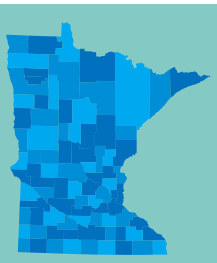
Grant

February 2023

Devil Track River Watershed Nine Key Element Protection Plan

MINNESOTA POLLUTION CONTROL AGENCY



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Executive summary

Devil Track River with Devil Track Lake and the source water protection areas for Grand Marais are priority areas in the Lake Superior North major watershed (Lake Superior North One Watershed, One Plan, 2017). Devil Track Lake is a priority given its size, current and potential shoreland development, historical logging and presence of aggregate mining within the watershed. The source water protection area for Grand Marais includes the lower portion of the Devil Track River watershed. The water intake for the city's drinking water system located in Lake Superior is highly susceptible to potential contaminants. This Nine Key Element (NKE) plan is a protection plan to ensure these waterbodies remain unimpaired by reducing sediment and nutrient loading.

The Devil Track River Watershed is a high-value watershed that is currently meeting most water quality standards. The watershed has no nutrient or sediment impairments. There are five lakes that are impaired for aquatic consumption by mercury in fish tissue and/or in water column (Table 1). The mercury impairments will be addressed through the implementation of the Statewide Mercury TMDL plan and the recommended actions are mostly outside the control of the local units of government.

Table 1. Mercury 303(d) impairments in the Devil Track Watershed

Water body name		Use Class	Affected designated use	Pollutant or stressor
Devil Track Lake	16-0143-00	2B	Aquatic Consumption	Mercury in fish tissue Mercury in water column
Elbow	16-0096-00	2B	Aquatic Consumption	Mercury in fish tissue Mercury in water column
Kemo	16-0188-00	1B, 2A	Aquatic Consumption	Mercury in fish tissue
Musquash	16-0104-00	1B, 2A	Aquatic Consumption	Mercury in water column
Pine	16-0194-00	1B, 2A	Aquatic Consumption	Mercury in fish tissue

The water quality of the lakes and streams in the Devil Track River watershed is generally very good. All assessed streams in the watershed meet the aquatic life and aquatic recreation standards. All assessed lakes in the watershed meet the aquatic recreation standard; however, Devil Track Lake is showing evidence of a decrease in water clarity.

