

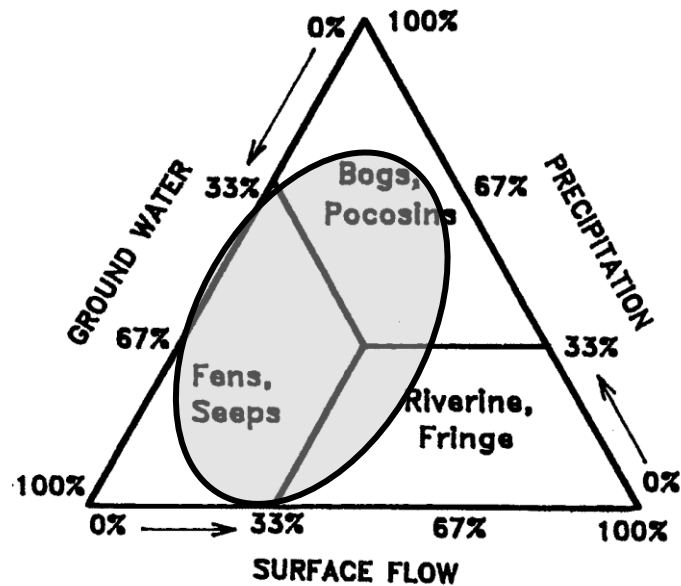
# Demand for Aquatic Life and Recreation

**Landscape** The hydrogeomorphology of the watershed is generally characterized by shallow surficial groundwater on a gently undulating and generally flat or level landscape.

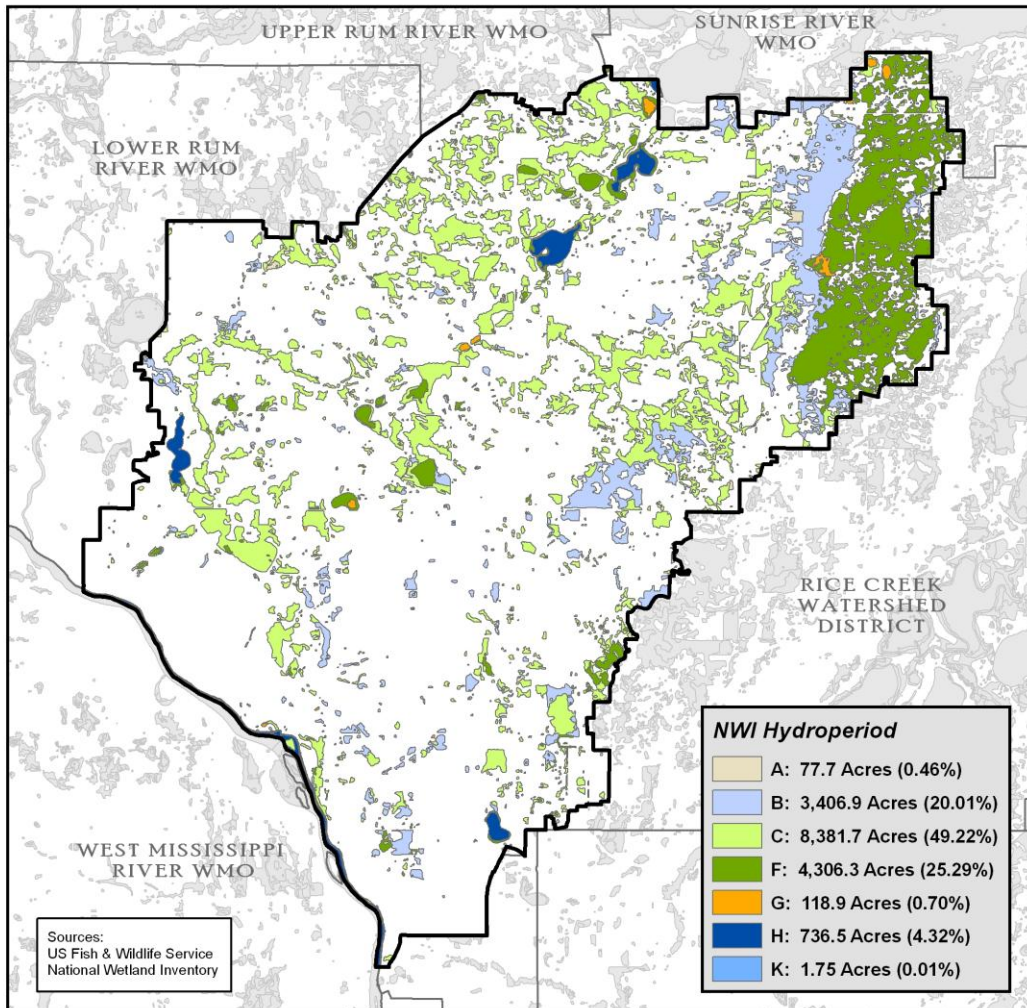
Where the landscape is pitted, it is generally low in relief, and the regional surficial water table breaches the land surface contributing to the creation of wetlands and shallow lakes. These conditions have led to five basic wetland types based on geomorphic setting, water source and hydrodynamics.

**Water Source** While precipitation is the ultimate source of all water within the watershed, the majority of water resources supporting aquatic life receive the majority of their annual water from the surficial ground water.

Predominant Water Sources in the Coon Creek Watershed



**Hydroperiod** According to the NWI, approximately 70% of the wetlands within the District are temporarily flooded, saturated or seasonally flooded (NWI). This finding is consistent with the District's location in the Anoka Sand Plain and reinforces that under normal circumstances, the wetland hydrology in the watershed is groundwater related.

