Grant

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Coon Creek Watershed District Nine Key Element Document for Coon and Sand Creeks

This document provides a summary of the EPA's nine key elements information for Coon and Sand Creeks.

MINNESOTA POLLUTION CONTROL AGENCY

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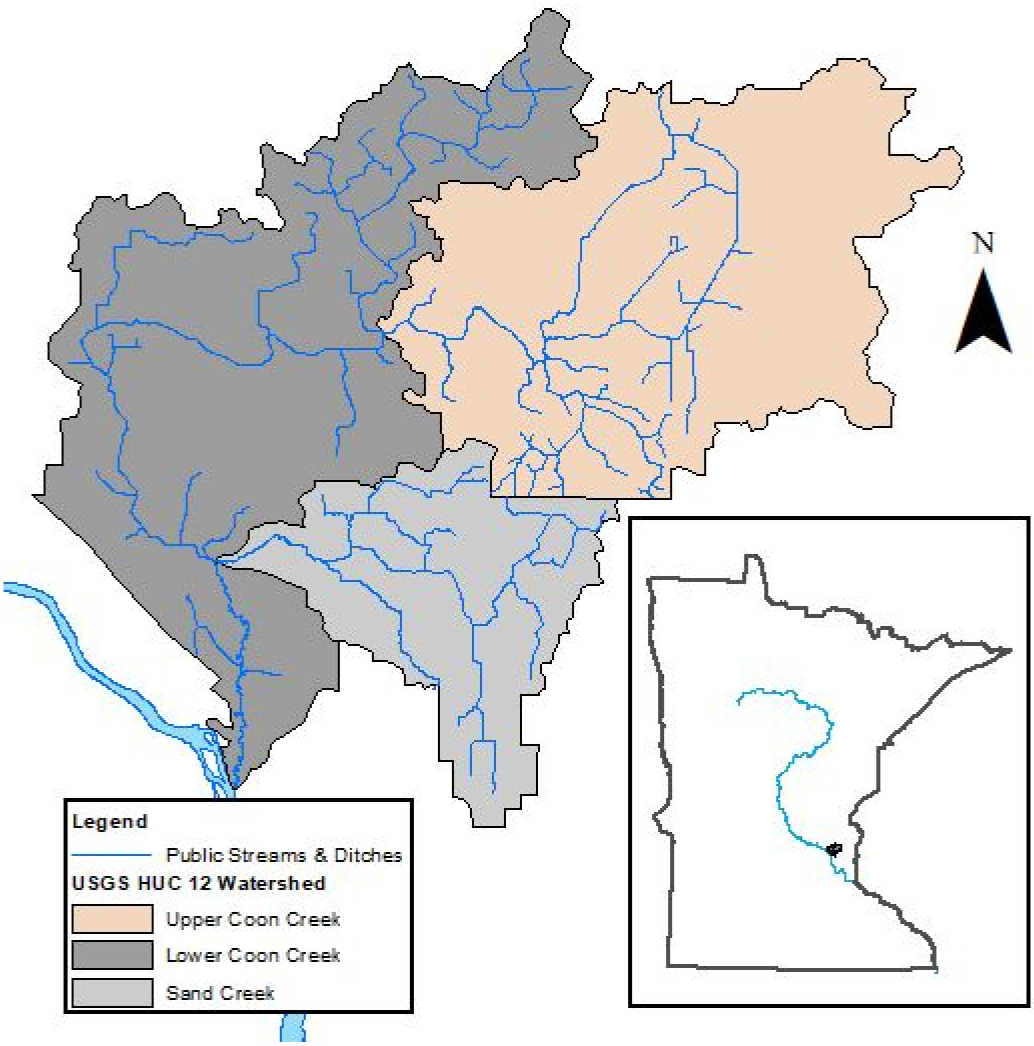
Executive summary

The Coon Creek Watershed District (CCWD or District) has a long history of working with its member cities, watershed citizens, and many other partners in protecting and restoring the water resources within the watershed. The watershed district was formed in 1959 pursuant to Minn. Stat. 103D. Ensuring good water quality is one of the five core mission goals of the CCWD. Since the adoption of the current 2013-2023 CCWD comprehensive watershed management plan, a district-wide Total Maximum Daily Load (TMDL) study and Watershed Restoration and Protection Strategy (WRAPS) were developed and formally approved in 2016. The District is part of the Twin Cities Metropolitan Area (Figure 1).

Figure 1. Location of the Coon Creek Watershed in Minnesota



The CCWD comprehensive watershed management plan is currently being amended to include updated water quality and TMDL implementation chapters which form the basis for the Section 319 Small Watershed Focus Program nine key element (NKE) plan for the implementation of nonpoint source management practices as part of the holistic management approach of the CCWD. The NKE plan includes point source pollution information that is addressed in the CCWD plan through other sources of funding. The focus of the NKE plan (this document) includes Coon Creek and its primary tributary, Sand Creek. Both streams fail to support recreation and aquatic life beneficial uses, with excess *E. coli*, sediment, phosphorus, poor habitat, and altered hydrology identified as primary stressors.

Development of a NKE plan in conjunction with the existing CCWD comprehensive watershed management plan presents a complex challenge to mesh all of the varied programmatic requirements. Water and watershed plans in Minnesota are generally developed on a 10-year timeline with specific activities and projects that will be reasonably achieved within the current funding and capacity of the watershed management organization. The Environmental Protection Agency (EPA) requires that the 10-year timeline address all of the activities and projects that will be required to achieve the reductions needed to meet water quality standards. Part of the NKE document is to then plan for the means to achieve these goals. While it may not appear to be a significant difference, in practice it can be difficult to mesh the two approaches. It is the goal of the CCWD and the MPCA to work with the two approaches in achieving the water quality goals for the Coon Creek watershed.

The CCWD comprehensive watershed management plan and WRAPS use an adaptive management approach. These plans, combined with the documentation described in this memorandum, fully provide the NKEs identified by EPA as critical in a watershed plan for achieving improvements in water quality for Coon and Sand Creeks. This memorandum bridges the gap between the details required to meet the NKEs and the CCWD planning processes. This NKE document is intended to address all pollutants, sources, and implementation strategies in the watershed to reach the reductions needed to achieve and protect water quality standards.

For the purposes of the Section 319 grant program, only practices and activities eligible for funding under the EPA 2014 Section 319 program guidance and Minnesota’s Nonpoint Source Pollution Program Management Plan (NPSPPMP) are eligible for Section 319 funding. All match activities must be eligible for Section 319 funding, except where noted in the NPSPPMP. Other activities will need to seek alternative funding sources, including local ad valorem taxes and various state grants.

Water quality condition summary

Coon Creek and Sand Creek have been assessed by the MPCA as impaired for aquatic recreation and aquatic life based on *E. coli* and macroinvertebrate Index of Biotic Integrity (MIBI) (MPCA, 2013) (Table 1). The two streams were deferred from assessment with fish IBI (FIBI) due to channelization and will be assessed as part of the 2020 assessment cycle for the Mississippi River-Twin Cities HUC-8 watershed using the MPCA's Tiered Aquatic Life Use standards for modified systems adopted in 2017. FIBI data were, however, below both the existing general use and proposed modified use FIBI thresholds, so inclusion on the 2022 impaired waters list is likely. Crooked, Ham, Cenaiko, and Netta Lakes were assessed as fully supporting aquatic recreation based on Minnesota's eutrophication standards for shallow lakes in the North Central Hardwood Forest ecoregion. Crooked and Ham Lakes, however, were listed as impaired for aquatic consumption based on elevated levels of mercury in fish tissue samples and are included in Minnesota's statewide Mercury TMDL and implementation plan. Addressing mercury impairments is outside the scope of the duties of the CCWD and the implementation of the mercury TMDL implementation plan is expected to mitigate the mercury impairment. Figure 2 shows the location of the assessed and impaired waters in the three HUC-12 subwatersheds comprising the Coon Creek watershed.

Figure 2. Map of assessed and impaired waters in the Coon Creek Watershed

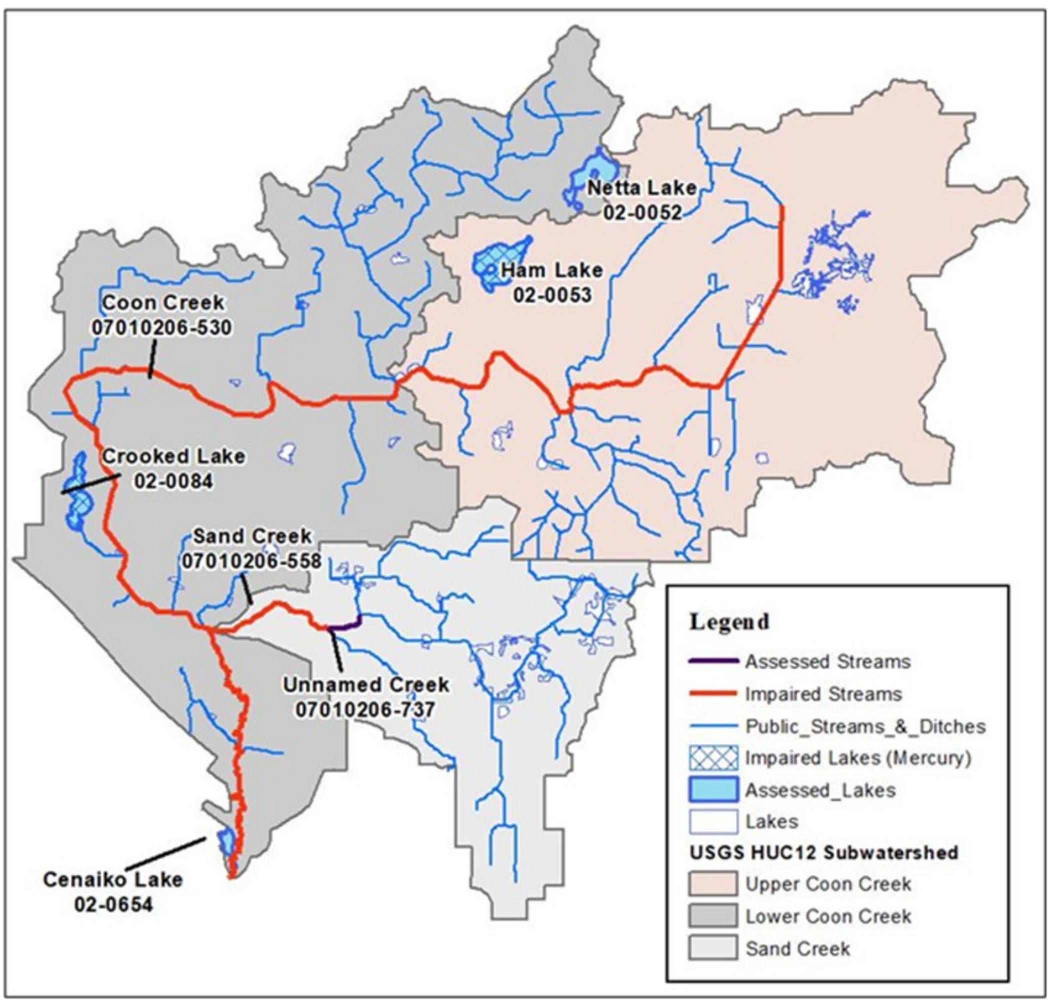


Table 1. Summary of impairments listed on the 303(d) list

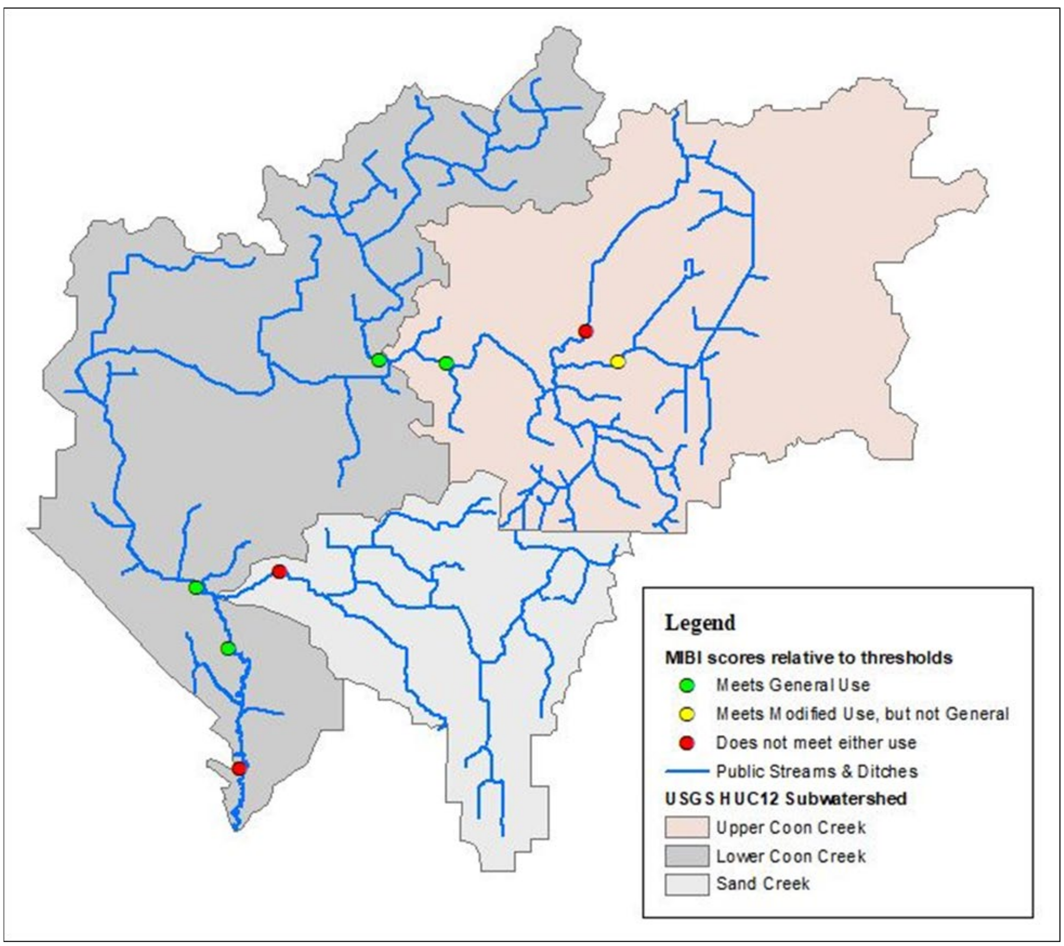
Water body name	AUID	Affected designated use	Pollutant or stressor
Coon Creek	07010206-530	Aquatic Life Aquatic Recreation	Benthic macroinvertebrates bioassessments *Escherichia coli* (*E.coli*)
Sand Creek	07010206-558	Aquatic Life Aquatic Recreation	Benthic macroinvertebrates bioassessments *Escherichia coli* (*E.coli*)

Table 2 and Figure 3 summarize the MIBI data used in the MPCA assessments.