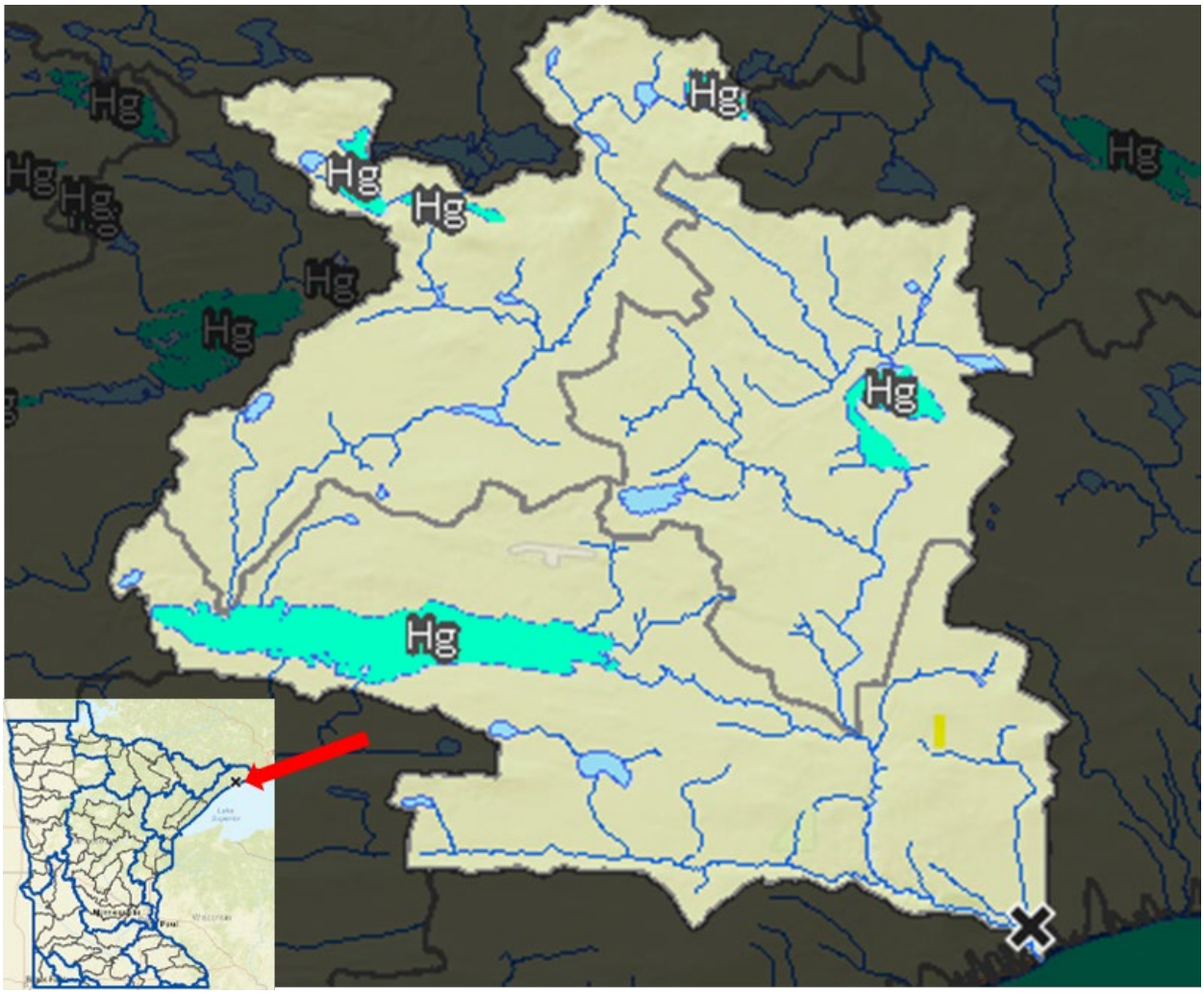
Priority concerns in the watershed include stormwater management, subsurface sewage treatment systems (SSTS), historic land use, timber harvesting, aggregate materials, construction and industrial operations, stream connectivity, invasive species, impacts of climate change, waterbodies at risk of becoming impaired, fisheries, wild rice lakes, drinking water, groundwater, wetland management, unique and high value resources, data collection, and education and outreach (Lake Superior North One Watershed One Plan, 2017).

This NKE plan is focused on three hydrologic unit code (HUC) 12 watersheds and will be referred to as the Devil Track Watershed throughout the plan. The three HUC 12 watersheds are summarized in Table 2.

Table 2. HUC 12 watersheds in Devil Track Watershed

Watershed	HUC#
Junco Creek	040101010501
Elbow Creek	040101010502
Devil Track River	040101010503

Figure 1. Devil Track River Watershed (WHAF, 2023)



The Devil Track River Watershed Nine Key Element (NKE) Plan addresses the water quality protection needs for Devil Track Lake and Devil Track River. Activities that will achieve the goals for the lake and river are expected to also protect the other lakes and streams in the watershed. If additional measures are needed for other individual waterbodies, the NKE plan will specify them as the plan is adapted.

The mercury in fish tissue impaired lakes are addressed by the statewide mercury TMDL study approved in 2007 and supporting updates approved in 2010, 2013, and 2014.

Funding of projects proposed in this plan may be restricted to funding source. Only projects and practices that are allowable by EPA's 2014 program guidelines and Minnesota's Nonpoint Source Program Management Plan (except where noted in the MPCA's NPSMPP) will be funded by the Federal Clean Water Act Section 319 funds. Match funds and activities must also be eligible under the guidelines and plan.

Water quality conditions

The Devil Track Watershed assessed waterbodies meets water quality standards. There is a trend of increasing TP levels in the system. A load reduction goal of 298 lbs/yr TP has been set to continue to protect water quality and improve the trend of nutrient loads. The practices described in this NKE plan will also reduce nitrogen, and sediment at the outlet of this watershed.

The loading estimates are calculated using the Pollutant Load Estimation Tool (PLET), an online tool developed by the U.S. Environmental Protection Agency (EPA). The tool loads pertinent information from the EPA's input server for PLET. The PLET tool calculates the nitrogen, phosphorus, and sediment loads by watershed. The total pollutant load by watershed is summarized in Table 3.

