understanding, and Participation Regarding Watershed Issues
 - ✓ Improve Water Quality
 - ✓ Protect Public Health
 - ✓ Preserve, Increase and Enhance Recreational Opportunities
 - ✓ Protect, Enhance, and Restore Riparian and Instream Habitat
 - ✓ Watershed Management Sustainability
 - ✓ Preserve & Protect Critical Areas

It should be noted that the overarching goals of the CDWIC are to restore and/or protect the designated and desired uses of the Watershed. Therefore, the uses addressed by each goal are included. The collective goals, objectives, and associated uses are presented on the following pages. The goals are listed in order of priority, however it is generally understood and recommended that multiple actions will be occurring simultaneously throughout the implementation of the plan. For example, it is essential that efforts to increase public understanding and participation regarding watershed issues occur on an on-going basis during the life of this plan. Many of the identified goals and long-term (greater than 5 years), and short-term (less than 5 years) objectives must be addressed in concert with one another to accomplish the end result of improved water quality in the Combined Downriver Watershed.



The long-term goal is identified, under which short- and long-term (or both) objectives have been identified. The objectives address many of the designated and desired uses of the watershed.

1. Reduce Stream Flow Variability

Both Short- and Long-Term Objectives	Use(s) Addressed	
<ul style="list-style-type: none"> • Reduce runoff volume/rate • Preserve & enhance native vegetation / naturalization 	<ul style="list-style-type: none"> • Flood Control • Warmwater Fishery • Other Indigenous Aquatic Life & Wildlife • Wetland Preservation • Natural Vegetation/Unique Habitat/ Natural Buffers • Partial Body Contact Recreation • Total Body Contact Recreation 	
<table border="0"> <thead> <tr> <th style="background-color: #e0e0e0;">Long-Term Objectives</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • Preserve and restore wetlands & open space </td> </tr> </tbody> </table>		Long-Term Objectives
Long-Term Objectives		
<ul style="list-style-type: none"> • Preserve and restore wetlands & open space 		

2. Reduce Flooding

Long-Term Objectives	Use(s) Addressed
<ul style="list-style-type: none"> • Improve drain capacity in streams • Preserve and restore wetlands & open space • Reduce runoff volume/rate • Improve understanding of streamflow volumes & distribution 	<ul style="list-style-type: none"> • Flood Control • Open Space Preservation • Wetland Preservation

3. Increase Public Education, Understanding, and Participation Regarding Watershed Issues

Short-Term Objectives	Use(s) Addressed		
<ul style="list-style-type: none"> • Improve media coverage • Create partnerships with institutions, schools, and the private sector • Foster relationships with the County and neighboring communities 	<ul style="list-style-type: none"> • All 		
<table border="0"> <thead> <tr> <th style="background-color: #e0e0e0;">Both Short- and Long-Term Objectives</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • Improve education and awareness of watershed successes and failures </td> </tr> </tbody> </table>	Both Short- and Long-Term Objectives	<ul style="list-style-type: none"> • Improve education and awareness of watershed successes and failures 	
Both Short- and Long-Term Objectives			
<ul style="list-style-type: none"> • Improve education and awareness of watershed successes and failures 			



4. Improve Water Quality

Short-Term Objectives	Use(s) Addressed
<ul style="list-style-type: none"> Eliminate/reduce illicit discharges 	<ul style="list-style-type: none"> Agricultural Water Supply Industrial Water Supply Warmwater Fishery Other Indigenous Aquatic Life and Wildlife Partial Body Contact Recreation Total Body Contact Recreation Open Space Preservation Wetland Preservation Natural Vegetation/Unique Habitat/Natural Buffers
Both Short- and Long-Term Objectives	
<ul style="list-style-type: none"> Protect, expand, and restore the riparian corridor Improve erosion and sedimentation controls Preserve and restore wetlands & open space 	
Long-Term Objective	
<ul style="list-style-type: none"> Reduce directly connected storm water discharges to sanitary systems 	

5. Protect Public Health

Both Short- and Long-Term Objectives	Use(s) Addressed
<ul style="list-style-type: none"> Reduce secondary health concerns related to flooding 	<ul style="list-style-type: none"> Total Body Contact Recreation Partial Body Contact Recreation
Long-Term Objectives	
<ul style="list-style-type: none"> Meet partial body contact requirements Meet total body contact requirements 	

6. Preserve, Increase and Enhance Recreational Opportunities

Both Short- and Long-Term Objectives	Use(s) Addressed
<ul style="list-style-type: none"> Protect & improve riparian corridor aesthetics 	<ul style="list-style-type: none"> Recreational Areas Open Space Preservation Wetland Preservation Greenway Preservation Natural Vegetation/Unique Habitat/Natural Buffers Partial Body Contact Recreation
Long-Term Objectives	
<ul style="list-style-type: none"> Obtain land for wetlands and passive parks Meet partial body contact requirements Increase public access to stream corridors Encourage recreation & open space planning in land use approval process 	



7. Protect, Enhance, and Restore Riparian and Instream Habitat

Short-Term Objectives	Use(s) Addressed
<ul style="list-style-type: none"> Integrate storm water management in planning and land use approval process 	<ul style="list-style-type: none"> Warmwater Fishery Other Indigenous Aquatic Life and Wildlife
Long-Term Objectives	<ul style="list-style-type: none"> Natural Vegetation/Unique Habitat/Natural Buffers
<ul style="list-style-type: none"> Restore warmwater fishery Restore diverse aquatic community 	

8. Watershed Management Sustainability

Short-Term Objectives	Use(s) Addressed
<ul style="list-style-type: none"> Establish institutional relationships to ensure plan implementation 	<ul style="list-style-type: none"> All
Long-Term Objectives	
<ul style="list-style-type: none"> Develop long-term funding methodologies 	

9. Preserve & protect Critical Areas

Long-Term Objectives	Use(s) Addressed
<ul style="list-style-type: none"> Integrate critical areas preservation goals into land-use policy 	<ul style="list-style-type: none"> All