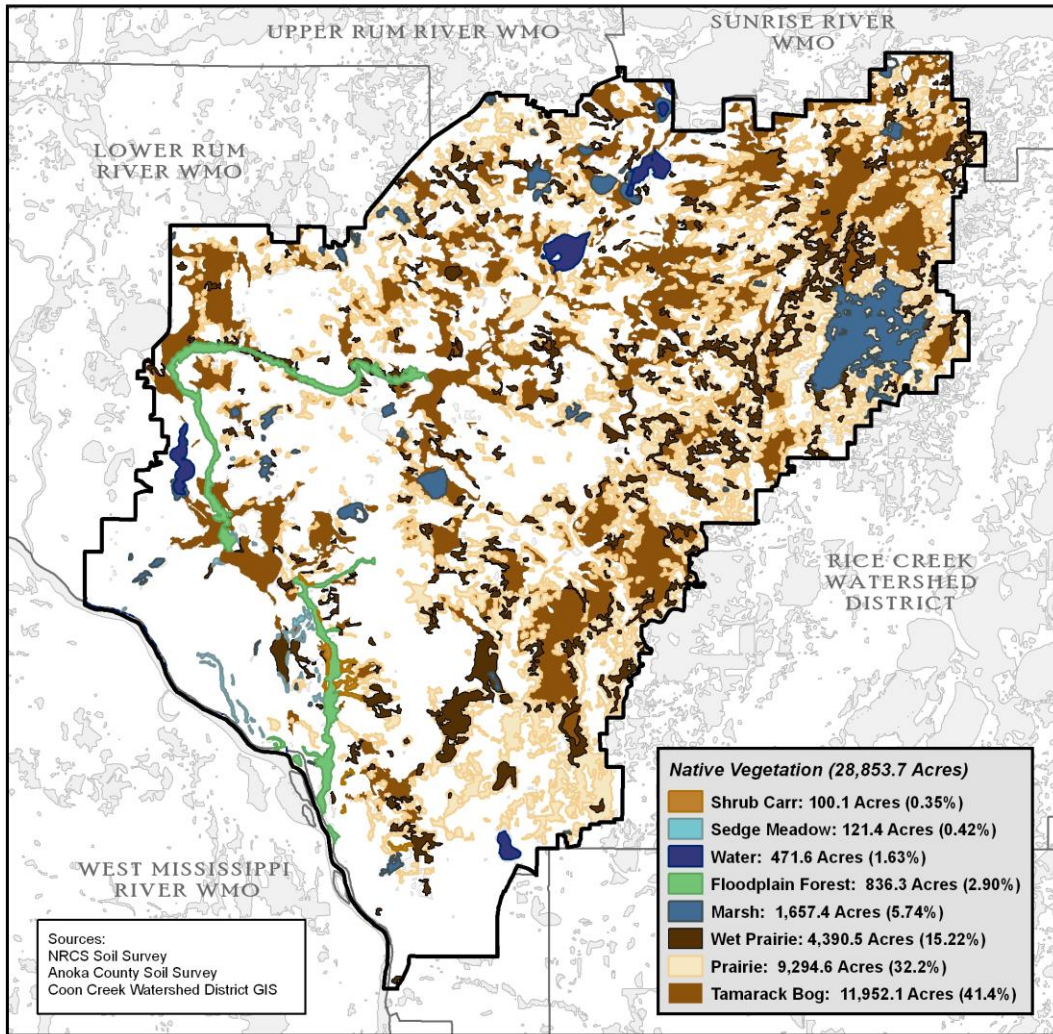


## Habitat and Recreational Capability

Approximately 29,000 acres of aquatic habitat existed within the Rice Creek watershed prior to settlement. Most of that habitat was marsh, meadow and prairie (54%). However, Tamarack bogs comprised the single largest habitat type (41%).

The quantity and quality of aquatic habitat from landscape processes of the watershed is shown below.

Presettlement water resource map of Coon Creek Watershed



**Recreational Landscape** The recreational landscape of the watershed is composed of three principal components:

1. Surface water resources
2. Vegetative communities
3. Topographic relief

All contribute to the overall quality and quantity of the area's water based recreational resources.

**Fishery Habitat** The Coon Creek watershed contains twelve lakes. Half of those lakes (6) are man-made and while originally constructed for a source of barrow material they have become a central aesthetic feature in a subdivision and in most cases also used for boating and fishing. Cenaiko Lake is stocked with trout.

1. Three lakes (Cenaiko Lake, Crooked Lake and Ham Lake) support active recreational fisheries.

2. Lake Netta, while more wetland than lake, has a long history of recreational use by the residents that live on the lake but is subject to winter kill
3. Crooked, while classified as a deep lake behaves much more like a shallow lake
4. Cenaiko Lake (Man Made) is stocked with trout
5. Sunrise Lake (Man Made) supports a centrarchid fishery

Lake Name	Nature	Lake ID	Size (Ac)	Littoral Zone (%)	Max Depth (ft)	Water Clarity (ft)
Amelia	Man Made		10			
Bunker	Wetland	020090	70	100%	6	
Cenaiko	Man Made	020654	29	40%	36	5.4
Club West	Man Made	020764	37		26	3.5
Crooked	Shallow	020084	118	73%	26	8.5
Dianne	Man Made		14			
Ham	Shallow	020053	193	92%	22	6.8
Laddi	Wetland	020072	77	100%	4	3.9
McKay	Wetland	020083	20	100%	6	
Netta	Shallow	020052	168	80%	19	7.6
Sunrise	Man Made		134			
TPC	Man Made		34			

**Invertebrate Habitat** Total number of families, FBI, and EPT indices of stream health are not different among unmaintained reaches of stream and those that have been maintained (ditched or cleaned) in the last 10 years.