Table 3. Summary of pollutant loading in the Devil Track Watershed (PLET)

Watershed	N load (lbs/yr)	P load (lbs/yr)	Sediment load (t/yr)
040101010502 - Junco Creek	6077.04	1440.35	80.99
040101010503 - Elbow Creek	42603.89	1260.71	69.67
040101010504 - Devil Track River	11389.32	3256.31	282.95
TOTAL	**21727.25**	**5957.37**	**433.61**

Water quality data

Six stream reaches of Devil Track River and its tributaries have been assessed for aquatic life use support based on fish and macroinvertebrate indices of biotic integrity. One downstream reach of the river was also assessed for aquatic life use support based on dissolved oxygen, chloride, pH, ammonia, and phosphorus. The reach was also assessed for aquatic recreation based on *E. coli* bacteria. All assessed reaches (reach and parameter) were found to be supporting their aquatic use designation. The remaining reaches had insufficient or no data to be assessed. Table 4 summarizes the assessments completed for the six stream reaches. Most of the waterbodies in this region of Minnesota are unimpaired. These waterbodies will be viewed as protection waterbodies to protect the integrity of the water quality.

Ten lakes in the watershed have been assessed for aquatic recreation based on total phosphorus, chlorophyll-*a*, and transparency criteria. All 10 were found to be supporting aquatic recreation using the three eutrophication criteria.

Table 5 summarizes the use support and average data values for the lakes as listed in the Lake Superior North WRAPS report.

Table 4. Streams assessed in Devil Track River watershed

	AUID (04010101)	-D80	-D79	-566	-601	-717	-D61
	Stream name	**Devil Track River**	**Devil Track River**	**Little Devil Track River**	**Junco Creek**	**Elbow Creek**	**Woods Creek**
	Reach description	**Unnamed Cr to Lk Superior**	**Devil Track Lk to Unnamed Cr**	**Unnamed Cr to Devil Track R**	**Junco Lk to Devil Track R**	**Unnamed Cr to Devil Track R**	**(90.1484) 47.861 to Lk Superior**
Aquatic life	Fish IBI	Sup	Sup	Sup	Sup	Sup	Sup
	Macroinvertebrate IBI	Sup	Sup	Sup	Sup	Sup	Sup
	Dissolved Oxygen	Sup	IF	IF	IF	IF	IF
	Total suspended solids	IF	IF	IF	IF	IF	IF
	Secchi Tube	IF	IF	IF	IF	IF	–
	Chloride	Sup	–	–	–	–	–
	pH	Sup	–	IF	IF	IF	IF
	Ammonia	Sup	IF	IF	IF	IF	IF
	Phosphorus	Sup	IF	IF	IF	IF	IF
Aquatic recreation	E. coli	Sup	IF	–	–	–	–

Sup = found to meet the water quality standard, Imp = does not meet the water quality standard and therefore is impaired, IF = the data collected were insufficient to make a finding, – = No data

Table 5. Lakes assessed in Devil Track River Watershed

Lake ID	Lake	Aquatic recreation	Average TP (µg/L)	Average transparency (m)	Trend in clarity
16-0098-00	Binagami	Sup	16	1.2	--
16-0044-00	Boys	Sup	12	2.4	--
16-0143-00	Devil Track	Sup	12	3	Decreasing
16-0096-00	Elbow	Sup	13	2.5	--
16-0188-00	Kemo	Sup	8	4.4	None
16-0045-00	Kimball	Sup	12	3.7	--
16-0046-00	Mink	Sup	14	3.1	--
16-0104-00	Musquash	Sup	7	3.8	--
16-0194-00	Pine	Sup	7	3.7	--
16-0049-00	Trout	Sup	8	6.4	None

Sup = found to meet the water quality standard, -- = insufficient data

E. coli concentrations for 17 samples collected at the site in 2013 and 2014 were all less than 60 MPN/100 ml with most being less than 20 MPN/100 ml. Total phosphorus concentrations at the site

were generally low with an average of 21 ug/L and only one sample with a concentration greater than 100 ug/L for the 41 samples collected in 2013, 2014, and 2015.