Table 2. MIBI scores and General Use impairment criteria thresholds for Coon and Sand Creeks.

Water body name	AUID	MIBI, Class 5	MIBI, Class 6
Coon Creek	07010206-530	57	17 – 56 (range of 6 sites)
Sand Creek	07010206-558	17	NA
Criterion Threshold		37	43

Figure 3. Map of MIBI assessment results compared against General Use and Tiered Aquatic Life Use Modified Use standards at established MPCA monitoring sites in the Coon Creek Watershed (CCWD 2018a).



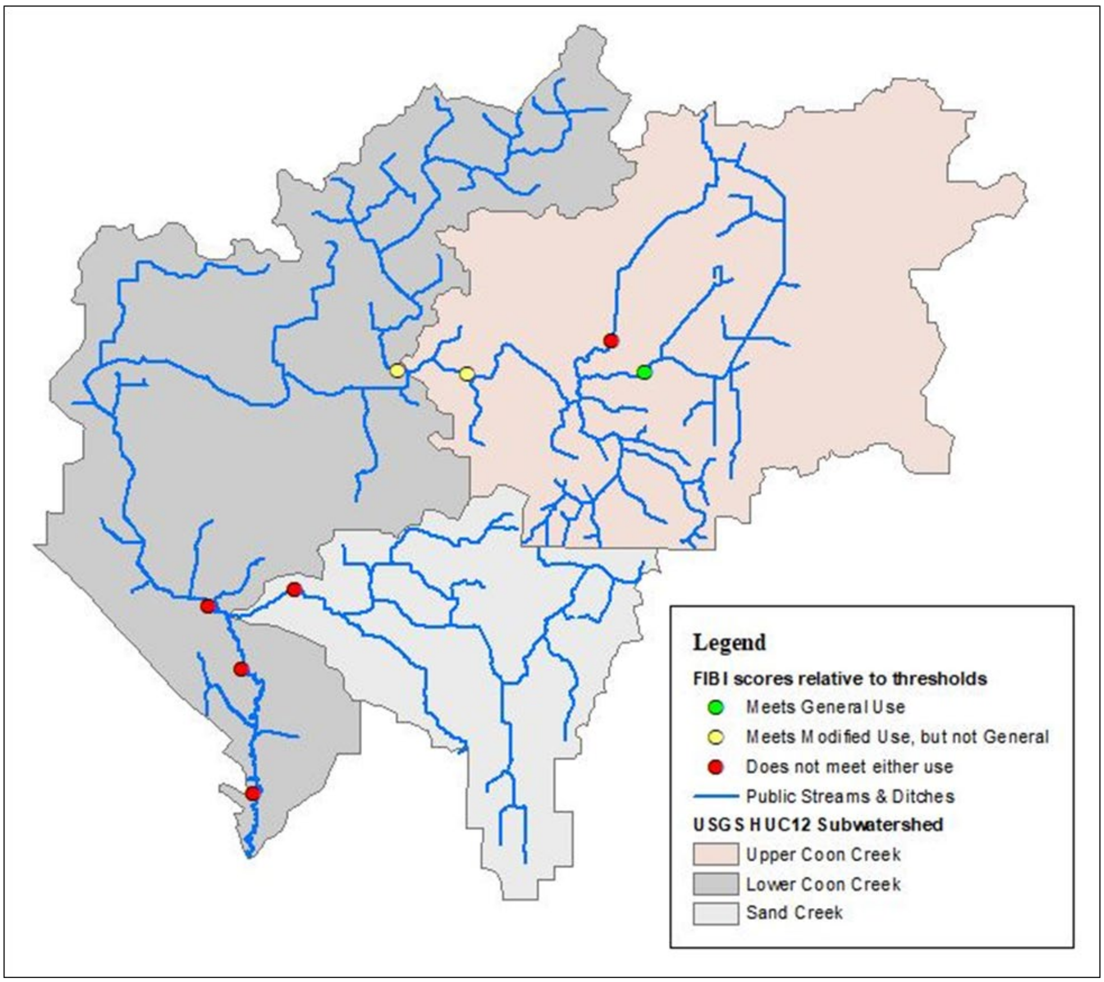
The red dots, in Figure 3, indicate that the stream reach did not meet general use or modified uses and will remain impaired regardless of reclassification if applicable. The yellow dots indicate that the stream reach does meet the proposed modified use standard, but fails to meet the existing general use standard.

Table 3 and Figure 4 summarize the FIBI data used in the MPCA assessments.

Table 3. FIBI scores and General Use Impairment criteria thresholds for coon and Sand Creeks

Water body name	AUID	FIBI, Class 5	FIBI, Class 6	FIBI, Class 7
Coon Creek	07010206-530	27 – 33 (range of 3 sites)	18 – 40 (range of 2 sites)	36 – 52 (range of 2 sites)
Sand Creek	07010206-558	NA	11	NA
Criterion Threshold		47	42	42

Figure 4. Map of FIBI assessment results compared against General Use and Tiered Aquatic Life Use Modified Use standards at established MPCA monitoring sites in the Coon Creek Watershed.



Biomonitoring sites where FIBI scores do not meet general or modified use standards are identified by a red dot in Figure 4. The yellow dots indicate the stream reach meets the proposed modified use standard, but fails to meet the existing general use standard.

The candidate causes for the aquatic life impairments in Coon and Sand Creeks were identified using the EPA's Causal Analysis/Diagnosis Decision Information System methodology (CCWD 2014). Stressors with the strongest evidence included excess sediment, excess phosphorus, poor habitat, and altered hydrology. Low dissolved oxygen was also identified as a likely stressor, but only for the headwaters of Coon Creek and likely the result of natural expansive wetlands. Long-term statistical trend analyses have not been conducted for total suspended solids (TSS) and total phosphorus (TP) in the District's streams due to insufficient continuous monitoring data including a lack of flow data to calculate loading. Stream is now being measured as of 2020. Annual routine monitoring between 2009 and 2019 conducted near the outlets of Coon and Sand Creeks does indicate stable or slightly improving TSS and TP concentrations (Figure 5). Concentrations of TSS at the outlet monitoring site at Sand Creek over the past 5 years have not exceeded the state water quality standard and TP concentrations are very close to meeting standards. The TSS and TP concentrations at the Coon Creek outlet monitoring site exceed the standards. The streams have not been assessed for impairment; however, they will be assessed as part of the 2020 Intensive Watershed Monitoring cycle. Concentrations of *E. coli* are highly variable within and between years, with no apparent trends, but consistently exceed the chronic state standard.

Figure 5. Annual routine monitoring results for total suspended solids and total phosphorus from the outlets of Sand and Coon Creeks from 2009 through 2019. Eight grab samples per year were collected at each location, half during baseflow (red circles) and half during stormflow (black diamonds); mean concentrations are shown with error bars (+/- 1 standard deviation)

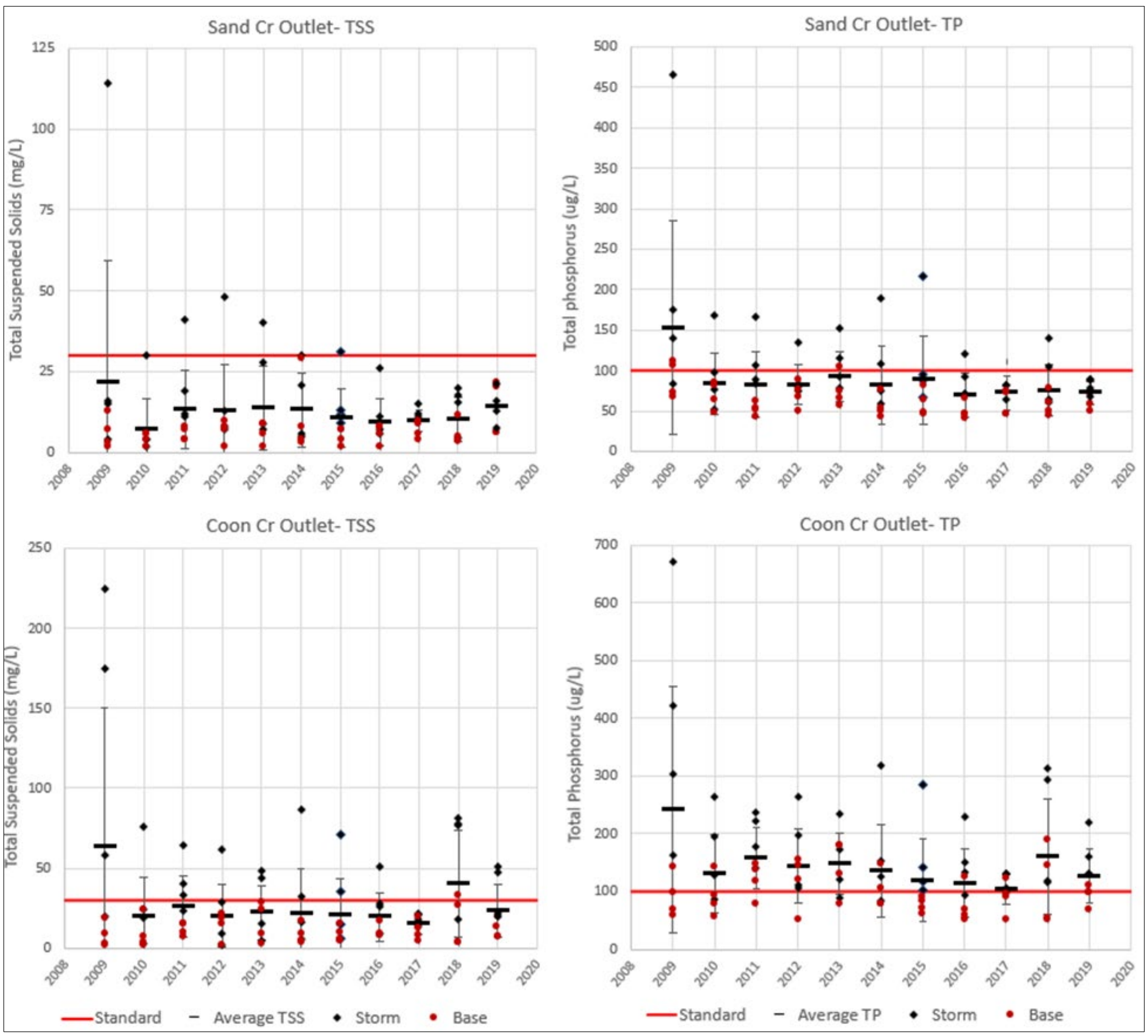


Table 4 summarizes the *E. coli* data collected for Coon and Sand Creeks, the basis for the recreation impairments. Concentrations of *E. coli* exceeded the chronic water quality standard (geometric monthly mean of 126 cfu/100 ml) in both streams from May through October. The acute water quality standard (maximum of 1,260 cfu/100 ml) was exceeded 21 and 23% of the time in Coon and Sand Creeks, respectively.

Table 4. *E. coli* sampling data at subwatershed outlet monitoring sites from 2009-2019 summarized by month with exceedances of the chronic (126 cfu/100ml) state water quality standard shown in red

		Coon Creek	Sand Creek
Month	**# samples**	**Geomean (cfu/100ml)**	**Geomean (cfu/100ml)**
April	3	75	70
May	7	312	210
June	11	541	593
July	14	397	382
August	5	430	316
September	7	416	586
October	6	319	302

Implementation strategies

The implementation strategies outlined in Table 5 summarize the activities and practices that are estimated to achieve the required reductions to meet water quality standards and achieve the CCWD's goals for Sand and Coon Creeks. The strategies are intended to meet both the established wasteload and load allocations and to address the non-pollutant stressors to aquatic life (CCWD 2018b). Table 5 includes the estimated reductions by project including costs, milestones, assessment criteria, and schedule for the implementation. Implementation of the stormwater practices is given as projects because implementation of urban stormwater BMPs is dependent upon site-specific factors such as road repair and construction schedules, redevelopment activities, commercial/industrial partners, etc.

The restoration of streambanks in Upper, Lower, and Sand Creeks have been a focus of restoration work in the CCWD for several years. There have been two past Section 319 grants awarded for this work and are completed or are nearing successful completion. This work is accounted for in Element b. reductions tables. The CCWD approaches streambank restoration through multiple techniques. This includes improving the in-stream and riparian habitat by reducing channel incision and creating continuous habitat with riffle-pool sequences and grade stabilizing cross vanes and reconnecting oxbows when needed. Severely eroding banks will be addressed with a combination of bioengineering and hard-armoring practices, such as vegetated rock riprap, stream barbs, and root wads. Less eroded sites banks will be stabilized with log toes, revetments, and addressing the slope through grading. These banks will be stabilized with vegetation. When it is necessary, tree thinning will occur to allow sunlight to penetrate the canopy and encourage regrowth. Supplemental seeding will be included to ensure a minimum strip of 30 ft. The filter will capture overland nutrient runoff and provide improved habitat to macroinvertebrates and fish as a multiple benefit. When feasible, the CCWD favors a natural channel design (NCD) approach that seeks to restore the natural hydrology and flood plain connection.