Year	2008	2008	2009	2009	2009	2010	2010	2010	Mean	Mean
Season	Summer-ACD	Fall-ACD	Summer-ACD	Fall-ACD	Fall	Spring	Summer-ACD	Fall-ACD	2010 Anoka Co.	1998-2010 Anoka Co.
FBI	4.40	4.40	4.00	4.20	6.00		4.10	4.20	5.5	5.8
# Families	15	19	7	10	19		15	16	19.4	14.3
EPT	4	6	4	3	4		6	5	4.7	4.3
Date	27-Aug	9-Oct	24-Aug	5-Oct	7-Oct	28-Apr	5-Aug	1-Oct		
Sampled By	ACD	ACD	ACD	ACD	BHS	BHS	ACD	ACD		
Sampling Method	MH	MH	MH	MH	MH	MH	MH	MH		
Mean # Individuals/Rep.	202	177	142	143	296		426	447		
# Replicates	1	1	1	1	1		1	1		
Dominant Family	Baetidae	Heptageniidae	Baetidae	Hydropsychidae	Corixidae		Gammaridae	Gammaridae		
% Dominant Family	41.1	30.5	57.7	39.9	29.1		57.6	32.3		
% Ephemeroptera	59.9	53.1	74.6	46.2	2.7		13.6	40		
% Trichoptera	10.4	15.3	19	39.9	14.2		22.1	19.5		
% Plecoptera	0	0	0	0	0		0	0		

**Wetland Habitat** The Coon Creek Watershed contains approximately 13,300 acres of wetland (NWI, 1979). An additional 6,500 acres of wetland may be farmed. Wetlands, under normal conditions, comprise approximately 22% of the watershed.

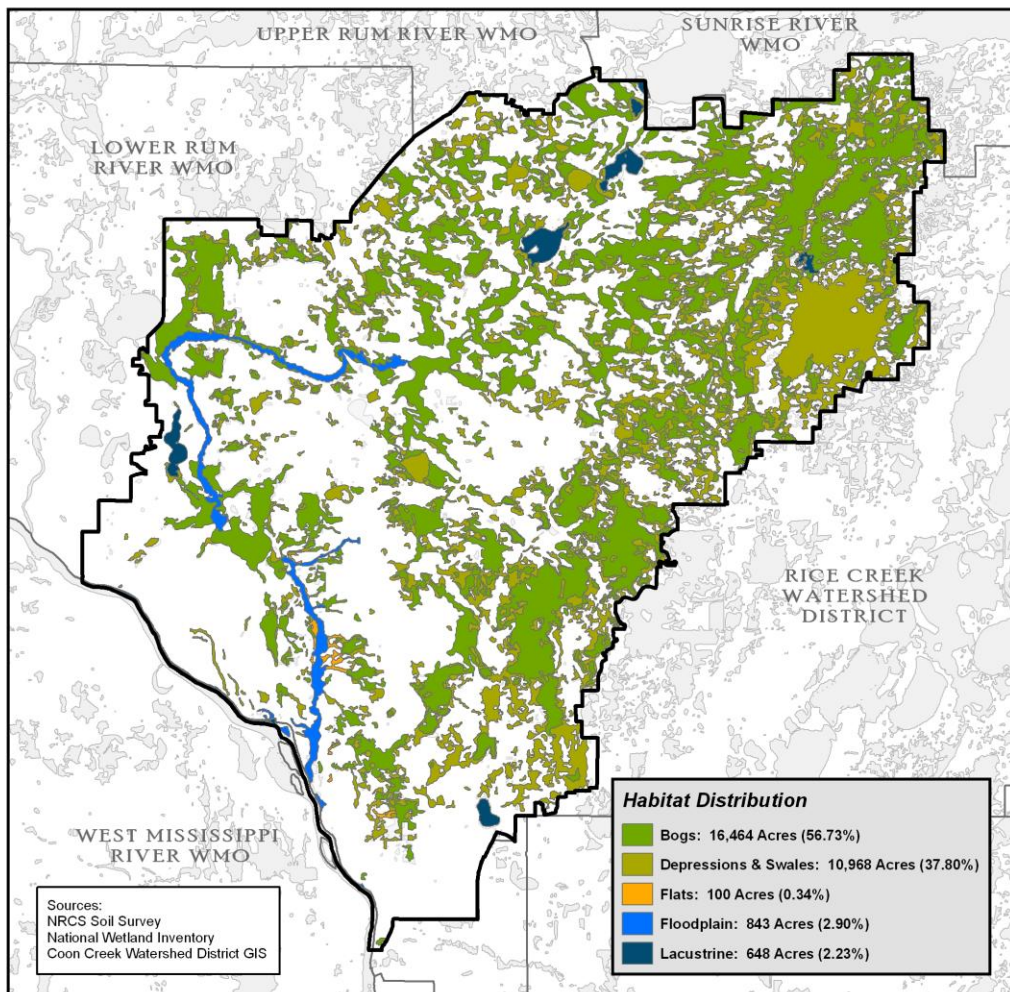
Historic estimates, based on hydric soil mapping, are that approximately 47% of the watershed was wetland prior to settlement (USDA, 1977).