Site S007-466 is located downstream of Elbow Creek and has about 30 samples in 2013, 2014, and 2015. All but one transparency value was greater than 100 cm. The lowest value for transparency of 67 cm corresponded with the maximum TSS concentration of 12 mg/L. Site S000-862 is located at Devil Track Road downstream of Devil Track Lake. It is a volunteer monitoring site with 21 transparency measurements taken in 2019 and 2020. All measurements were greater than 100 cm.

The data for the Little Devil Track River (S016-417) are limited to transparency measurements in 2014, 2015, and 2020. Of the 26 measurements, only two were less than 100 cm at 70 and 95 cm. Woods Creek (S008-028) water quality data is limited to five transparency measurements in 2020. All were greater than 100 cm.

Although the amount of data is somewhat limited, it indicates good water quality in the rivers and streams.

The water quality of Devil Track Lake has gradually declined in recent years. Figure 2 shows a general decrease in annual average Secchi depths at one site on the lake. The average annual TP concentration for the lake is 13 µg/L with a very slight increase since 2019 (Figure 3). Five monitoring sites on the lake have sampler/observer observations of the water quality for different years in the period of record, 2000-2010, through regular sampling or Citizen Lake Monitoring Program volunteers. Observers generally rank the physical appearance of the lake as being clear, low algae, or medium algae with the recreational suitability being mostly good to very good.

Figure 2. Average annual secchi depth (m) for Devil Track Lake (16-0143-00-204)

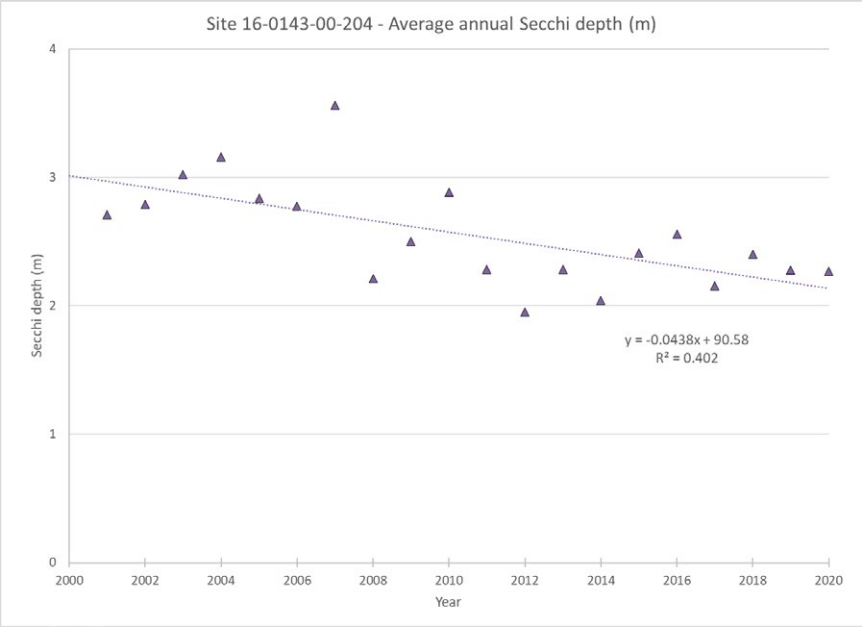
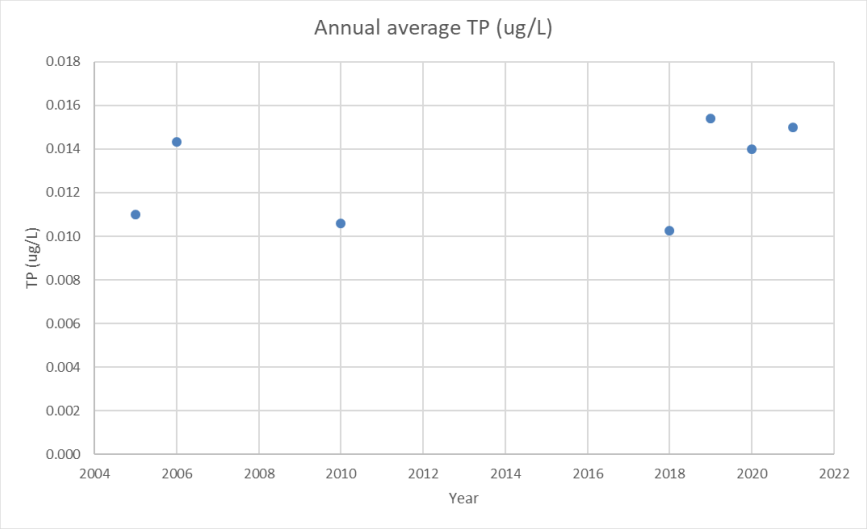


Figure 3. Average annual total phosphorus concentration for Devil Track Lake (16-0143-00-201)



The lake conditions in Devil Track Lake and the other lakes in the watershed are shown in Table 6. The table summarizes the data and estimates made using the methods developed for Minnesota's Lakes of Phosphorus Sensitivity Significance (DNR, 2022).