Stormwater practices addressing wasteload allocations will be conducted as part of Municipal Separate Storm Sewer System (MS4) permit compliance. Reductions and potential individual practices for stormwater are listed in Table 6. The CCWD will choose from the suite of implementation practices to reach the reductions needed to meet the milestones outlined in Table 5. The milestones will be met by selecting practices that have estimated reductions that will meet or exceed the milestones as modeled using P8 or the MPCA Simple Estimator.

It is expected that the milestones and monitoring will guide the progression of this plan, ensuring the application of adaptive management, to achieve the reductions needed to meet water quality standards within 10 years.

Table 5. Management activities, schedule, estimated costs, load reductions, milestones, and assessment criteria for Coon and Sand Creeks. Implementation of these projects would result in attainment of water quality standards by 2031.

Activity	Milestones					Long-Term Goals	Assessment	Costs (present value)	Reductions per avg project or unit				Projected cumulative reductions (Upper Coon Cr)				Projected cumulative reductions (Lower Coon Cr)				Projected cumulative reductions (Sand Cr)			
	2-year (2023)	4-year (2025)	6-year (2027)	8-year (2029)	10 year (2031)				Total # Projects or units	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs/yr	# Projects	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs/yr	Projects #	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs	Projects #	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs /yr
Structural BMPs																								
Streambank stabilizations-Individual Banks (armoring, bioengineering, or re-grading)	8 projects, 1,800 ft	8 projects, 1,800 ft	8 projects, 1,800 ft	8 projects, 1,800 ft	8 projects, 1,800 ft	40 projects, 9,000 ft	# feet stabilized	$1,554,000	40	23	20	0.3	16	368	320	4.8	20	460	400	6	4	92	80	1.2
Streambank stabilizations-Corridor Restorations (NCD, 2-stage, bioengineering)	1 project, 2,350 ft	1 project, 2,350 ft	1 project, 2,350 ft	1 project, 2,350 ft	1 project, 2,350 ft	5 projects, 11,750 ft	# feet stabilized	$1,915,500	5	320	272	4.1	2	640	544	8.2	2	640	544	8.2	1	320	272	4.1
Stormwater BMPs – Site Treatment (infiltration basins, biofiltration, ponds, retrofit devices) Table 6	6 projects, 225,750 ft3	6 projects, 225,750 ft3	6 projects, 225,750 ft3	6 projects, 225,750 ft3	6 projects, 225,750 ft3	30 projects, 1.13 mill. ft3	# ft3 volume reduction (or treatment volume)	$281,000	30	0.14	1.4	4.7	12	1.68	17.16	56.16	13	1.806	18.447	60.372	5	0.714	7.293	23.868
Stormwater BMPs-Regional Treatment (infiltration galleries, filtration practices incl media filters, ponds) Table 6	1 project, 5.34 mill. ft3	1 project, 5.34 mill. ft3	1 project, 5.34 mill. ft3	1 project, 5.34 mill. ft3	1 project, 5.34 mill. ft3	5 projects, 26.7 mill. ft3	# ft3 volume reduction (or treatment volume)	$1,740,000	5	2.3	45.2	1468	2	4.68	90.36	2936.08	2	5.031	97.137	3156.286	1	1.989	38.403	1247.834
Riparian buffer enhancement	9 projects, 3,113 ft	9 projects, 3,113 ft	9 projects, 3,113 ft	9 projects, 3,113 ft	9 projects, 3,113 ft	45 projects; 15,565 ft	# ft 30' wide buffers established	incl in bank stabilization costs	45	0.04	0.14	14.2	18	0.72	2.52	255.6	22	0.88	3.08	312.4	5	0.2	0.7	71
Subsurface sewage treatment system (SSTS) compliance	SSTS diagnostic monitoring study completed	Address 25% of failing systems	Address 25% of failing systems	Address 25% of failing systems	Address 25% of failing systems	Address 100% of failing systems with potential to discharge to stream (10%)	# of non-compliant systems remaining	$250,000	50	0	12	2228	24	0	288	53472	24	0	288	53472	2	0	24	4456
Address sources of internal loading through phosphorus inactivation (alum, Iron filings, Phoslock, etc.)	Internal P loading diagnostic study completed	1 waterbody treated	1 waterbody treated	1 waterbody treated	1 waterbody treated	4 P inactivation projects completed	No net annual P export from treated waterbodies	$500,000	4	0	20	0	1	0	20	0	2	0	40	0	2	0	40	0
Conversion of marginal agricultural land to water storage/treatment	Contact 100% of landowners with	Convert 60 ac active ag	Convert 60 ac active ag	Convert 60 ac active ag	Convert 60 ac active ag	Secure willing landowners and	# acres marginal ag land converted	$1,500,000	240	7	3	2	160	112	544	320	80	56	272	160	0	0	0	0

Activity	Milestones					Long-Term Goals	Assessment	Costs (present value)	Reductions per avg project or unit				Projected cumulative reductions (Upper Coon Cr)				Projected cumulative reductions (Lower Coon Cr)				Projected cumulative reductions (Sand Cr)			
	2-year (2023)	4-year (2025)	6-year (2027)	8-year (2029)	10 year (2031)				Total # Projects or units	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs/yr	# Projects	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs/yr	Projects #	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs	Projects #	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs/yr
BMPs (e.g., sediment basins, WASCOBS, constructed wetland, wetland restoration) Table 7	active agricultural within 100-year floodplain					convert 240 ac marginal ag land to wetland or water treatment																		
In-stream and Riparian Habitat Restoration	1 project, 2,350 ft	1 project, 2,350 ft	1 project, 2,350 ft	1 project, 2,350 ft	1 project, 2,350 ft	5 projects, 11,750 ft; MSHA scores = "good"	# feet channel improved; MSHA scores	incl in corridor restoration costs	NA	NA	NA	NA	2	NA	NA	NA	2	NA	NA	NA	1	NA	NA	NA
Address barriers to connectivity		Complete study analyzing all mainstem crossings for fish passage	Remove last known barrier on Sand Cr: Xeon Blvd.	Remove 1 Coon Cr barrier resulting from 2025 study	Remove 1 Coon Cr barrier resulting from 2025 study	3 projects	# and % of known barriers removed; FIBI scores	$750,000	NA	NA	NA	NA	0	NA	NA	NA	2	NA	NA	NA	1	NA	NA	NA
CCWD Regulatory Affairs Programing																								
Enforce District Rules related to erosion and sediment control, stormwater management, wetlands, floodplains, and illicit discharge detection & elimination	Continued enforcement of District Rules (2000 acres of compliant development)	Continued enforcement of District Rules (2000 acres of compliant development)	Continued enforcement of District Rules (2000 acres of compliant development)	Continued enforcement of District Rules (2000 acres of compliant development)	Continued enforcement of District Rules (2000 acres of compliant development)	Meet non-degradation and TMDL targets for all new development and redevelopment (10,000 ac or 15% of watershed area)	# acres (% watershed area) developed/ redeveloped in accordance with stormwater rules	$7,250,000	10000	0.03588	0.297741	0.956518	4000	144	1,191	3,826	4,300	154	1,280	4,113	1,700	61	506	1,626
CCWD Planning Programming																								
Seek out and apply for grants to increase the District's capacity for water resource protection and restoration	Apply for at least 2 grants, awarded >$250,000	Apply for at least 2 grants, awarded >$250,000	Apply for at least 2 grants, awarded >$250,000	Apply for at least 2 grants, awarded >$250,000	Apply for at least 2 grants, awarded >$250,000	Awarded at least 5 out of 10 grants totaling over $1,250,000	# of grants awarded; # dollars awarded	$25,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
For each subwatershed, complete a comprehensive inventory of	Complete 3 subwatershed plans	Complete 3 subwatershed plans	Complete 3 subwatershed plans	Complete 3 subwatershed plans	Complete 3 subwatershed plans	15 completed subwatershed plans for District-	# plans completed; % watershed area covered	$525,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Activity	Milestones					Long-Term Goals	Assessment	Costs (present value)	Reductions per avg project or unit				Projected cumulative reductions (Upper Coon Cr)				Projected cumulative reductions (Lower Coon Cr)				Projected cumulative reductions (Sand Cr)			
	2-year (2023)	4-year (2025)	6-year (2027)	8-year (2029)	10 year (2031)				Total # Projects or units	TSS t/yr	TP lbs/ yr	*E. coli* Bill. Orgs/ yr	# Projects	TSS t/yr	TP lbs/y r	*E. coli* Bill. Orgs/ yr	Projects #	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs	Projects #	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs /yr
stormwater assets & condition, water quality modeling, diagnostic monitoring, and identification/ ranking of potential BMPs						wide coverage																		
CCWD Water Quality Cost-Share Program																								
Administer a cost-share program to support TMDL implementation activities by partners (separate pool of BMPs that will be implemented) (Table 6 and Table 7)	Award $150,000 to leverage other local funds ≥1:1	Award $150,000 to leverage other local funds ≥1:1	Award $150,000 to leverage other local funds ≥1:1	Award $150,000 to leverage other local funds ≥1:1	Award $150,000 to leverage other local funds ≥1:1	Award at least $750,000 leveraged ≥1:1 with local funds	$s awarded $s leveraged	$775,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CCWD Research & Monitoring Programming																								
Routine Lake monitoring	Annual condition monitoring on 4/6 lakes	Annual condition monitoring on 4/6 lakes	Annual condition monitoring on 4/6 lakes	Annual condition monitoring on 4/6 lakes	Annual condition monitoring on 4/6 lakes	Trend analysis of mean TP, Chl-a, and Secchi Disk for all 6 lakes	Data compiled and assessed Annual report for pollutant monitoring Stable or improving trends	$1,150,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Routine Stream Monitoring	Annual flow and pollutant monitoring in all 4 major streams and at least 20% of tributary ditches	Annual flow and pollutant monitoring in all 4 major streams and at least 20% of tributary ditches	Annual flow and pollutant monitoring in all 4 major streams and at least 20% of tributary ditches	Annual flow and pollutant monitoring in all 4 major streams and at least 20% of tributary ditches	Annual flow and pollutant monitoring in all 4 major streams and at least 20% of tributary ditches	TSS, TP, & *E. coli* loading estimates and trend analysis at the subwatershed level	Data compiled and assessed Annual report for pollutant monitoring Stable or improving trends		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Routine Wetland Monitoring	Continuous water levels in 7 wetlands	Continuous water levels in 7 wetlands	Continuous water levels in 7 wetlands	Continuous water levels in 7 wetlands	Continuous water levels in 7 wetlands	Continuous long-term (20+ years) groundwater level records and trends in representat	Stable or improving trends		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Activity	Milestones					Long-Term Goals	Assessment	Costs (present value)	Reductions per avg project or unit				Projected cumulative reductions (Upper Coon Cr)				Projected cumulative reductions (Lower Coon Cr)				Projected cumulative reductions (Sand Cr)			
	2-year (2023)	4-year (2025)	6-year (2027)	8-year (2029)	10 year (2031)				Total # Projects or units	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs/yr	# Projects	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs/yr	Projects #	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs	Projects #	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs /yr
						ive wetlands																		
Aquatic Invasive Species Monitoring	early detection surveys on all lakes each year	early detection surveys on all lakes each year	early detection surveys on all lakes each year	early detection surveys on all lakes each year	early detection surveys on all lakes each year	Detections of all new infestations within 6 months	# infestations detected/ addressed		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BMP performance Monitoring	Monitoring performance of at least 2 District BMPs	Monitoring performance of at least 2 District BMPs	Monitoring performance of at least 2 District BMPs	Monitoring performance of at least 2 District BMPs	Monitoring performance of at least 2 District BMPs	Comparison of actual v. expected performance of all District owned BMPs	% pollutant or volume reduction targets achieved		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Special studies/diagnostic monitoring	*E. coli* source tracking study	2024 Winter Chloride Study	1 special study of parameter of interest	1 special study of parameter of interest	1 special study of parameter of interest	5 special studies covering contaminants of emerging concern	# of investigative studies		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CCWD Education & Outreach Programming																								
Capital project support	public meetings, project webpages, interpretive signage, newsletter articles, interpretive materials, walks/tours for all applicable CIP projects	public meetings, project webpages, interpretive signage, newsletter articles, interpretive materials, walks/tours for all applicable CIP projects	public meetings, project webpages, interpretive signage, newsletter articles, interpretive materials, walks/tours for all applicable CIP projects	public meetings, project webpages, interpretive signage, newsletter articles, interpretive materials, walks/tours for all applicable CIP projects	public meetings, project webpages, interpretive signage, newsletter articles, interpretive materials, walks/tours for all applicable CIP projects	Foster public education, engagement, and community partnerships for all proposed regional capital projects (n=10)	# meeting & tour participants, # website hits, # of signs installed, # handouts, # partners, media circulation #s	$112,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Activity	Milestones					Long-Term Goals	Assessment	Costs (present value)	Reductions per avg project or unit				Projected cumulative reductions (Upper Coon Cr)				Projected cumulative reductions (Lower Coon Cr)				Projected cumulative reductions (Sand Cr)			
	2-year (2023)	4-year (2025)	6-year (2027)	8-year (2029)	10 year (2031)				Total # Projects or units	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs/yr	# Projects	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs/yr	Projects #	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs	Projects #	TSS t/yr	TP lbs/yr	*E. coli* Bill. Orgs /yr
Develop, expand, and adapt public engagement tools (e.g. website updates, social media content, video production, targeted audience surveys, material accessibility and cultural consults, educational displays, community-based social marketing & facilitation training and implementation)	Complete 2 targeted projects (e.g. new website integration with Projects & permitting, how-to videos for stormwater permit compliance, translate 5 materials,)	Complete 2 targeted projects (e.g. chloride application audience survey, attend meeting facilitation training)	Complete 2 targeted projects	Complete 2 targeted projects	Complete 2 targeted projects	10 targeted public engagement projects	# of targeted projects completed	$336,600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Build and foster community capacity and involvement (administer CAC/TAC; hold annual SWPPP hearing; host, participate in, and sponsor outreach events and community programs such as Adopt-a-Drain, storm drain stenciling, MN Water Stewards, AIS detectors, Lawns to Legumes, public art, faith-based environmental stewardship, etc.)	Host, participate in, or sponsor >50 events or programs	Host, participate in, or sponsor >80 events or programs	Host, participate in, or sponsor > 80 events or programs	Host, participate in, or sponsor >80 events or programs	Host, participate in, or sponsor >80 events or programs	370 events or programs hosted, participated in or sponsored	# of events hosted # events participated in # connections	$525,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Host training workshops (e.g. Smart Salting, Turf Maintenance, Resilient Landscapes, SSTS Maintenance, etc.)	Host 2 rotating training workshops	Host 2 rotating training workshops	Host 2 rotating training workshops	Host 2 rotating training workshops	Host 2 rotating training workshops	5 unique training workshops hosted at least twice	# of training workshops hosted & # attendees	$52,500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Support K-12 water resource education (Administer Water education grant program; lesson plan development and supplies; River of	Award 6 water education grants for total of $7,000, work with	Award 6 water education grants for total of $7,000, work with	Award 6 water education grants for total of $7,000,	Award 6 water education grants for total of $7,000, work with	Award 6 water education grants for total of $7,000, work with	36 Water Education grants, work with 10 student groups	$$ Water Education grant funds awarded, # students worked with	$128,600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Activity	Milestones					Long-Term Goals	Assessment	Costs (present value)	Reductions per avg project or unit				Projected cumulative reductions (Upper Coon Cr)				Projected cumulative reductions (Lower Coon Cr)				Projected cumulative reductions (Sand Cr)			
	2-year (2023)	**4-year (2025)**	**6-year (2027)**	**8-year (2029)**	**10 year (2031)**				**Total # Projects or units**	**TSS t/yr**	**TP lbs/yr**	***E. coli* Bill. Orgs/yr**	**# Projects**	**TSS t/yr**	**TP lbs/yr**	***E. coli* Bill. Orgs/yr**	**Projects #**	**TSS t/yr**	**TP lbs/yr**	***E. coli* Bill. Orgs**	**Projects #**	**TSS t/yr**	**TP lbs/yr**	***E. coli* Bill. Orgs /yr**
Dreams; Project Wet; Connect the Drops, etc.)	≥ 2 student groups	≥ 2 student groups	work with ≥ 2 student groups	≥ 2 student groups	≥ 2 student groups																			
Pet Waste Disposal Campaign (installation and maintenance of disposal stations, supporting materials, targeted events, swag)	Install 18 additional pet waste stations + maintenance	Annual maintenance of 25 pet waste stations & supporting materials	Annual maintenance of 25 pet waste stations & supporting materials	Annual maintenance of 25 pet waste stations & supporting materials	Annual maintenance of 25 pet waste stations & supporting materials	25 pet waste stations maintained; disposal of 676 lbs of waste per station/yr totaling 169,000 lbs of waste	x lbs of dog waste properly disposed	$422,000	25	0	6.8	7051	0	0	0	0	10	0	68	70510	15	0	102	105765
Contaminants of emerging concern (CECs) campaign	Discuss CECs at 10 events, develop 1 new outreach material	Discuss CECs at 10 events, develop 1 new outreach material	Discuss CECs at 10 events, develop 1 new outreach material	Discuss CECs at 10 events, develop 1 new outreach material	Discuss CECs at 10 events, develop 1 new outreach material	5 new CEC outreach materials developed, discuss CECs at 50 events	# events attended # materials developed # materials given out # interactions	$85,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Smart Salting Campaign (citizen monitoring, businesses and contractor outreach, incentives)	Maintain at least 50 volunteers for chloride monitoring, do one targeted salting outreach campaign	Maintain at least 50 volunteers for chloride monitoring, do one targeted salting outreach campaign	Maintain at least 50 volunteers for chloride monitoring, do one targeted salting outreach campaign	Maintain at least 50 volunteers for chloride monitoring, do one targeted salting outreach campaign	Maintain at least 50 volunteers for chloride monitoring, do one targeted salting outreach campaign	5 chloride outreach campaigns, continued maintenance of 50+ volunteer force	# of samples taken by volunteers; # of participants in salting outreach campaign	$115,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CCWD Operations & Maintenance programming																								
Comprehensive Drainage System Inspection	Updated inspection records of 40% of drainage network	Updated inspection records of 40% of drainage network	Updated inspection records of 40% of drainage network	Updated inspection records of 40% of drainage network	Updated inspection records of 40% of drainage network	Inspection of 100% of drainage network, twice	% of drainage network inspected	$603,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Activity	Milestones					Long-Term Goals	Assessment	Costs (present value)	Reductions per avg project or unit				Projected cumulative reductions (Upper Coon Cr)				Projected cumulative reductions (Lower Coon Cr)				Projected cumulative reductions (Sand Cr)			
	2-year (2023)	**4-year (2025)**	**6-year (2027)**	**8-year (2029)**	**10 year (2031)**				**Total # Projects or units**	**TSS t/yr**	**TP lbs/yr**	***E. coli* Bill. Orgs/yr**	**# Projects**	**TSS t/yr**	**TP lbs/yr**	***E. coli* Bill. Orgs/yr**	**Projects #**	**TSS t/yr**	**TP lbs/yr**	***E. coli* Bill. Orgs**	**Projects #**	**TSS t/yr**	**TP lbs/yr**	***E. coli* Bill. Orgs/yr**
BMP inspections	Annual inspection of 100% of District-owned BMPs	Annual inspection of 100% of District-owned BMPs	Annual inspection of 100% of District-owned BMPs	Annual inspection of 100% of District-owned BMPs	Annual inspection of 100% of District-owned BMPs	Annual inspection of 100% of District-owned BMPs	% of District-owned BMPs inspected annually	$90,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 6. Suite of stormwater BMPs and estimated reductions for stormwater projects identified in Table 5. Averages by BMP type are based on last 10 years of projects implemented.