# Current Distribution of Aquatic Life and Recreational Opportunities

**Aquatic Life Habitat Distribution** The hydrogeomorphology of the watershed is generally characterized by shallow surficial groundwater on a gently undulating and generally flat or level landscape.

Where the landscape is pitted, it is generally low in relief, and the regional surficial water table breaches the land surface helping create wetlands and shallow lakes. These conditions have lead to five basic wetland types based on geomorphic setting, water source and hydrodynamics.



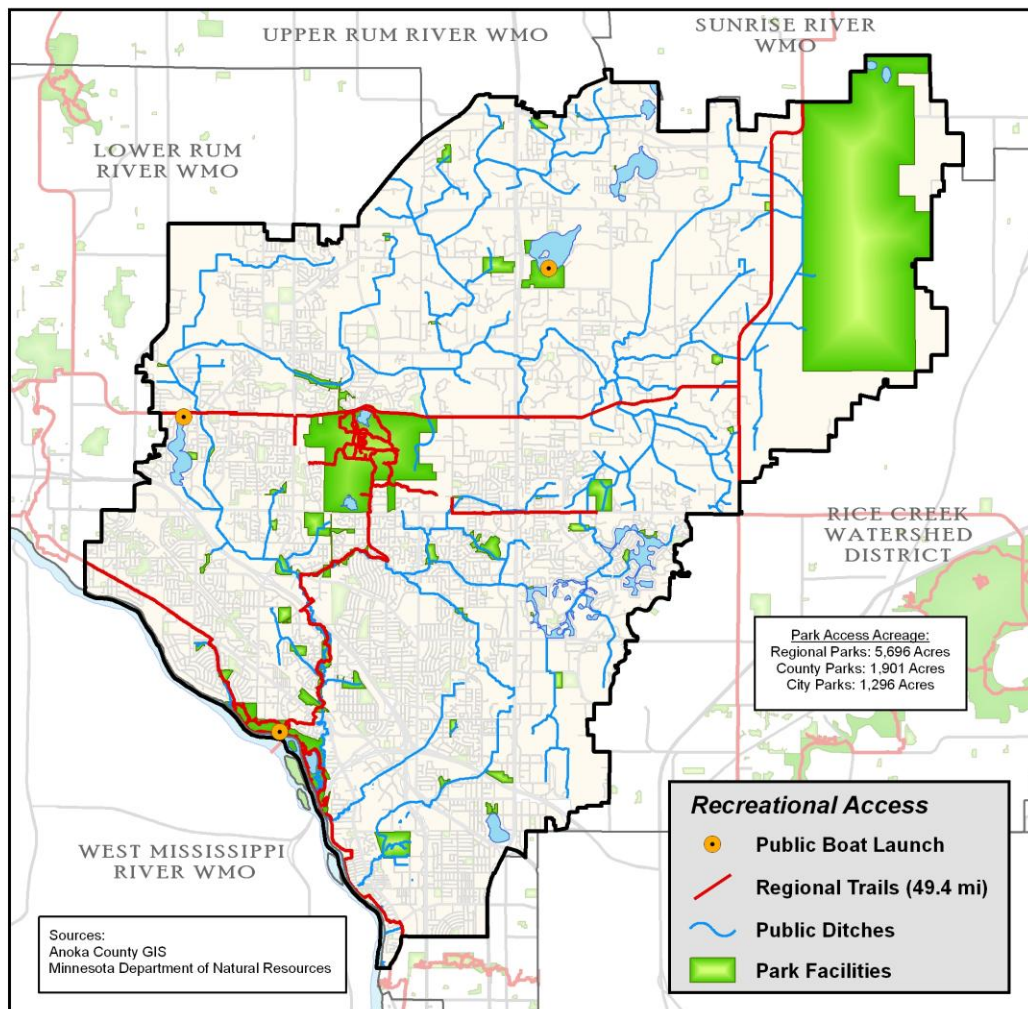
**Aquatic Recreation Opportunities** Primary contact activities such as swimming, diving and wading occur in three of the District's lakes,

1. Crooked
2. Ham
3. Sunfish

Very limited contact occurs in some portions of Coon and Sand Creeks. Boating and canoeing occur on these lakes as well as lake Netta.