Table 6. Lake information for lakes in Devil Track River watershed in Minnesota's Lakes of Phosphorus Sensitivity Significance geodatabase (DNR, 2022, GIS Data Layer).

Category/ variable	Value						
DNR ID	**16014300**	**16009800**	**16016000**	**16009600**	**16018800**	**16019400**	**16010400**
Lake ID	**16-0143-00**	**16-0098-00**	**16-0160-00**	**16-0096-00**	**16-0188-00**	**16-0194-00**	**16-0104-00**
Lake name	**Devil Track**	**Binagami**	**Thompson**	**Elbow**	**Kemo**	**Pine**	**Musquash**
Presence of water clarity trend	Degrading	Insufficient data		Insufficient data			Insufficient data
Observed mean summer TP (µg/L)	13	16	14	19	8	8	7
Observed mean summer Secchi transparency (m)	3	2	1	1	5	3	4
Summer mean TP goal (µg/L)	13	16	14	19	8	8	7

Table 7 summarizes the lake sensitivity classifications for the Devil Track River watershed lakes based on phosphorus sensitivity, biological significance, and the presence of wild rice. The classifications indicate the uniqueness and sensitivity of the watershed's lakes.

Table 7. Lake sensitivity status of the lakes in Devil Track River watershed in Minnesota's Lakes of Phosphorus Sensitivity Significance geodatabase (MDNR, 2022).

Lake name	Devil Track	Binagami	Thompson	Elbow	Kemo	Pine	Musquash
Lakes of P sensitivity significance	Highest	Higher	High	High	High	High	Higher
Lakes of biological significance	High	High		Outstanding	Outstanding		
Wild rice lakes				Yes			

Woods Creek is a tributary to the Devil Track River that supports a wild population of Brook Trout and Rainbow Trout, along with several rare coldwater macroinvertebrate taxa. This stream currently meets exceptional use aquatic life criteria for both fish and macroinvertebrate assemblages, yet several stressors render these species vulnerable to extirpation. Stressors to aquatic life in Woods Creek include physical habitat degradation and barriers to fish movement. Low flow conditions during dry periods are also a limiting factor in this watershed, a condition that occurs due to a combination of natural factors (small drainage area, geology) and land-use impact (timber harvest, ditching, private dams) (MPCA, 2018).

Implementation strategies

The implementation strategies for this NKE plan focus on preventing increases in pollutant loading, targeting site specific problem areas that contribute pollutants, targeting site specific problems that may degrade aquatic life habitat, and addressing stream connectivity issues that are apt to affect the ecology of the Devil Track River and its tributaries. An underlying framework for these strategies is a stormwater management approach that emphasizes the maintenance, restoration and/or rehabilitation of natural hydrologic functions, such as infiltration, filtration, flood storage and evapotranspiration, to create a more resilient landscape.

Table 8. Activities, milestones, assessment criteria, costs, and estimated reductions for Devil Track Watershed

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
Administration	N	Update and improve language of shoreland ordinance to standardize expectations and help landowners better understand requirements	5 meetings of county and SWCD staff, commissioners, partners, and citizens	5 meetings of county and SWCD staff, commissioners, partners, and citizens	Complete ordinance update process and communicate revisions to lakeshore owners at lake association meetings and/or workshops			Revised shoreland ordinance adopted # development meetings # outreach meetings and workshops	$30,000			
	N	Update ordinances and regulations to better address erosion rates, climate change impacts and land use impacts to riparian bluff areas.	5 or more meetings with county commissioners, county staff, and township officials to update ordinances	Adopt ordinance revisions and communicate to landowners				# ordinances and regulations revised # development meetings # outreach meetings and workshops	$30,000			
	N	Support development of geological atlas by Minnesota Geological Survey and Minnesota Department of Natural Resources through discussions and meetings.	One meeting	One meeting	One meeting	Two meetings, completion of geologic atlas	Two workshops on use of the geologic atlas					