Practice type	Ave. TSS reduction/ project t/yr	Ave. TP reduction/ project lbs/yr	Ave. *E. coli* reduction B. org./yr	Ave. drainage area treated ac	Ave. cost/ project
Filtration practices (media filters)	0.0	69	2,756	640	$520,000
Baffles/hydrodynamic separators	0.1	0.2	.001	28	$4,573
Biofiltration practices (e.g., rain gardens with underdrains)	0.2	0.8	13	8	$16,000
Bioinfiltration practices (e.g., Rain gardens without underdrains, swales)	0.2	1	13	8	$11,037
Stormwater pond construction	4.3	24	887	300	$150,000
Stormwater pond modifications	5.1	19	360	105	$59,604

Table 7. Suite of agricultural BMPs and estimated reductions and costs per acre, for practices identified in Table 5

Practice/BMP	Ave. TSS reduction/ project t/yr	Ave. TP reduction/ project lbs/yr	Ave. *E. coli* reduction B. org./yr	Ave. cost/ acre
Nutrient management	0	.4	.4	$25
Filter strips	.12	.6	.5	$425
Sediment traps/basins	.1	1	.6	$500
Enhanced buffers	0.04	0.14	1.4	$300
Riparian forest buffers	.09	.4	21	$1,500
Residue and tillage management	.05	.3	.1	$11
Forage and biomass planting	0.02	.07	.1	$375
WASCOBs	.1	1	.6	$500
Grade stabilization	.05	.5	.3	$500
Restoration and Management of Rare and Declining Habitats	.14	.7	.4	$100
Structure for water control	.5	1.9	2.2	$500
Wetland restoration	0.7	3	2	$6,250
Constructed wetlands	.7	3	2	$6,250

Element a. sources

An identification of the causes and sources or groups of similar sources that will need to be controlled to achieve the load reductions estimated in this watershed-based plan (and to achieve any other watershed goals identified in the watershed-based plan), as discussed in item (b) immediately below. Sources that need to be controlled should be identified at the significant subcategory level with estimates of the extent to which they are present in the watershed (e.g., X numbers of dairy cattle feedlots needing upgrading, including a rough estimate of the number of cattle per facility; Y acres of row crops needing improved nutrient management or sediment control; or Z linear miles of eroded streambank needing remediation).

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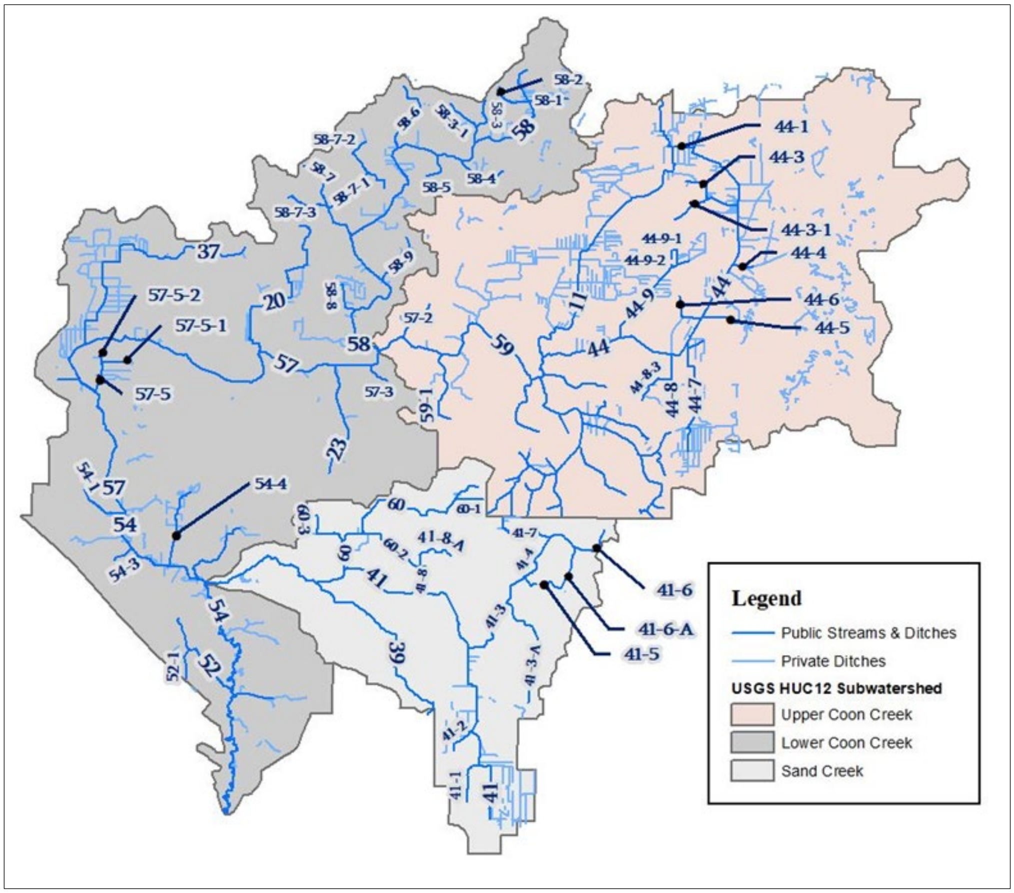
The Coon Creek watershed is approximately 89.3 square miles (57,221 acres) in size. The main stem of Coon Creek begins as a series of channelized streams and ditches in a large wetland complex known as the Carlos Avery Wildlife Management Area in Columbus, MN. Coon Creek flows generally south - southwest to its confluence with the Mississippi River south of the Coon Rapids Dam. The main channel of Coon Creek is approximately 26.7 miles long and drops roughly 90 feet from its headwaters to its outlet. Nearly half of the total drop occurs within 5 miles of the creek's outlet into the Mississippi River. Coon Creek is impaired along the entire reach (CCWD, 2016a, p. 18).

The Sand Creek watershed is approximately 15.8 square miles (10,122 acres) in size. The impaired portion of Sand Creek is limited to a 2.2-mile portion downstream of its confluence with Anoka County Ditch 39. The headwaters of Sand Creek originate as a network of stormwater conveyance channels in the City of Blaine. Sand Creek generally flows east to west before emptying into Coon Creek in the City of Coon Rapids. Sand Creek has a total elevation change of 50 feet over its 8.3 mile main channel. (CCWD, 2016a, p. 18).

Nonpoint source pollution loading

The public ditch system was identified in the TMDL as a source of pollutant loading and is shown in Figure 6. "CCWD contains a mix of natural, modified, and constructed channels that work in unison to convey stormwater and provide flood control (Figure 6). Channel modifications including channelization, dredging, and armoring have occurred on approximately 94% of the public ditch system leaving only 8 miles in a natural state." (CCWD, 2018b, p. 3). This extensive ditch system was designed to convey water quickly and efficiently; therefore, is prone to flashiness, high sheer stress, instability, and erosion.

Figure 6. Public ditch system in Sand Coon Creeks



A biotic stressor identification study was completed to identify the main stressors contributing to the aquatic life impairment of the streams. The study identified excess phosphorus, excess sediment, altered hydrology, altered habitat, and low DO as stressors to varying degrees (Table 8). TP and TSS were determined to be the primary stressors resulting in the impaired biological communities. Consequently, load allocations were established for TSS and TP for Coon and Sand Creeks in a 2016 TMDL to identify the loading capacities and resulting load reductions needed to achieve the water quality standards. A TMDL implementation plan was then completed in 2018 as part of an amendment to the CCWD comprehensive plan drafted in 2013.

Table 8. Primary stressors contributing to biological impairments in Sand and Coon Creeks (CCWD, 2020)

Stream	TP	TSS	Altered Habitat	Altered Hydrology	D.O.
Coon	●	●	■	■	○
Sand	●	●	■	■	

Relative magnitude: ●= High, ■= moderate, ○= low

The recreation impairments for Coon and Sand Creeks are based solely on excess levels of *E. coli*. Sources of *E. coli* were quantified for each receiving water as part of the TMDL study (CCWD 2016a, p. 38) (Table 9). Domestic pet waste accounts for between 37—89% of total bacteria loading in these streams while wildlife accounts for approximately 10%. The other major sources of *E. coli* loading to Coon Creek are livestock (51%) and failing septic systems (6%), but these are unimportant for Sand Creek as very few livestock or septic systems are present in this subwatershed.