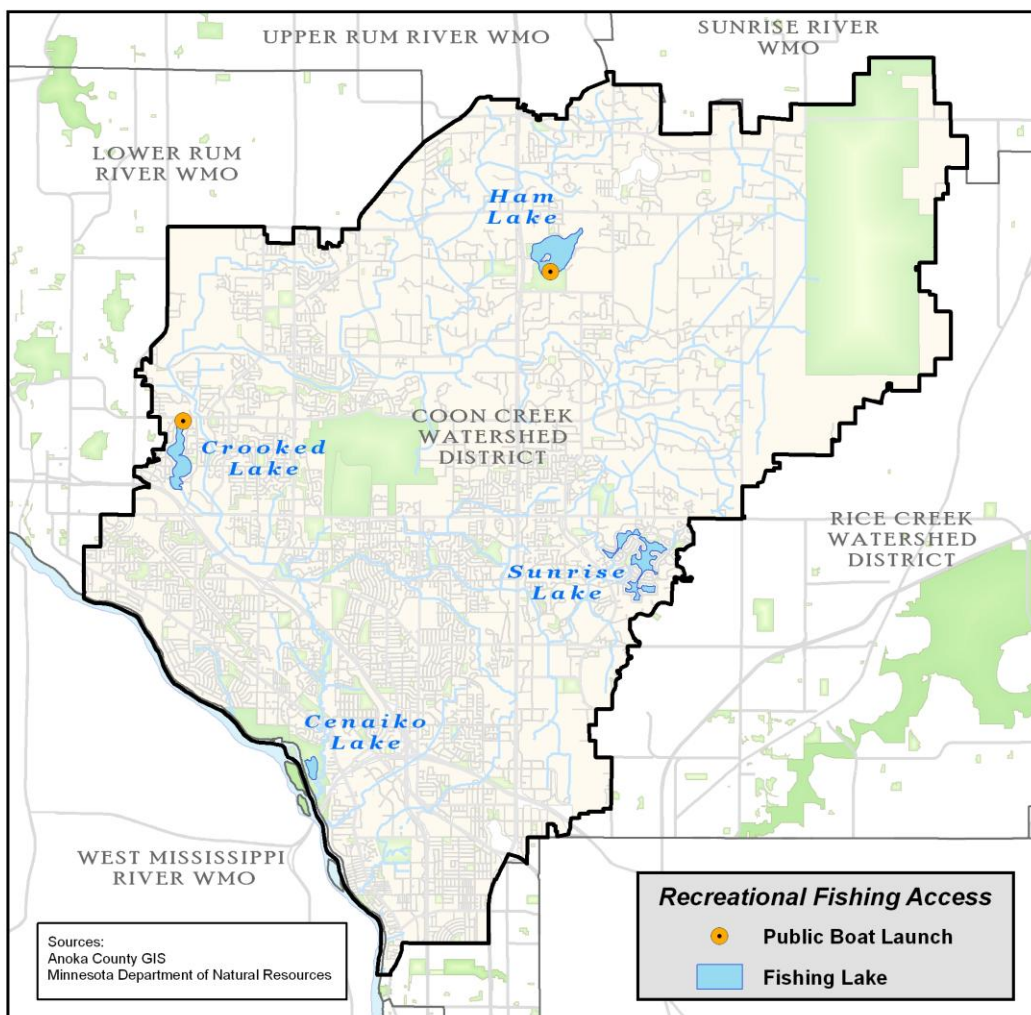
Coon Creek is a major water feature of the District. It begins in northeastern Ham Lake and flows south, then west and then south again entering the Mississippi River at the TH 610 Bridge in southern Coon Rapids. The upper three quarters of the creek is generally slow moving and shallow. Below US 10 it encounters more vertical relief and begins to pick up speed until it enters Coon Rapids Dam Regional Park and the Floodplain of the Mississippi river.

Coon Creek generally is not considered navigable except by small craft such as canoes and kayaks during high flows. Artificial constrictions, such as bridges and culverts, could make passage along some portions of the creek hazardous during higher flows.



**Fish** The Coon Creek watershed contains twelve lakes. Half of those lakes (6) are man-made and while originally constructed for a source of barrow material have become a central aesthetic feature in a subdivision and in most cases also used for boating and fishing.

1. Cenaiko Lake is stocked with trout.
2. Two lakes (Crooked Lake and Ham Lake) support fisheries.
3. Lake Netta, has a history of recreational use by the residents that live on the lake but is subject to winter kill
4. Crooked, while classified as a deep lake behaves much more like a shallow lake
5. Sunrise Lake (Man Made) has an active centrarchid fishery that is used by residents of the Lakes community





**Invertebrate** The invertebrate community suggests Coon Creek’s health is average compared to other nearby streams. The stream’s habitat is relatively sparse, mostly due to past excavations aimed at making the creek perform as a ditch. The supplemental stream water chemistry readings taken during biomonitoring indicate a higher than expected level of dissolved pollutants, as measured by conductivity. Conductivity and salinity were similar to, though not as extreme as, some urbanized streams at the same time of year. The source could be road salts, failing septic systems, and/or chemical wastes. Turbidity was also high. These factors, as well as the general lack of habitat in this ditched stream, probably limit the invertebrate community.

*Map of Stream Habitat*

**Aquatic Endangered & Threatened Species** There are 22 endangered and threatened species within the watershed that either depend on or prefer aquatic habitats for portion of their life cycle or livelihood

	<b>Plant</b>	<b>Animal</b>	<b>Total</b>
<b>Endangered</b>	2	1	3
<b>Threatened</b>	2	3	5
<b>Special Concern</b>	4	10	14
	8	14	22

**Value of Aquatic Life and Recreation**

The necessary factors and conditions that affect aggregate demand for aquatic life and recreation within the Coon Creek Watershed are discussed below.

**Population Served** It is estimated that aquatic habitat served by public access to water resources directly benefits approximately 4 million users per year. Below are the most popular water related activities.

<b>Activity</b>	<b>Percent of Use</b>	<b>Visitors</b>
Trail Related	51%	2,053,689
Swimming-Lake Creek & River	13%	502,892
Relaxing	9%	371,432
Sun Bathing	8%	316,751
Other	7%	227,464
Playground Use	5%	215,323



Fishing	3%	124,661
Picnic	2%	76,307
Camping	0%	12,183
Boating	0%	10,200

**Cost to Use** The cost of accessing and utilizing aquatic habitat and recreational opportunities within the watershed is low.

Most aquatic habitat and recreational opportunities within the District is accessed by a fully developed road and street system as well as trail systems developed and maintained by the cities and Anoka County within the watershed.

This connectedness makes the costs associated with travel time and effort convenient and low.