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		Provide training in use of the atlas.										
	N	Document the sources of drinking water as surface or groundwater on properties around lakes and streams; obtain data on numbers of individuals drinking surface vs wells; create database of well information and surface drinking water information (Cook County well index).	Collect data on drinking water sources of 50 properties	Collect data on drinking water sources of 50 properties	Collect data on drinking water sources of 50 properties	Collect data on drinking water sources of 50 properties	Collect data on drinking water sources of 50 properties	# surface water systems # groundwater systems (wells)	$25,000			
	N	Collect hazardous waste from prioritized landowners using a mobile hazardous waste collection truck as part of the county semi-annual hazardous waste collection.; Work with landowners with significant waste and/or junkyards to	Coordinate with partners; outreach to landowners and build rapport	Collect hazardous waste from five landowners and continue outreach with landowners	Collect hazardous waste from five landowners and continue outreach with landowners	Collect hazardous waste from five landowners and continue outreach with landowners	Collect hazardous waste from five landowners and continue outreach with landowners	# pounds collected # landowners participating	$90,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		minimize soil and water quality impacts through land management practices to remove waste, ensure best management practices are in place.										
Buffer	Y	Achieve installation of improved buffer and setbacks on 10 properties for a total of 5,000 linear ft.			Implement appropriate BMPs on two parcels per year (1000 ft)	Implement appropriate BMPs on two parcels per year (1000 ft)	Implement appropriate BMPs on two parcels per year (1000 ft)	# noncompliant setbacks addressed/fixed # feet	$300,000	1334.67	1050.83	40.8
	Y	Establish program encouraging the establishment of native trees and vegetation along shorelines and riparian zones on private land and provide technical and financial assistance in establishing three miles of shoreline and riparian native vegetation.	Develop program for implementing BMPs to re-vegetate shorelines and stream riparian areas in 5-10 meetings; Connect with landowners to organize native vegetation plantings	Increase or improve 50 ft. of riparian or shoreline buffers along streams using developed program; Contact 5 landowners per year	Increase or improve 50 ft. of riparian or shoreline buffers along streams using developed program; Contact 5 landowners per year	Increase or improve 50 ft. of riparian or shoreline buffers along streams using table Y; Contact 5 landowners per year	Increase or improve 50 ft. of riparian or shoreline buffers along streams using table Y; Contact 5 landowners per year	200 ft of buffers installed 20 landowners connected Trees and cages installed	$200,000	52.96	25.53	1.16

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
Developed	Y	Implement BMPs to reduce flows and loads from surface and subsurface water from current and legacy sand and gravel mining activities on water quality and lateral flow conditions in Junco Creek, Kimball Creek, Kadunce Creek and Devil Track Lake. Management activities and BMPs will include site visits, education and outreach, and installation of best management practices from stormwater BMPs, invasive species BMPs, and shoreline and riparian BMPs to improve individual site conditions. Implementation projects from Table 17, Table 18, and Table 20 suite of practices.	Install 2 BMP practices from Table A, Table B and Table C. Develop outreach tools on BMPs for sand and gravel mines and distribute to pit owners and operators.	Install 2 bmp practices from Table A, Table B and Table C. Develop outreach materials.	Install 2 BMP practices Develop outreach tools on BMPs for sand and gravel mines and distribute to pit owners and operators.	Install 2 BMP practices and distribute outreach materials to pit owners and operators	Install 2 BMP practices	# practices installed	$250,000	682.09	71.77	11.93