Table 9. Estimate of *E. coli* produced and available by major nonpoint pollution source for Coon and Sand Creeks subwatersheds

Category	Source	Animal Units in Subwatershed	*E. coli* organisms production rate per individual animal (cfu/day)	Total *E. coli* produced per month (Billions of orgs)	Total *E. coli* Produced Per Month by Category (Billions of orgs)	Total *E. coli* Available Per Month by Category (Billions of orgs)	Percent by category
Coon Creek							
Livestock	Horses	390-480	2.1×10^8	2,500-3,000	140,000-160,000	140,000-160,000	51%
	Cattle	100-120	4.5×10^{10}	140,000-160,000			
	Poultry	0.0-0.0	1.3×10^8	0.0-0.0			
Wildlife	Deer	880-1,100	2.5×10^8	6,600-8,300	19,000-24,000	19,000-24,000	7%
	Waterfowl	980-1,200	2.0×10^8	5,900-7,200			
	Other Wildlife	Equivalent of Deer	2.5×10^8	6,600-8,300			
Human	Failing SSTS	520-640	1.0×10^9	16,000-19,000	16,000-19,000	16,000-19,000	6%
Domestic Pets	Dogs	14,000-17,000	2.3×10^9	960,000-1,200,000	960,000-1,200,000	96,000-120,000	37%
Total	**All**	**18,000-22,000**	**-**	**1,100,000-1,400,000**	**1,100,000-1,400,000**	**270,000-320,000**	**100%**
Sand Creek							
Wildlife	Deer	190-250	2.5×10^8	1,400-1,900	6,000-7,700	6,000-7,700	11%
	Waterfowl	530-650	2.0×10^8	3,200-3,900			
	Other Wildlife	Equivalent of Deer	2.5×10^8	1,400-1,900			
Domestic Pets	Dogs	7,300-8,900	2.3×10^9	500,000-610,000	500,000-610,000	50,000-61,000	89%
Total	**All**	**8,200-10,000**	**-**	**500,000-620,000**	**500,000-620,000**	**56,000-69,000**	**100%**

The primary sources of each pollutant differed between the streams, but generally included stormwater runoff, in-channel and streambank erosion, agricultural runoff, poor pet waste management, failing septic systems, and natural sources such as wetlands and wildlife (Table 10). For Coon Creek, the primary TSS loads are from streambank erosion (63%; 1,719 tons/yr), stormwater runoff, and agriculture. The primary TP loading comes from stormwater runoff and streambank/in channel erosion. The source of bacterial loading is primarily through agricultural runoff (51%) and domestic pet waste (37%). Approximately 6% of the TP loading for Coon Creek is from failing SSTS. For Sand Creek, the primary TSS and TP loads are from stormwater runoff and streambank erosion (13%). Bacteria loading is largely from domestic pet waste (89%) or wildlife (11%). Unregulated stormwater runoff is a significant loading source to the creeks (CCWD, 2018b, p. 4). Another probable source of P loading in the CCWD is the naturally nutrient rich soils and natural wetland internal loading and discharge (CCWD, 2014).

Table 10. Summary of TSS, TP, and bacteria loading in Coon and Sand Creeks (CCWD, 2018b, p. 4)

	Coon Creek			Sand Creek		
	TSS	**TP**	**Bacteria**	**TSS**	**TP**	**Bacteria**
Agricultural runoff	■	■	■			■
WWTP discharges						
Poor pet waste management			■			■
Failing SSTS		■	■			
Combined sewer overflows						
Wildlife			■			■
Stormwater runoff	■	■		■	■	
In channel/streambank erosion	■	■		■	■	
Peatlands/wetlands		?	?		?	?

Relative magnitude: ■ = High, ■ = Moderate, ■ = Low, ? = potential source/ unknown

Point source pollution loading

Permitted sources of TSS, TP, and *E. coli* in the CCWD consist entirely of regulated stormwater runoff. There are no municipal wastewater treatments plants, combined sewer overflows, sanitary sewer overflows, or concentrated animal feeding operations. There are three types of regulated stormwater runoff in CCWD: Municipal Separate Storm Sewer Systems (MS4s), construction stormwater, and industrial stormwater. Stormwater that enters an MS4 conveyance is regulated as point source pollution even though it is diffuse in nature. Stormwater runoff may contain urban-use chemicals (fertilizers, pesticides, detergents, and automotive fluids), domestic pet waste, sand and salt from road maintenance activities, and leaf litter or other nutrient-rich organic debris. Seven MS4s (Table 11) are jointly responsible for meeting established WLAs for regulated urban runoff. Each MS4 implements a Stormwater Pollution Prevention Plan (SWPPP) to address WLAs in compliance with the National Pollutant Discharge Elimination System (NPDES) program. Additionally, CCWD established a Water Quality Cost Share program in 2019 to support implementation of water quality improvement projects by MS4s that are above and beyond any permit requirements (e.g. oversizing BMPs, supplemental street sweeping).

Table 11. MS4 entities in Coon and Sand Creek Watersheds

MS4 Entity	Permit #
Andover	MS400170
Anoka County Highways	MS400066
Blaine	MS400075
Coon Rapids	MS400011
CCWD	MS400172
Ham Lake	MS400092
Minnesota Department of Transportation	MS400170

Construction stormwater and industrial stormwater are considered point sources and are regulated by separate MPCA permits (Construction Stormwater General Permit & Industrial Stormwater Multi-Sector Permit) (Table 12). A review of past Construction Stormwater General Permits issued within Anoka County revealed an average of roughly 760 acres or 0.27% of land area under active construction each year. Given this very small percentage of land area disturbed and stringent erosion controls, permitted construction stormwater is considered an insignificant source of TSS and TP (CCWD 2016a, p. 31-32). A review of the MPCA ISW Permit database showed <50 permit holders, with 75% of them falling under the "No Exposure" exclusion, making them a non-contributor of stormwater pollutants. A review of the remaining permitted facilities did not reveal any with phosphorus as a benchmark pollutant; industrial stormwater was therefore also considered an insignificant source of pollutants to Sand and Coon Creeks (CCWD 2016a, p. 32).

Table 12. Permits issued in Coon and Sand Creek Watersheds

	Permit Type		
Watershed	**Active Construction Stormwater Permits***	**Industrial Stormwater**	**Domestic State Disposal System(SDS)**
Upper Coon Creek	2	1	-
Lower Coon Creek	32	-	2
Sand Creek	19	-	-
Total	53	1	2

* 53 Construction Stormwater permittees conducted construction activity in 2020 disturbing 370 acres. This number does not reflect all construction and subdivision stormwater permits currently effective during the time of this document development.

Element b. reductions

An estimate of the load reductions expected for the management measures described under paragraph (c) below (recognizing the natural variability and the difficulty in precisely predicting the performance of management measures over time). Estimates should be provided at the same level as in item (a) above (e.g., the total load reduction expected for dairy cattle feedlots; row crops; or eroded stream banks).

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The planned implementation described in Table 5 and the work that has been completed summarized in Table 13 and Table 14 will achieve the estimated reductions needed to meet water quality standards in Coon and Sand Creeks in 10 years (Table 15). Reductions were calculated using the EPA's Spreadsheet Tool for Estimating Pollutant Loads (STEPL) and using the NRCS Direct Volume Method for streambank erosion. Specifically, the annual mass of soil loss was calculated via field measurements of the area of eroding streambank (bank length x height) along the entire length of each creek and multiplying that area by estimated annual recession rates and soil density. The phosphorus load associated with streambank erosion was calculated using the Minnesota Board of Soil and Water Resources Pollution Reduction Calculator for streambank erosion (i.e., 0.85 lbs of TP per ton of TSS for sandy soils).

Since the TMDL baseline year of 2009, significant progress has been made in reducing both nonpoint and point pollutant loading (Table 13 and Table 14). The CCWD has led a robust bank stabilization program for both individual eroding banks and comprehensive stream corridor restoration projects. Specifically, efforts to address streambank/in channel erosion, poor habitat, and altered hydrology in Sand Creek have been supported through previously awarded Section 319 grants. Lower Sand Creek Corridor Restoration Project (completed) was awarded in federal fiscal year (FFY) 2017 and the Middle Sand Creek Corridor Restoration Project awarded in FFY 2018. Combined, these two corridor restoration projects stabilized 6050 linear feet of actively eroding streambank, reducing TSS loading by 513 tons/year and phosphorus loading by 436 pounds/year. These projects also improved in-stream and riparian habitat along a contiguous 1.25 mile reach of Sand Creek, over half of its total length. Habitat was improved via installation of course woody debris, rock riffles, cross vanes, j-hooks, and habitat boulders as well as terrestrial invasive species control and a robust native replanting plan. Altered hydrology was addressed by re-meandering portions of the straightened channel and excavating a new floodplain and former oxbows for increased connectivity, storage, and conveyance.

To address regulated stormwater pollutant loading, comprehensive subwatershed analyses have been completed to identify, site, and prioritize proposed stormwater BMPs to reduce TSS, TP, and *E. coli* loading. Projects resulting from these analyses are incorporated into annual budgets and work plans via regular updates to District and municipal capital improvement plans.

Over 50 of the top ranked projects, including 46 rain gardens, construction of 2 new stormwater ponds, modification of 3 existing pond outlets, and installation of three media filters have been implemented since 2009. Partners on these projects have included the Anoka Soil and Water Conservation District, City of Blaine, City of Coon Rapids, City of Fridley, City of Andover, and private citizens. Additionally, CCWD regulates all new development and redevelopment, ensuring that these activities meet nondegradation and TMDL requirements.

Table 13. Projects completed by CCWD and partners in Coon and Sand Creeks 2009-2020 and estimated load reductions

Treatment type	**Completed (2009-2020)**	**Projects #**	**Estimated reductions (Coon Cr)**		
			TSS t/yr	**TP lbs/yr**	***E. coli* bill. orgs/yr**
Streambank stabilizations-Individual Banks (armoring or re-grading)	43 projects, 9,700 ft, $834,200	43	656	984	13
Streambank stabilizations-Corridor Restorations (NCD, 2-stage, bioengineering)	6 projects, 14,100 ft, $1,380,000	6	1,251	1,877	25
Stormwater BMPs (infiltration basins, biofiltration, ponds, retrofit devices)-Site Treatment	48 projects, 1,730,000 ft^3 volume reduction, $517,000	48	9	56	588
Stormwater BMPs (infiltration basins, biofiltration, ponds, retrofit devices)-Regional Treatment	5 projects, 12,266,000 ft^3 volume reduction or filtration, $758,500	5	19	154	3,476
Enforce District Rules	Enforcement actions related to erosion and sediment control, stormwater management, wetlands, floodplains, and illicit discharge detection & elimination	30	75	1,243	3,994
Totals			**2,010**	**4,314**	**8,096**

The projects summarized in Table 14 are a variety of agricultural and rural practices that were reported to eLINK (Clean Water Funded projects) or by NRCS. These projects were completed by Anoka SWCD and the NRCS field staff. These projects focus on SSTS replacement, agricultural management practices, private wells, water storage, and pasture practices.

Table 14. BMPs installed as reported in the Healthier Watersheds since 2009 implemented by Anoka SWCD and private landowners (https://www.pca.state.mn.us/search?query=healthier+watershed)

Practice Description	Installed Amount (by unit)	Units	Subwatershed	TSS Reduction tons/yr	TP Reduction lbs/yr	*E. coli* Reduction billions org/ yr
SSTS improvement	22	count	Lower Coon Creek	--	476	5,124
Nutrient Management	7	acres	Lower Coon Creek	0.0	4.2	2.8
Residue and Tillage Management, No-Till	1	count	Lower Coon Creek	2.1	18.2	4.7
Riparian Forest Buffer	54	acres	Lower Coon Creek	4.7	36.7	21.3
Water Well	5	count	Lower Coon Creek			
Well Decommissioning	1	count	Lower Coon Creek			
Prescribed Grazing	11	acres	Lower Coon Creek	0.1	0.7	3.0
Waste Utilization	20	acres	Lower Coon Creek	0.0	8.7	7.1
Forage and Biomass Planting	27	acres	Lower Coon Creek	0.5	4.1	3.9
Restoration and Management of Rare and Declining Habitats	521	acres	Lower Coon Creek	73.3	605	206.0
SSTS improvement	21	count	Upper Coon Creek	--	435	4,679
Water Well	5	count	Upper Coon Creek			
Well Decommissioning	1	count	Upper Coon Creek			
High Tunnel System	2,880	feet	Upper Coon Creek	0.1	0.7	0.2
SSTS improvement	2	count	Sand Creek	--	40.8	445.6
Bioretention Basin	1	count	Sand Creek	0.5	6.8	189
Structure for Water Control	2	count	Sand Creek	9	64.6	4,489
WASCOB	1	count	Sand Creek	2	35.7	12
		Total	**All**	**93**	**1,737**	**15,188**

Table 15. Summary of expected reductions from planned and completed work

	TSS t/yr		**TP lbs/yr**		***E. coli* bill orgs/yr**	
	Coon Creek	**Sand Creek**	**Coon Creek**	**Sand Creek**	**Coon Creek**	**Sand Creek**
Existing load	4,271	1,436	32,755	8,883	381,136	106,153
Reduction needed	1,754	36	14,557	1,088	119,838	75,392
Completed BMP reductions (sum of Table 13 and Table 14)	2,102	435	6,050	679	23,284	6,185
Planned milestone reductions (Table 5)	1,994	304	8,893	1,438	223,929	95,016
Sum of reductions	**4,096**	**739**	**14,943**	**2,117**	**247,213**	**101,202**

Element c. BMPs

> *A description of the BMPs (NPS management measures) that are expected to be implemented to achieve the load reductions estimated under paragraph (b) above (as well as to achieve other watershed goals identified in this watershed-based plan), and an identification (using a map or a description) of the critical areas (by pollutant or sector) in which those measures will be needed to implement this plan.*
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The planned BMPs, which are summarized in Table 5 and Table 6 and practices completed in Coon and Sand Creeks summarized in Table 13 and Table 14, are estimated to yield reductions to meet the estimated reductions needed to meet water quality standards. All reductions are summarized in Table 15.