**Available Substitutes** Substitutes for specific aquatic habitat types are closely related to a particular use associated with that habitat. Most aquatic habitat, with the exception of specialized opportunities (eg: Springbrook Nature Center, Bunker Hills Park, Coon Rapids Dam Park) there are substitutes for the aquatic habitats within the District.

**Ease of Adopting Substitutes** However, adapting, replacing or mitigating these aquatic habitats is extremely difficult because of particular combination of landscape, soils and water sources that combine to manifest the habitat types that are present.

**Marginal Value of Aquatic Life** The value of each acre of aquatic habitat and the life forms they support is moderate to high.

On a simple basis (Dividing the total benefits, lakes could be valued at approximately \$320,000 per lake acre or \$113.20 per aquatic habitat user

**Service Preferences** While Aquatic life was ranked ninth on the national level, 8<sup>th</sup> by citizens and local professionals and 5<sup>th</sup> by all water resource professionals.

	Citizens	City Engineers	Water Professionals	National
Drinking water	1	1	1	1
Water Quality	2	2	2	2
Flood Control	2	2	3	5
Groundwater Recharge	4	4	4	7
Storm Protection	6	5	6	6
Drainage	5	8	7	8
<b>Aquatic life and recreation</b>	<b>8</b>	<b>8</b>	<b>5</b>	<b>9</b>

Hunting and Fishing	<b>8</b>	<b>8</b>	<b>9</b>	<b>10</b>
Irrigation	9	9	10	4
Livestock and wildlife watering	10	10	8	11
Aesthetics	<b>11</b>	<b>11</b>	<b>11</b>	<b>12</b>
Industrial use and cooling	13	13	12	3

## **Risks and Impairments to Aquatic Life and Recreation**

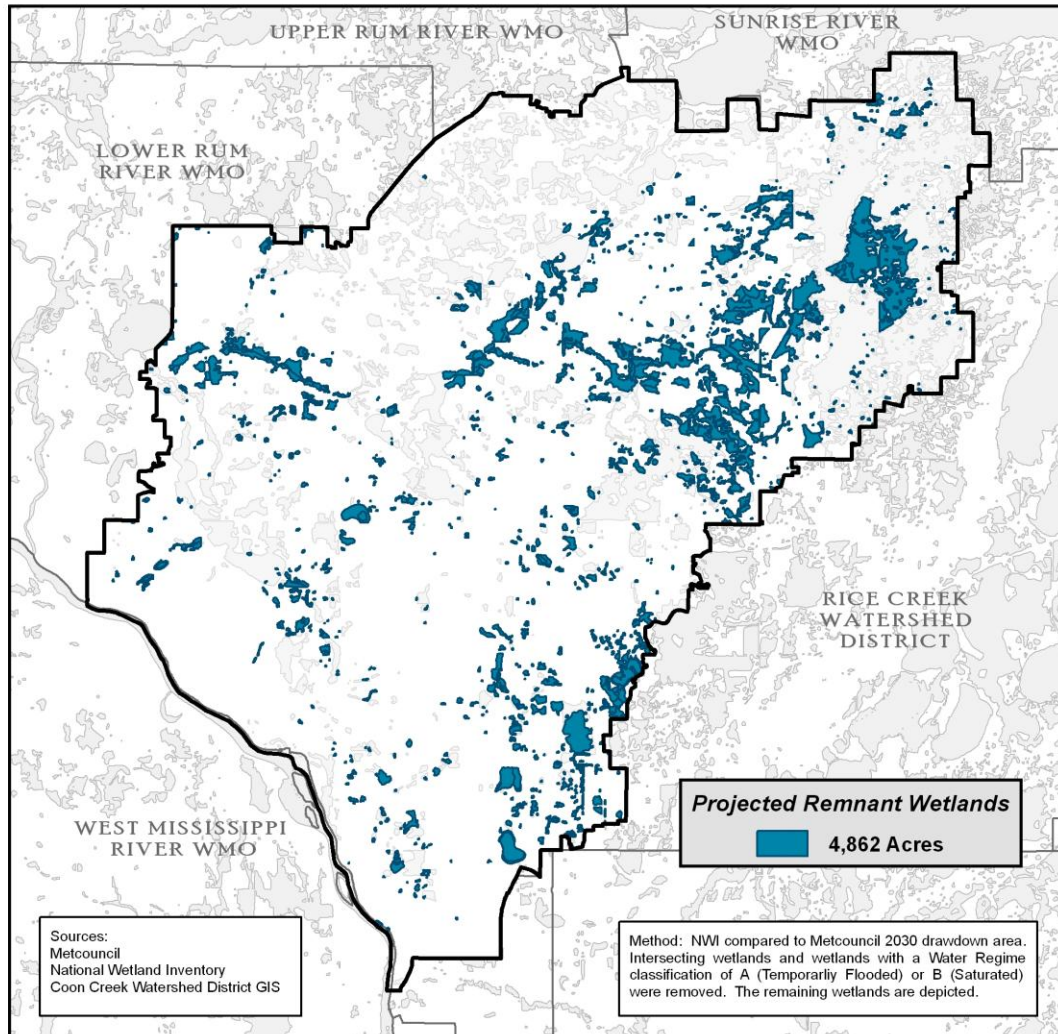
Risks of disruptions to services differ from site to site and are associated with the exposure and vulnerability of the drainage system itself and the vulnerability and exposure of important landscape features that affect the functional capacity of the system. Threats that cause risk can arise from physical, social or managerial actions or processes.

The State shall determine if a water body is impaired based on degradation of the physical, chemical or biological qualities of the water resource to the extent that attainable or previously existing beneficial uses are actually or potentially lost.