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
	Y	Implement four animal waste management for mushing kennels by increasing vegetation and width of buffers in riparian areas and use dog waste management practices or managing waste through various compost techniques.	identify landowners; develop connections to complete projects	complete one project to establish handling waste management.	establish buffer and ensure establish within second year	complete one project to establish handling waste management.	establish buffer and ensure establish within second year	# of kennels with buffers # of kennels with waste management plans	$15,000	11.19	0.84	0
	N	Work with 10 landowners to seal unused wells; install 5 monitoring stations as applicable.	Connect with 1 landowner to seal well	Connect with 2 landowners to seal wells; 1 monitoring station installed	Connect with 1 landowner to seal well	Connect with 2 landowners to seal wells; 1 monitoring station installed	Connect with landowners to install additional monitoring wells	10 sealed wells; 5 monitoring stations installed	$75,000			
	Y*	Install one stormwater pond; install 3 stormwater treatments to slow and treat water at two local businesses in the watershed (Table 17)			Connect with landowner; install stormwater projects	Connect with landowner; install stormwater projects	Connect with landowner; install stormwater projects	# of landowners connected; # of projects installed	$100,000			
Forestry	Y	Work with small acreage (< 20 acres) forest landowners to implement forest management practices listed in Table 20.	Provide technical assistance and implement practices with one landowner using SWCD	Provide technical assistance and implement practices with one landowner using SWCD cost-	Provide technical assistance and implement practices with one landowner using SWCD cost-	Provide technical assistance and implement practices with one landowner using SWCD cost-	Provide technical assistance and implement practices with one landowner using SWCD cost-	# acres with improved forest management	$60,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
			cost-share or NRCS EQIP funds	share or NRCS EQIP funds	share or NRCS EQIP funds	share or NRCS EQIP funds	share or NRCS EQIP funds					
	Y	Provide 0.1 FTE forester for landowner contacts and technical assistance.	0.1 FTE forester for forest management work in the watershed	0.1 FTE forester for forest management work in the watershed	0.1 FTE forester for forest management work in the watershed	0.1 FTE forester for forest management work in the watershed	0.1 FTE forester for forest management work in the watershed	# landowners contacted # landowner collaborations # TA contacts	$30,000			
	Y	Minimize negative impacts to existing hydrology and water quality from timber management by ensuring that no more than 50% of the Woods Creek watershed, and the watershed of its largest tributary (S-67-1-1), are classed as open lands (developed lands, agricultural, or forest cover < 15 years old).Continue to review forestry harvest plans for the watershed, to protect cold-water sources and riparian habitat. Enforce protection of	Connect with partners and landowners on forestry practices through 1 annual meeting	Connect with partners and landowners on forestry practices through 1 annual meeting	Connect with partners and landowners on forestry practices through 1 annual meeting	Connect with partners and landowners on forestry practices through 1 annual meeting	Connect with partners and landowners on forestry practices through 1 annual meeting	# of meetings # plans reviewed % lands as open land	$10,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		riparian management zones (RMZs) provided by Forest Resource Council guidelines.										
	Y	Install forest and other land management activities that promote preservation or establishment of long-lived conifer species within 400 ft of streams	Connect with landowners; install 1,000 feet of riparian planting	install 1,000 ft. of riparian plantings	install 1,000 ft. of riparian plantings	install 1,000 ft. of riparian plantings	install 1,000 ft. of riparian plantings	5,000 ft of riparian planted	$15,000	1006.259	485.1365	22.0685
	Y	Work with the U.S. Forest Service and other partners to clear and maintain the angler/work crew access trail running from mile 0.57 to mile 3.6. to improve impacts from stormwater and snow melt, increase native plants to stabilize		Implement start of trail improvements	Complete trail improvements			Miles of improved trail	$150,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		banks in riparian zones										
	Y	Work with partners to implement reforestation following logging practices on 10 acres or less on private or public land. Utilize Table 20 as applicable	Connect with 1 landowner on planting plans and reforestation	Connect with 1 landowner on planting plans and reforestation	Connect with 1 landowner on planting plans and reforestation	Connect with 1 landowner on planting plans and reforestation	Connect with 1 landowner on planting plans and reforestation	# of landowners contacted # of reforestation plans # of acres planted	$200,000			
Invasive species	Y	Implement the Cook County/SWCD Aquatic Invasive Species Plan for the watershed's lakes: Kemo, Elbow, Devil Track, Junco, Thompson, Trestle Pine, and Binagami. Early Detection and Monitoring of AIS to include spiny water fleas, rusty crayfish, aquatic vegetation and any new species. By detecting infestations early, further spread to other waterbodies may be prevented.	Monitor lakes as designated in AIS plan. There are 8 total lakes in the watershed. Each summer four lakes will be surveyed, alternating to schedule each lake being surveyed every other year.	Monitor lakes as designated in AIS plan. There are 8 total lakes in the watershed. Each summer four lakes will be surveyed, alternating to schedule each lake being surveyed every other year.	Monitor lakes as designated in AIS plan. There are 8 total lakes in the watershed. Each summer four lakes will be surveyed, alternating to schedule each lake being surveyed every other year.	Monitor lakes as designated in AIS plan. There are 8 total lakes in the watershed. Each summer four lakes will be surveyed, alternating to schedule each lake being surveyed every other year.	Monitor lakes as designated in AIS plan. There are 8 total lakes in the watershed. Each summer four lakes will be surveyed, alternating to schedule each lake being surveyed every other year.		$50,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
	Y	Work to control and minimize the populations of terrestrial invasive species in the watershed to include species specifically listed on the noxious weed list specific to Cook County.	Determine treatment locations and targeted species for treatment; Treat 2 miles or 1 acre; produce 1 outreach material	Treat 2 miles or 1 acre and revegetate with native species as necessary; Produce 1 outreach resources for landowners; assess previous treatment areas for follow up and success	Treat 2 miles or 1 acre and revegetate with native species as necessary; Produce 1 outreach resources for landowners; assess previous treatment areas for follow up and success	Treat 2 miles or 1 acre and revegetate with native species as necessary; Produce 1 outreach resources for landowners; assess previous treatment areas for follow up and success	Treat 2 miles or 1 acre and revegetate with native species as necessary; Produce 1 outreach resources for landowners; assess previous treatment areas for follow up and success	# miles treated Acres treated	$50,000	98.19	10.44	2.13
Lakeshore	Y	Collaborate with and assist lakeshore landowners in implementing BMPs from all tables through lake management plans for Devil Track Lake, Kemo Lake, and Elbow Lake. These are described in Table 17.		Work with landowners to implement three BMP projects from suite of BMPs in Tables following individual lake management plans	Work with landowners to implement three BMP projects from suite of BMPs in Tables following individual lake management plans	Assess success of projects	Assess success of projects	# landowners contacted # projects completed # engaged landowners # BMPs implemented # feet or acres treated # projects thriving and functioning	$250,000	400.87	51.15	9.67
	Y	Implement stormwater BMPs at boat ramps and carry in entry points with the greatest erosion and runoff problems.	Create one full design incorporating stormwater BMPs on a problem ramp.	Implement stormwater BMPs in previous design for boat ramp reconstruction; Create another	Implement stormwater BMPs in previous design for boat ramp reconstruction; Create another	Implement stormwater BMPs in previous design for boat ramp reconstruction; Create another	Implement stormwater BMPs in previous design for boat ramp reconstruction; Create another	# boat ramp BMPs installed	$75,000	2.75	0.51	0.11