These strategies are intended to meet both the established wasteload and load allocations and to address the non-pollutant stressors to aquatic life. Notes on spatial-targeting and prioritization for each type of implementation activity are included in Table 16 and Table 14. Maintaining accurate as-built records of all stormwater assets coupled with up-to-date condition assessments is critical for evaluating performance and forecasting maintenance needs. (CCWD, 2018a) and will aid in the evaluation of the success of the implementation of this NKE plan. The NKE plan will be adapted and updated as implementation is measured.

Solutions to water quality impairments may not be readily available or may be at odds with other District goals (e.g. enhancing instream habitat for aquatic life versus maximizing conveyance for flood prevention or drainage of sensitive lands). Management strategies need to be innovative, flexible, and adaptive (CCWD, 2018a). Approaching the holistic system through the NKE plan development process allows the CCWD to evaluate the success of implementation and to make course corrections along the way.

Critical areas

The CCWD has multiple and sometimes competing priorities. There are multiple factors used in determining the placement of and the type of activity to be implemented. The CCWD relies heavily on a robust inspection program that characterizes the condition of the entire ditch system and all critical stormwater infrastructure on a 5-year rotating schedule. Annually, all inspection records are updated and any maintenance needs are reprioritized prior to annual budget planning. CCWD also conducts rotating focused subwatershed analyses that model existing conditions, identify pollutant loading critical areas, and identify and prioritize BMPs based on target pollutants.

BMP selection and implementation is prioritized within critical areas by cumulative load reductions and cost effectiveness on a dollar per mass basis (Table 16). When projects are ranked similarly from a pollutant load reduction perspective, secondary benefits are taken into consideration (flood reduction, habitat improvement, public safety) or an “upstream to downstream” implementation approach is used to address loading in a logical manner For example, all projects proposed for the Sand Creek subwatershed also reduce cumulative pollutant loading to Coon Creek as a primary tributary.

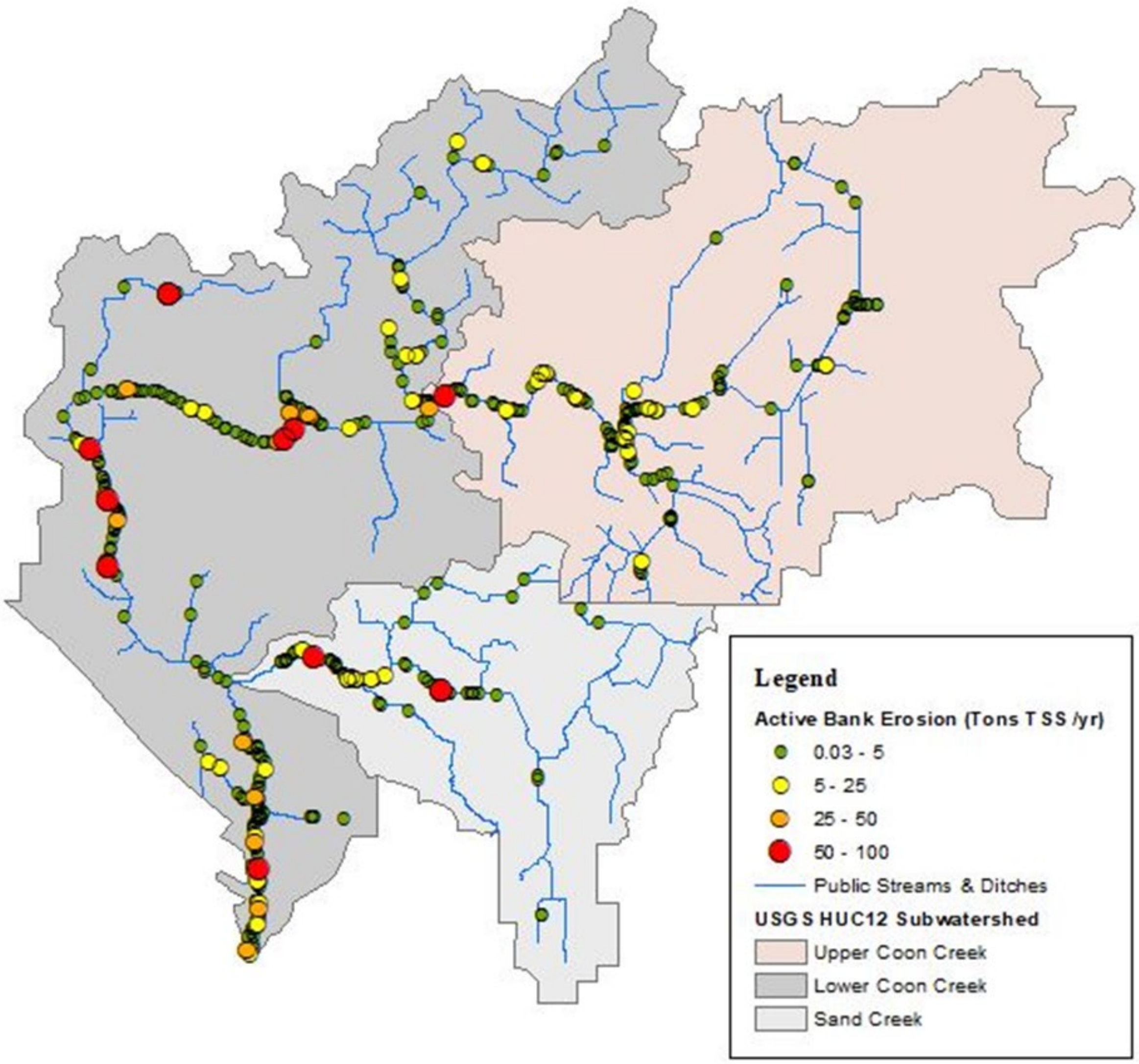
Table 16. Notes on spatial targeting and prioritization of proposed management activities

Activity	Targeting & Prioritization
Structural BMPs	
Streambank stabilizations- Individual Banks (armoring or re-grading)	Spatial targeting based on current ditch inspection results, updated each February. Annually, 20% of the entire public drainage network is inspected and all active erosion is documented and estimates of soil loss and pollutant loading are quantified using the NRCS Direct Volume method (bank height * length * lateral recession rate) and the BWSR streambank erosion calculator. Streambank stabilization prioritization is based on TSS and TP load reduction estimates by individual bank and cumulatively by management reach for corridor projects. If pollutant loading reduction estimates are similar for multiple proposed projects, reaches are prioritized from upstream to downstream.
Streambank stabilizations- Corridor Restorations (NCD, 2-stage, bioengineering)	
Stormwater BMPs (infiltration basins, biofiltration, ponds, retrofit devices)-Site Treatment	Spatial targeting of potential BMPs via subwatershed modeling (P8) paired with diagnostic monitoring to identify pollutant loading hotspots (lb TP/ac). Prioritization of BMP implementation based on pollutant removal estimates and cost efficiency per mass of pollutant removed, within the hotspots. BMPs treating large areas of previously untreated or undertreated catchments, that address multiple TMDL parameters or stressors, and that are located in upstream subwatersheds are given higher priority. These analyses are conducted as part of targeted subwatershed stormwater retrofit assessment reports found here: https://www.anokaswcd.org/index.php?option=com_content&view=article&id=197&Itemid=479
Stormwater BMPs (infiltration basins, biofiltration, ponds, retrofit devices)-Regional Treatment	
Riparian buffer enhancement	Spatial targeting based on current ditch inspection results, updated each February. Parcels with inadequate buffers (<30' width of vegetation including low-lying vegetation) are identified. Non-compliant parcels are prioritized for enhancement projects in the following order: 1) with active erosion in conjunction with planned bank stabilization projects, 2) with livestock adjacent to channel, 3) with other active agricultural activities (row crop > sod), 4) with public trails adjacent to channel (increased pet waste), and 5) with adjacent manicured turf.
SSTS compliance	Targeting: all systems that are not protective of surface water or groundwater. Priority to 1) ITPHS systems and 2) non-compliant systems located on parcels immediately adjacent to surface waters.
In-stream and Riparian Habitat Restoration	Targeting based on low MSHA metric scores. Table 22 CCWD Stressor ID (CCWD 2014)
Address barriers to connectivity	Targeting based on results of proposed 2023 fish passage study. Priority to Xeon Blvd crossing which is a known barrier disconnecting the entire Sand Creek system from Coon Creek.
CCWD Regulatory Affairs Programming	
Enforce District Rules related to erosion and sediment control, stormwater management, wetlands, floodplains, and illicit discharge detection & elimination	District-wide, by permit application
CCWD Planning programming	

Activity	Targeting & Prioritization
Seek out and apply for grants to increase the District's capacity for water resource protection and restoration	In accordance with targeting & prioritization identified for each project type
For each subwatershed, complete a comprehensive inventory of stormwater assets & condition, water quality modeling, diagnostic monitoring, and identification/ ranking of potential BMPs	Schedule based on CCWD Watershed Condition Classification scores from low to high (see p. 30, 34, & Appendix A of CCWD WRAPS) until District-wide coverage is achieved (CCWD 2016b)
CCWD Water Quality Cost-Share Program	
Administer a cost-share program to support TMDL implementation activities by partners	Annual competitive request for proposal process; by application
CCWD Research & Monitoring Programming	
Routine Lake monitoring	All District Lakes
Routine Stream Monitoring	All impaired stream Outlets & 20% of tributary outlets per year on rotating schedule
Routine Wetland Monitoring	7 established long-term monitoring sites
Aquatic Invasive Species Monitoring	All District Lakes
BMP performance Monitoring	All District-owned BMPs on rotating schedule consistent with O&M plans
Special studies/diagnostic monitoring	Driven by data gaps and emerging issues
CCWD Education & Outreach Programming	
Capital project support	All District Capital Projects
Develop, expand, and adapt public engagement tools (e.g. website updates, social media content, video production, targeted audience surveys, material accessibility and cultural consults, educational displays, community-based social marketing & facilitation training and implementation)	Ongoing District-wide programming
Build and foster community capacity and involvement (administer CAC/TAC; hold annual SWPPP hearing; host, participate in, and sponsor outreach events and community programs such as Adopt-a-Drain, storm drain stenciling, MN Water Stewards, AIS detectors, Lawns to Legumes, public art, faith-based environmental stewardship, etc.)	
Host training workshops (e.g. Smart Salting, Turf Maintenance, Resilient Landscapes, SSTS Maintenance, etc.)	
Support K-12 water resource education (Administer Water education grant program: lesson plan development and supplies; River of Dreams; Project Wet; Connect the Drops, etc.)	

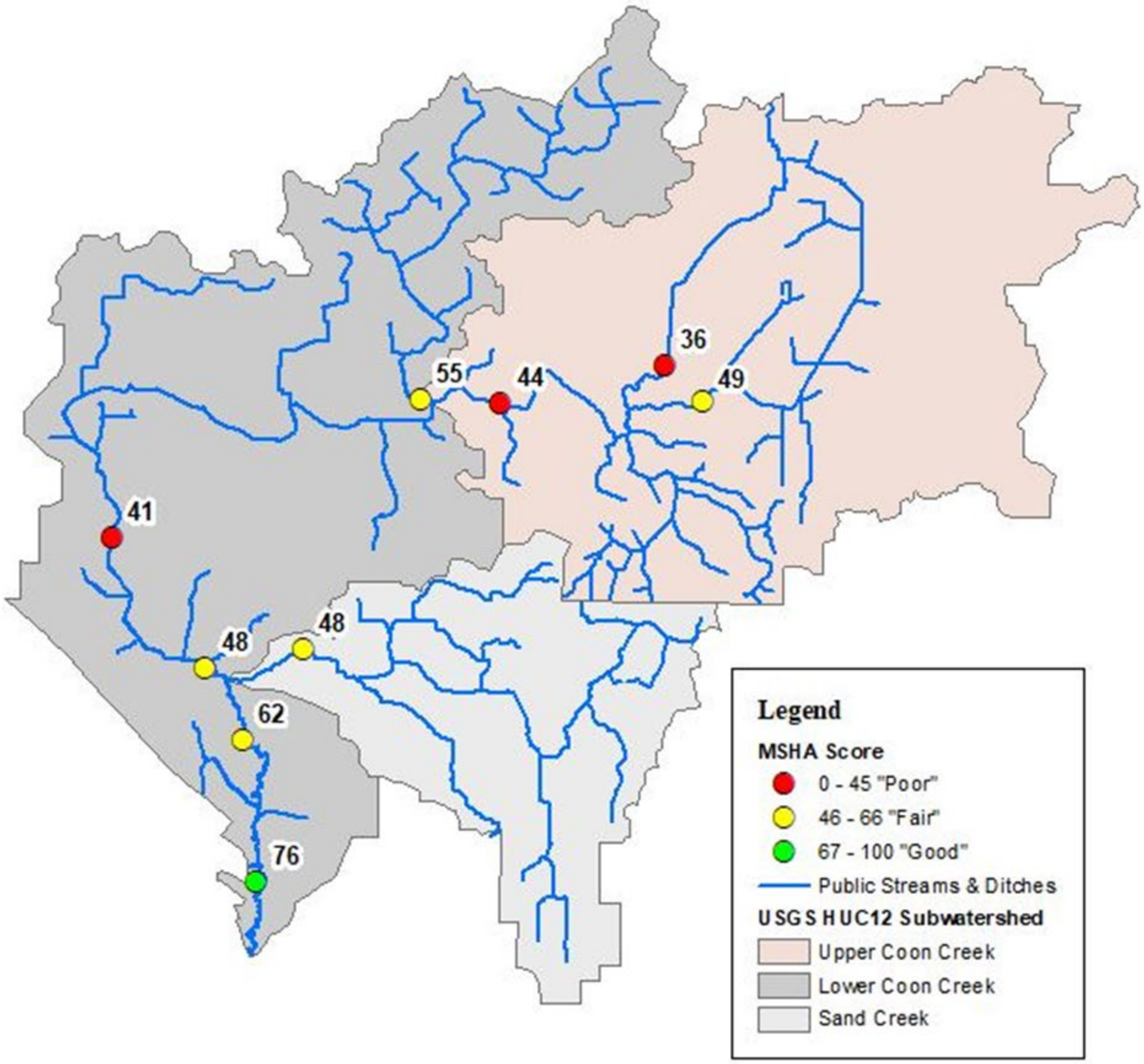
Activity	Targeting & Prioritization
Pet Waste Disposal Campaign (installation and maintenance of disposal stations, supporting materials, targeted events, swag)	Spatial targeting based on *E. coli* loading hotspots identified via routine monitoring in subwatersheds with *E. coli* based recreation impairments. Prioritization for pet waste disposal station installation will be based on results of 2021 *E. coli* source-tracking study which will identify areas with *E. coli* of canine origin and based on park and trail use metrics in locations immediately adjacent to receiving waters.
Contaminants of emerging concern (CECs) campaign	Ongoing District-wide programming
Smart Salting Campaign (citizen monitoring, businesses and contractor outreach, incentives)	Spatial targeting based on results of 2019 chloride monitoring study which revealed locations where receiving waters exceeded water quality standards.
CCWD Operations & Maintenance programming	
Comprehensive Drainage System Inspection	District-wide, rotating schedule (20% of public drainage system per year)
BMP inspections	All District-owned BMPs on rotating schedule consistent with O&M plans

Figure 7. Map of all actively eroding streambanks based on annual ditch survey results.