**Loss of Hydrology** During the past 10 years the District has observed a general drying out of the landscape. This drying out appears to be directly related to the decline in the surficial groundwater table. Wetlands most affected are those with saturated or temporarily flooded hydroperiods.

A 2009 Metropolitan Council Study showed surface water features likely to be affected by draw downs in the surficial aquifer. A map of the affected areas is shown below

**Projected loss of wetlands Coon Creek WD, if Met Council Model is correct**



**Oxidation of Organic Soils** During the past 10 years the District has also observed a general breakdown and change in hydric soils, particularly organic soils. Signs of decomposition and hydrophobic conditions are becoming increasingly evident.

**Invasive Species** Wetlands continue to be invaded by Reed Canary grass (*Phalaris arundinacea*) and Common Buckthorn. Both species appear to have received a boost from the decline in surficial groundwater levels and the generally droughty conditions during most of the past decade.

With the decline in lake levels, several lakes have experienced a spread in invasive species such as Eurasian Water Milfoil and Curly Leaf pondweed

As boat traffic and recreational use of all lakes increases, the spread of Eurasian Water Milfoil and Zebra mussels has become a common concern throughout the District

Lake Name	Eurasian Water Milfoil	Curly Leaf Pondweed
Cenaiko	?	
Crooked	1990	2005
Ham		Yes (<2005)

**Impairment of Fishery** As Lakes decrease in depth, fish populations can become more concentrated and the animals incur more stress. While fishing may improve over the short term, the potential for winter kill and disease increase significantly.

In addition, the normal fishery and the lower aquatic biota upon which it is dependent shall not be seriously impaired or endangered

Species composition shall not be altered materially. Propagation of fish and biota normally present shall not be prevented or hindered by the discharge of sewage, industrial waste or other wastes

**Excessive Algae and Plant Growth** The State goal is for no material increase in undesirable plants, including algae, nor shall there be any significant increase in:

- Harmful pesticides or other residues
- Sediments
- Aquatic Flora and Fauna

To evaluate these narrative standards, the following must be met

Total Phosphorus Concentrations	Std.	Unit	Crooked	Ham	Netta	L-side Common
	Lake	≥40	mg/L	.36	37	30
			Coon Hallow	Lions Park	Shadow brook	
Stream	.100	mg/L	151	94	91	

Chlorophyll-a Concentrations	Std.	Unit	Crooked	Ham	Netta	L-side Common
	Lake	≥14	mg/L	8	10.7	7.4
			Coon Hallow	Lions Park	Shadow brook	
Stream	.100	mg/L				



Transparency

	Std.	Unit	Crooked	Ham	Netta	L-side Common
Lake	<4.5	feet	6	5.2	7.3	7.5
			Coon Hallow	Lions Park	Shadow brook	
Stream						

**Biological Community and Aquatic Health**

Portions of Coon Creek have been monitored for biota every year since 2000 (ACD Water Atlases). The invertebrate community suggests Coon Creek’s health is average compared to other nearby streams. The stream’s habitat is relatively sparse, due mostly to excavations performed to repair and maintain the County Ditch function of most of the drainage system within the watershed.

The biomonitoring suggests that stream health is similar to the average for Anoka County streams, despite the good quality habitat. Family Biotic Index (FBI) has been consistently higher than the county average, but the number of families and number of pollution sensitive families (EPT) has been similar to county averages.

The invertebrate community suggests Coon Creek’s health is average compared to other nearby streams. This is unexpected because habitat at the Egret Street site is much better, including riffles, pools, snags, and forested areas around the stream. At Crosstown Boulevard the creek has been ditched so there are no riffles or pools, there is no rocky habitat, few snags, and adjacent habitat is grassy. One possible explanation is that the biotic community at Egret Street is limited by poorer water quality despite the better habitat. Chemical monitoring has found that Coon Creek’s water quality declines from upstream to downstream. This corresponds with an increase in urbanization. Future monitoring will provide insight.

**Total Suspended Solids (TSS) and Turbidity**

At least three observations and 10% of all observations exceeded the water quality standard of 25 NTU.

Turbidity and TSS problems are most severe in downstream reaches. Readings in downstream areas are typically two-times higher than those from upstream areas.

**Dissolved Oxygen**

Dissolved oxygen in Coon Creek and Pleasure Creek were similar at all sites, only once dropping below 5 mg/L at which point some aquatic life becomes stressed.

Dissolved oxygen in Sand Creek was within the acceptable level on 95% of the site visits. On four occasions it dropped below 5 mg/L.

These four readings occurred at three different sites; two during storms and two during baseflow. Three occurred in 2009, which was a severe drought year. Stagnant conditions are probably responsible for these low oxygen conditions, and are likely natural.

## Expected Future of Aquatic Life and Recreation

The quantity and quality of aquatic life and habitat available in the future will depend largely on several factors:

### Population of the Watershed

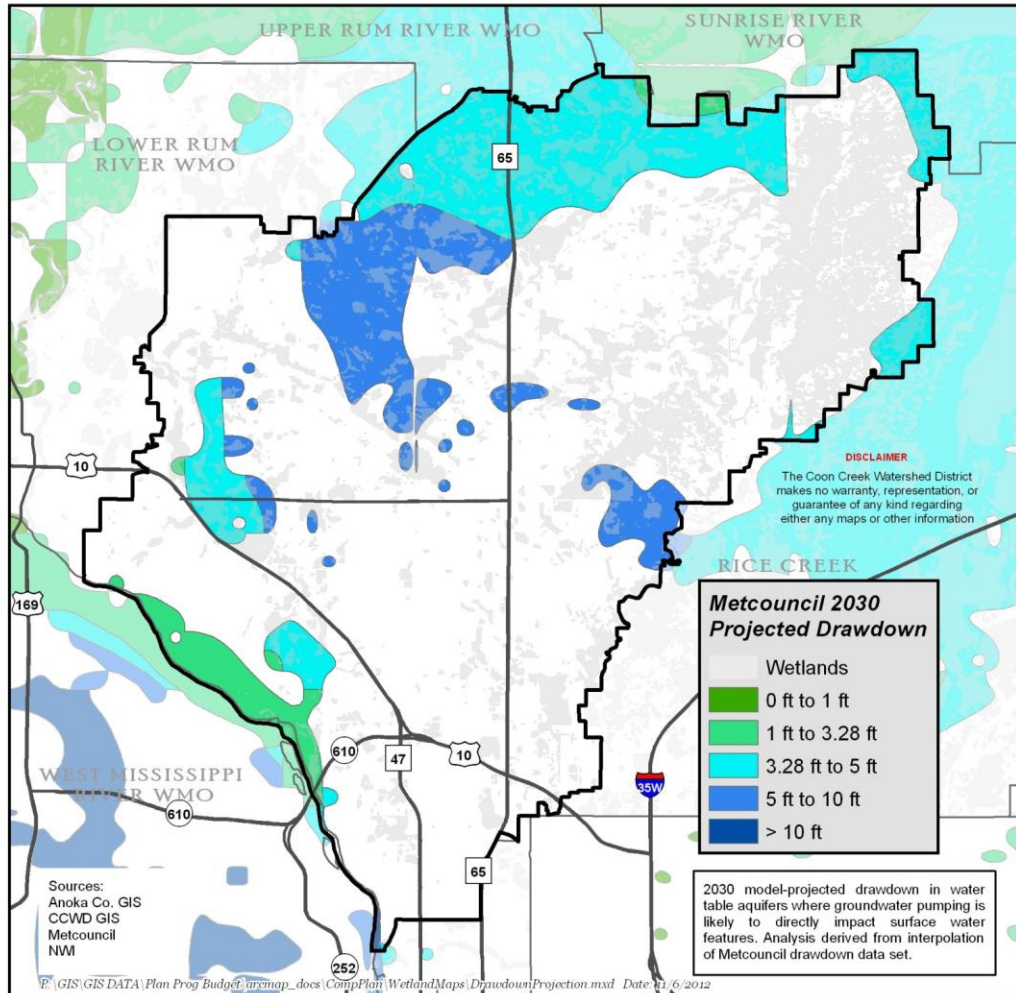
	2000	2010	2020	Pct Chg
Andover	17,450	30,598	39,165	28%
Blaine	46,845	60,643	71,943	19%
Columbus	479	508	623	23%
Coon Rapids	62,295	65,700	66,000	0%
Fridley	27,449	27,000	26,900	0%
Ham Lake	11,782	15,017	16,686	11%
Spring Lake Park	7,090	6,710	6,710	0%
Total	173,390	196,766	216,050	10%
Figures based on 2010 census adjusted to watershed boundary				

### Loss of Groundwater Dependent Surface Water Features

If surficial groundwater levels continue to fall between 2010 and 2020, surficial water features, such as

- a. Lakes (decline of 50% surface area)
- b. Wetlands (8,375 acres)
- c. Base Flow

will be difficult to protect and sustain in the areas shown below:



The result may be increasing demand with a reduced or reducing natural resource base. While some of the decrease in water levels will be a result of increased use of ground water and a decrease then in surficial groundwater levels, which is almost a certainty

A portion of the expected change will depend on climatic patterns. If the trend toward drought that has dominated the landscape the past ten years continues, then the worst case scenario mapped above will occur. However, if precipitation levels and occurrences become more volatile involving wetter than normal conditions such as 2011, then the acreage impact of lower water levels will be slightly mitigated and habitat changes will occur in the form of plant communities and animal species that are adaptable to life at the extremes of water (Drought and flood separated by shorter periods of time)

**Expected Externalities** If the climate becomes more volatile (Drier dry periods, wetter wet periods, shorter times between the two),

- Protection and maintenance of a given habitat or species may become impossible
- Die offs of species or communities, either through disease or conditions, and replacement of these species/communities can be expected

## **Management Needs**

**Recreation** Provide for recreation-related opportunities for responsible use of water and related resources within the District

Provide for opportunities for a variety of recreational pursuits, with emphasis on activities that harmonize with water and related natural environment and are consistent with the applicable land uses

To provide for development and management of sites consistent with the available natural resources to provide a safe, healthful, aesthetic atmosphere.

To ensure safe water quality for designated primary contact recreation areas

Mitigate adverse impacts of recreational uses on water and related resources through education, and on-the-ground management, including rule enforcement

Encourage water recreation opportunities that meet the public needs in ways that are appropriate to the Watershed District role and are within the capabilities of the resource base.

**Aquatic Life** Manage riparian areas under the principles of multiple-use, while emphasizing protection and improvement of soil, water, and vegetation, particularly because of their effects upon aquatic and wildlife resources. Give preferential consideration to riparian dependent resources when conflicts among land use activities occur.

Determine the effects of fluctuations in water levels, quantities, and timing of flow in relation to habitat of fish, waterfowl, mammals, and aquatic organisms, and to maintenance of phreatophytes and other riparian vegetation