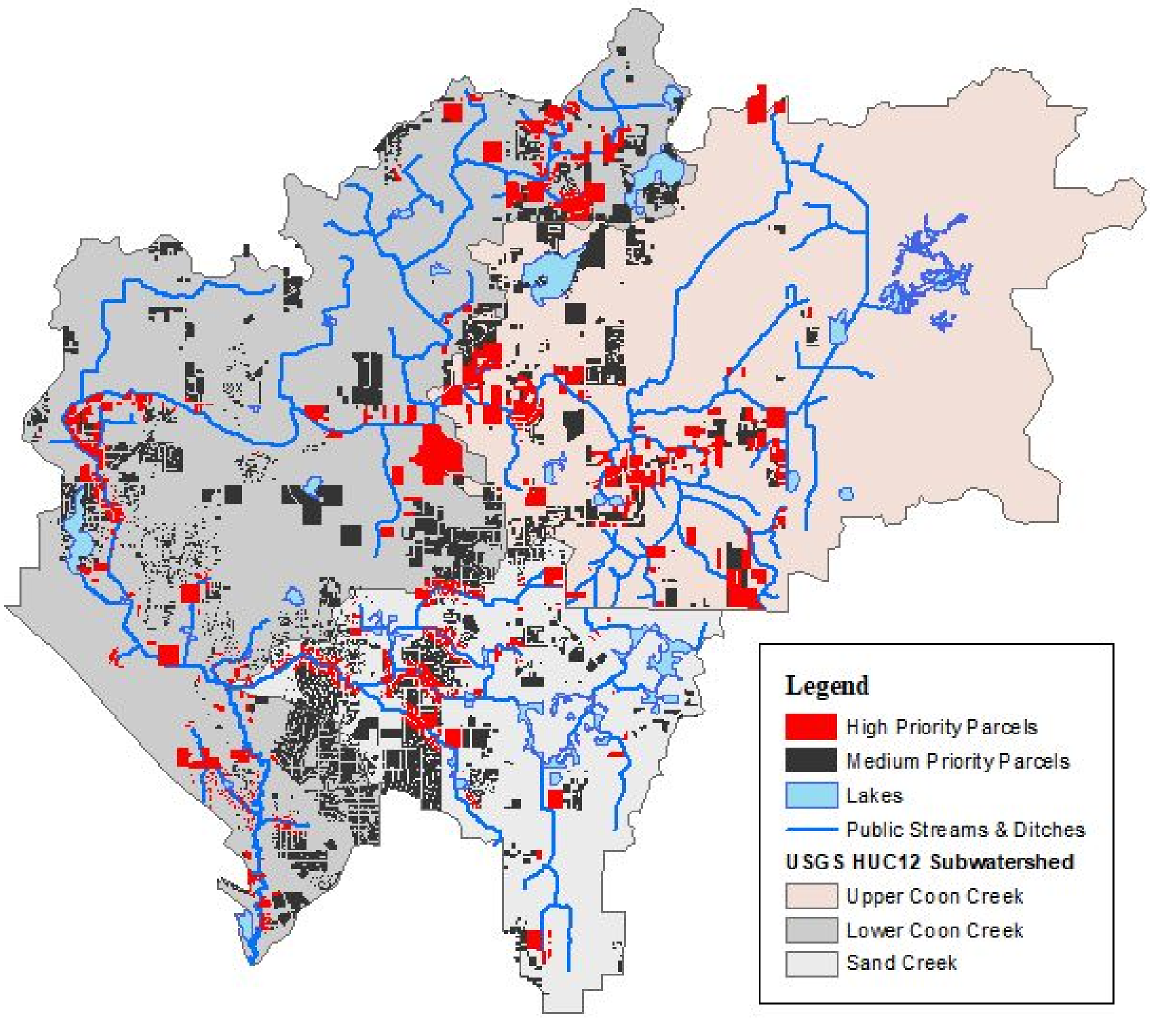
Critical streambank erosion areas are those with sediment loading rates exceeding 5 tons of TSS per year. Critical loading areas have been identified by local surveys and are illustrated in Figure 6. Areas identified with a red dot contribute 50 to 100 t/yr TSS, making them the most critical places to address. The orange dots indicate a load of 25-50 t/yr TSS, and yellow, 5-25 t/yr TSS and will be prioritized accordingly.

Figure 8. Map of Minnesota Stream Habitat Assessment Scores at established biomonitoring sites. Critical reaches are those ranking "poor" to "fair".



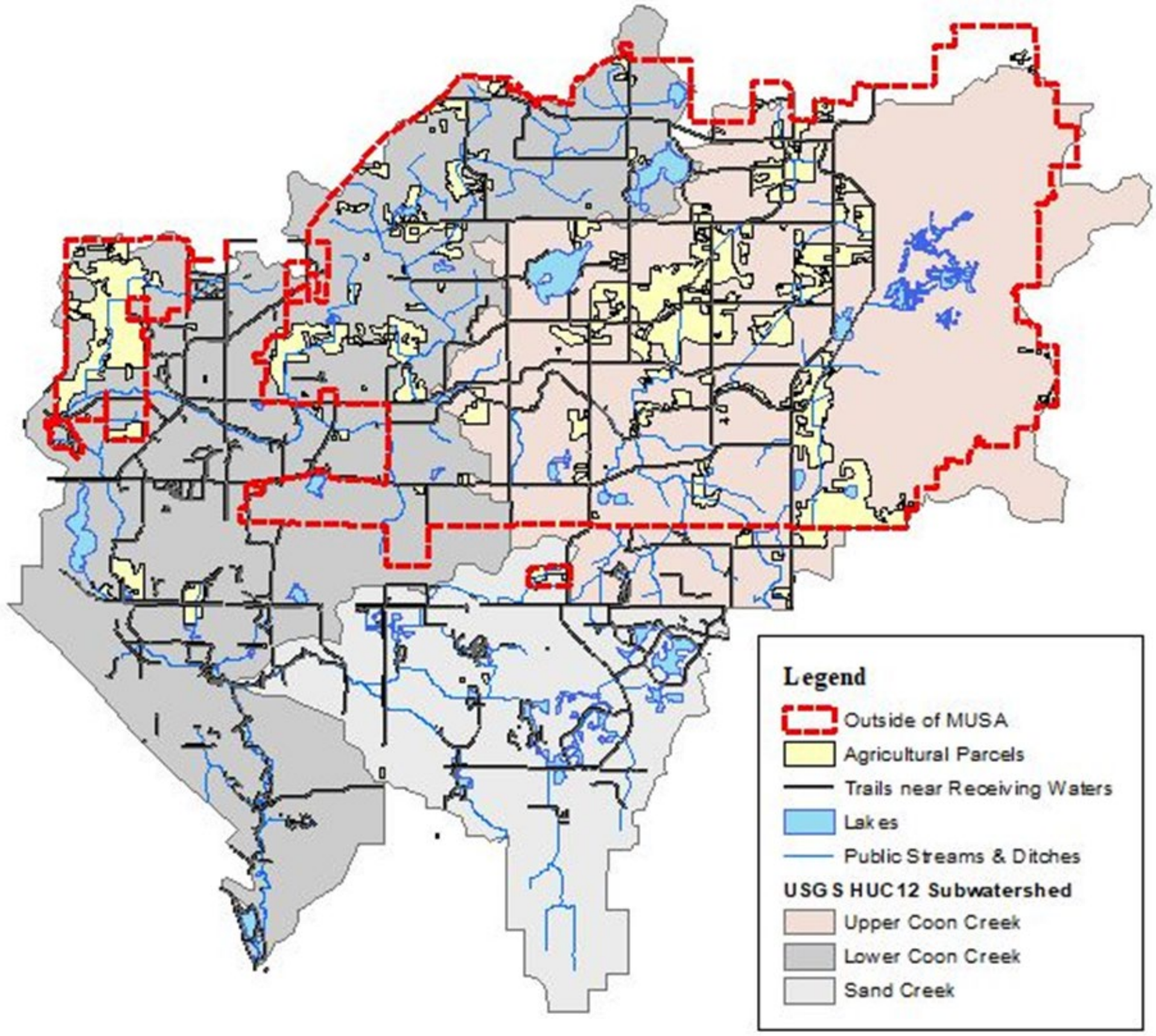
Stream locations with poor aquatic habitat scores are also considered critical areas for restoration (Figure 8). These will be addressed in conjunction with critical streambank erosion areas.

Figure 9. Map of parcels developed prior to local stormwater Rules (1988).



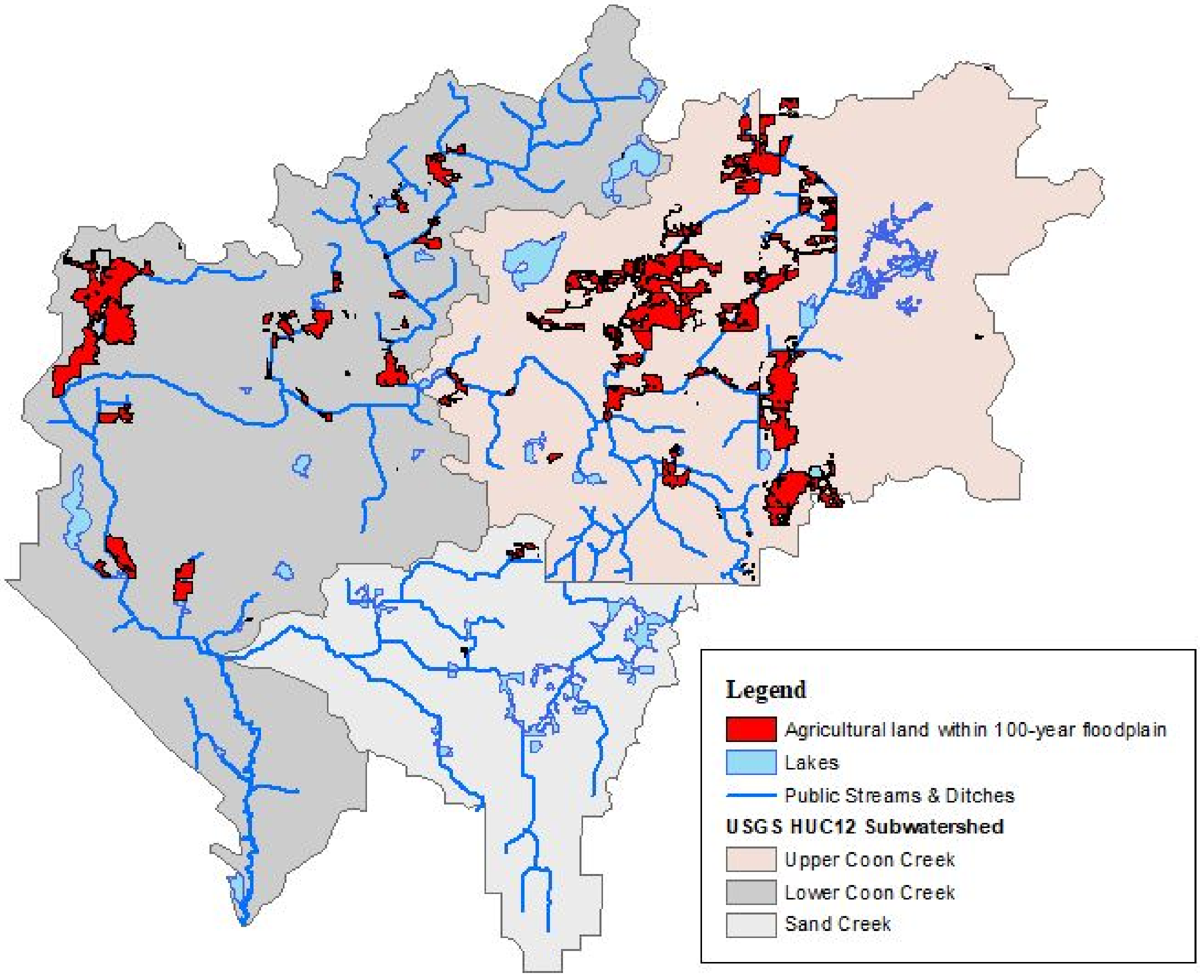
Areas to be targeted for stormwater BMP implementation include areas developed prior to the stormwater rules of 1988 (Figure 9). These represent parcels with inadequate stormwater volume and treatment capacity and serve as critical areas for implementing stormwater BMPs. Critical areas are defined as parcels within 1/10th mile of a stream or public drainage system and are denoted as the red areas in Figure 9. Addressing stormwater will mitigate the wasteload allocation loading of TP, TSS, and *E. coli* to the streams.

Figure 10. Map of critical areas for implementing *E. coli* reduction practices



High NPS *E. coli* loading critical areas are identified as agricultural parcels (51% of bacteria loading from livestock), parcels outside of the Sewered Metropolitan urban Service Area (MUSA), and public trail corridors adjacent to receiving waters (63% of bacteria loading attributable to domestic pet waste) as illustrated in Figure 10. Critical areas within agricultural parcels are those with livestock or fields with manure applied and within $1/10^{th}$ of a mile from a stream or public drainage system. Within the area outside of the MUSA, failing and noncompliant SSTS will be considered critical areas due to the nature of bacteria loading and the public health threat inherent to the failure. Pet waste is the highest NPS for Sand Creek and the second highest in Coon Creek. Critical areas for reducing *E. coli* from pet waste are public trails near waterways.

Figure 11. Map of marginal agricultural land as defined by being within the 100-year floodplain extent based on District-wide XPSWMM modeling



Critical areas for converting marginal agricultural land to water storage and treatment practices are shown in Figure 11. These portions of active agricultural parcels are within the 100-year floodplain and could be restored into wetlands, converted to constructed treatment wetlands, or accommodate water and sediment control basins.

Element d. costs and technical assistance

> *An estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon, to implement the entire plan (include administrative, Information and Education, and monitoring costs). Expected sources of funding, States to be used Section 319, State Revolving Funds, USDA's Environmental Quality Incentives Program and Conservation Reserve Program, and other relevant Federal, State, local and private funds to assist in implementing this plan.*
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Implementation Strategies to pursue water quality goals are integrated into CCWD's five core program areas. Specific projects and practices are also included in the capital improvement plan (CIP) or accomplished by local partners. Funding for the implementation strategies in Table 5 will be determined as part of the annual CCWD budget process, relying primarily on funds raised via the local ad valorem taxes with supplemental funding from Section 319 funds, outside grants, and other sources of revenue. Five core programs include: Planning, Operations and Maintenance, Public and Government Relations, Research and Monitoring, and Development and Regulation (CCWD, 2018a). The District also retains a professional engineer for project design and construction oversight.

Estimated implementation costs are described by practice in Table 5. Total estimated costs for the planned implementation is expected to exceed $20.7 million.

Partnerships are vital to the development and implementation of BMPs (Table 17). CCWD partners with multiple organizations to leverage skills and to increase the effectiveness of projects. In addition to CCWD, six cities (Andover, Blaine, Coon Rapids, Fridley, Ham Lake, Spring Lake Park) and two road authorities (Anoka County Highways and Minnesota Department of Transportation) have also been assigned wasteload allocations as part of the Coon Creek Watershed TMDL. All entities are working jointly to meet required pollutant reductions for TSS, TP, and *E. coli*.

Specific issues pertinent to partnerships included:

- Cooperative relationships between all governmental units managing water within the watershed are vital to Minnesota's and Coon Creek Watershed District's water resources.
- The quantity and quality of future water resources will impact stakeholders across municipal and watershed district jurisdictions.
- Clear and frequent communication is necessary to identify operational and procedural flaws and avoid financial issues.
- High legal costs required to settle disputes related to water and related land resource use issues must be avoided.
- Effective communication between entities is necessary to avoid constraining future collaborative efforts. (CCWD, 2013)

Table 17. Summary of partnerships in the Coon and Sand Creeks Watershed

Partner	Role
Anoka County SWCD	Facilitating landowner relationships; lead for implementing projects on private property (agricultural BMPs, residential rain gardens, SSTS fix-ups, well sealing, etc.); buffer law enforcement; monitoring; grant administration
Cities of Andover, Ham Lake, Blaine, and Coon Rapids	Providing cost share and in-kind support including land and easement acquisition for implementation of projects addressing categorical WLAs in Coon and Sand Creeks; operation and maintenance responsibility for select structural BMPs; lead for implementing non-structural BMPs such as street sweeping and sump cleaning
Anoka County Highways, MnDOT	Road authorities responsible for meeting individual TMDL WLAs for Coon and Sand Creeks
MPCA, BWSR, DNR	Technical assistance; grant administration
Watershed residents and users	Providing land, cost share, and in-kind for projects on private property. Volunteering time to protect and maintain water quality projects.

Element e. education and outreach

An information/education component that will be implemented to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, implementing and maintaining the NPS management measures that will be implemented.

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Cooperation, collaboration, and communication among partners and stakeholders is critical for effective watershed management. CCWD strives to go beyond public participation and promote civic engagement to create a higher level of understanding and a more interactive level of involvement in decision-making (CCWD 2016b, p 35). A detailed description of proposed education and outreach activities related to water quality protection and restoration is included in Table 5. Briefly, CCWD:

- Administers a Technical Advisory Committee and a Citizen Advisory Committee to obtain technical and citizen input.
- Executes an interactive website and social media presence.
- Publishes regular articles in local newsletters.
- Serves as a technical liaison to local lake associations.
- Hosts and attends outreach events and training workshops.
- Supports K-12 education and curriculum development via a Water Education Grant program and interactive presentations.
- Continuously develops a network of volunteers for large-group clean-ups and individual citizen science projects.
- Fosters community engagement through civic groups and local organizations.
- Develops informational outreach materials through various media.
- Creates innovative education and engagement campaigns.

When implementing capital projects, a customized public involvement plan is developed to support the project from the planning phase through post-construction maintenance. Capital project support typically involves sending direct mailers to select stakeholders, hosting public meetings, developing a project-specific webpage and print content for on-site message centers, installing permanent interpretive signage, creating displays for hands-on showcasing of project principles and purpose, hosting onsite tours, and when possible, associated public education and engagement campaigns to reduce targeted pollutants. These campaigns may include Community-Based Social Marketing and facilitation techniques and incorporate diversity, equity, and inclusion as much as practicable.

Element f. schedule

> *A schedule for implementing the activities and NPS management measures identified in this plan that is reasonably expeditious.*
>
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The schedule for the implementation of this plan is described in Table 5. The practices and activities are planned to be conducted over a 10-year window. It is expected that when the plan is fully implemented the estimated reductions will meet or exceed the reductions required to meet water quality standards for Coon and Sand Creeks.

Element g. milestones

A description of interim, measurable milestones for determining whether NPS management measures or other control actions are being implemented.

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The milestones presented in Table 5 will be used as interim measurements to determine the effectiveness of the implementation of this plan. They will serve as a gauge to measure work and to help the CCWD determine the effectiveness of the NKE. The CCWD will use the information to adapt, update, and change the NKE document to continue the progress toward meeting water quality standards. District will also rely on field monitoring results to annually monitor at least two BMP sites per year to assess whether the BMP performance is meeting the estimated pollutant load reductions.

Element h. assessment criteria

> *A set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made toward attaining water quality standards.*
>
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The CCWD has included assessment criteria in Table 5. The criteria include numbers of practices, feet, acres, etc. of practices and by-practice estimated load reductions. These criteria will be used in combination with milestones (Element g) and monitoring (Element i), to evaluate the performance of the BMPs. Analysis of this information, along with external watershed changes, will inform future adaptations of this plan to ensure that the plan is on track to meet the needed reductions to obtain water quality standards. Water quality response in the stream may lag substantially behind implementation.

The CCWD will be reporting on the grant work plan progress of the Section 319 Focus Watershed grants on a semi-annual basis, which will include a final report at the end of the four-year grant. Reductions and BMPs will be entered into the eLINK system per grant agreement. Data collected from the implementation of the NKE plan and the data collected through monitoring will assist the CCWD in determining the success of the plan.

Following the methodologies used in development of the CCWD TMDL (CCWD 2016a), flow and load duration curves will be updated every 3 years to compare against baseline conditions. The load reductions achieved since the baseline year will be plotted over time to ensure adequate progress is being made (e.g. at least 30% of needed load reduction achieved after 3 years).

Element i. monitoring

> *The monitoring & evaluation component to track progress and evaluate the effectiveness of the implementation efforts over time, measured against the criteria established under item (h) immediately above.*
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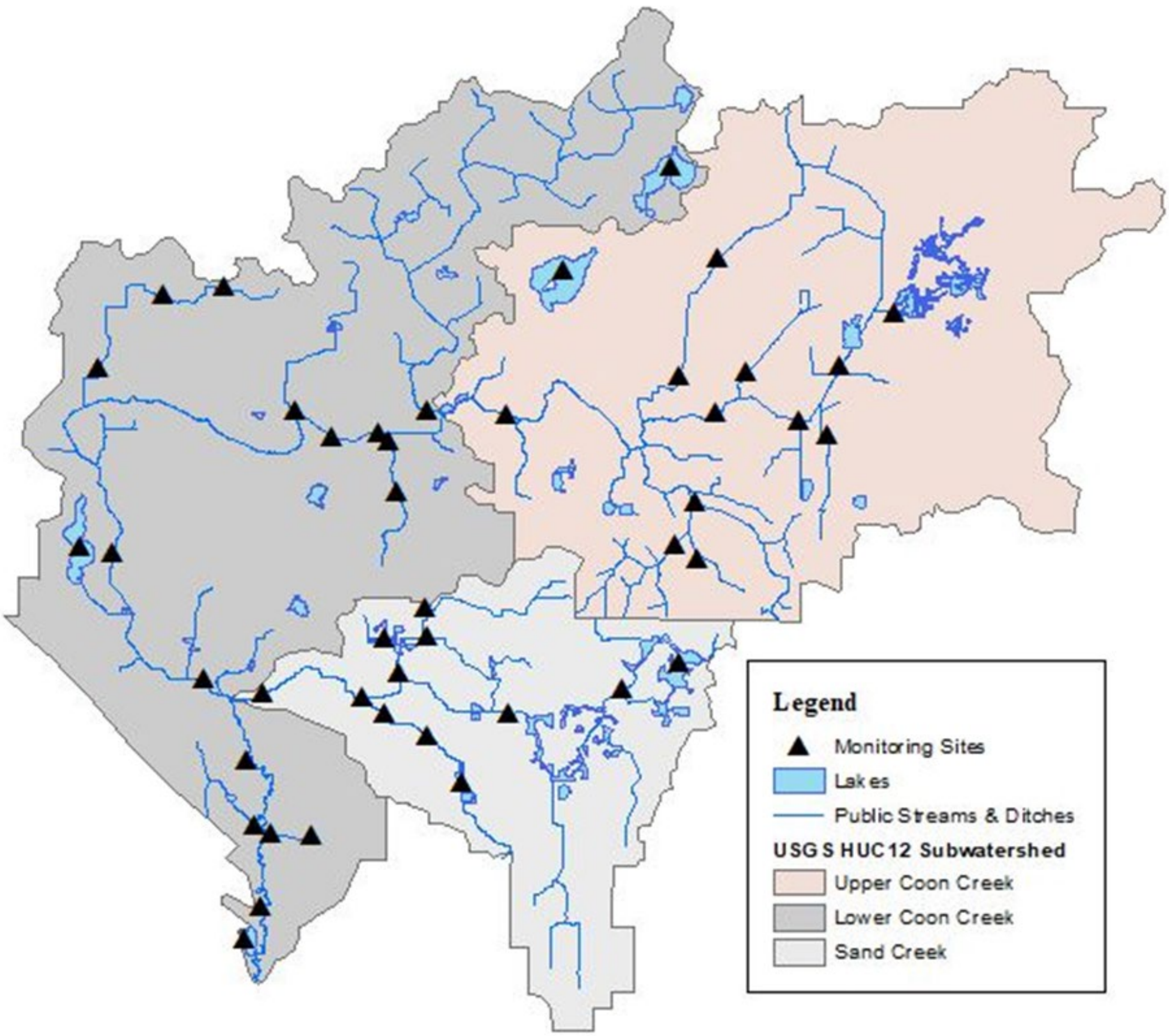
Specific monitoring tasks are described in Table 5 with monitoring sites identified in Figure 12. The monitoring plan for the CCWD is outlined fully in the draft CCWD comprehensive plan (2018a):

Implement a monitoring program to collect routine and diagnostic water quality and quantity data consistent with applicable State and Federal regulations and guidelines:

a. Evaluate the data collection activities of other agencies before additional inventories or monitoring activities are undertaken.
b. Monitor the water quality and condition of District lakes with recreational uses. Monitoring will include water level and eutrophication parameters (TP, Chl-a, & transparency) sampled biweekly from May through October, at least twice every three years. Additional parameters (aquatic plants, fish, dissolved oxygen and temperature profiles, chlorides, *E. coli*, cyanotoxins) will be monitored as needed or as prescribed by individual lake management plans.
c. Monitor the water quality of District streams and ditches at the outlet of each applicable subwatershed (n=18). Monitoring will include the parameters necessary to assess aquatic life and recreation impairments (TP, TSS, dissolved oxygen, pH, conductivity, temperature, *E. coli*). Monitoring frequency will depend on the size of the contributing drainage area, but will range from annually to a minimum of once every 5 years. Samples will be stratified by baseflow and stormflow with a minimum of 8 samples per year.
d. Collect continuous stream stage data and develop rating curves at subwatershed outlets and relevant municipal boundaries to enable flow and pollutant loading calculations. Direct discharge measurements will be collected annually by USGS at the outlets of Coon and Sand Creeks starting in 2020 to continuously update rating curves for the development of flow and load duration curves.
e. Track monthly and event-based precipitation totals and trends including management of weather station at CCWD office.
f. Monitor surficial groundwater levels at representative wetland sites across the District.
g. Monitor major stream outlets and lakes for chlorides once every 5 years following the monitoring protocols recommended by the Twin Cities Metropolitan Area Chloride TMDL Study.
h. Conduct biomonitoring on assessable stream reaches once every 10 years, midway between MPCA assessment cycles (i.e. 2025, 2035).
i. Use the MPCA's EQuIS system as the primary depository for water quality data; ensure all data are collected and analyzed by accepted procedures and reported with specified accuracy, precision, threshold limits of detection, and any relevant descriptive qualifiers.
j. Conduct diagnostic monitoring at the subwatershed-scale in conjunction with stormwater asset inventories to track pollutant sources and develop water quality models calibrated to monitoring data.

k. Conduct performance monitoring (paired influent and effluent samples) of District-sponsored BMPs and other BMPs of interest.
l. Conduct additional sampling and analysis as necessary to investigate illicit discharges and contaminants of emerging concern.

Figure 12. Map of routine rotating water quality and hydrology monitoring sites



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