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
				full design incorporating stormwater BMPs on a problem ramp.	full design incorporating stormwater BMPs on a problem ramp.	full design incorporating stormwater BMPs on a problem ramp.	full design incorporating stormwater BMPs on a problem ramp.					
Little Devil Track River	Y	Little Devil Track River replacement of two culverts currently in place. Slated to be replaced in 2024 at the Gunflint Trail Road site. Restore 10 banks (approx. 75 ft each)	Replace 2 culverts 150 ft streambank restored	150 ft streambank restored	150 ft streambank restored	150 ft streambank restored	150 ft streambank restored	2 culverts replaced # ft streambank	$1,000,000	50.2	6	1.5
	Y	Little Devil Track River Area - Management Recommendations for Connectivity: 1) Where site conditions permit, support the replacement of aspen stands with long-live conifers to deter beaver. 2) Work with local road authorities to ensure culverts on S-67-2-3 support fish passage. 3) Work with local watershed		Implement priority one recommendation for connectivity	Implement priority two recommendation for connectivity	Implement priority three recommendation for connectivity	Implement priority four recommendation for connectivity	4 projects completed	$250,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		authorities, and the private owner, on a plan to remove the dam on S-67-2-3 and restore buffers between the gravel pit and that stream. 4) Work with local road authorities to ensure fish passage is maintained or enhanced when the culvert at mile 1.5 (C.R. 12) is next replaced.										
	Y	Little Devil Track Watershed bank stabilization upstream of Gunflint Trail at power line crossing	Design and implementation of bank and flow path stabilization					Installed project	$500,000			
	N*	Along the Little Devil Track River acquire access easements covering private lands along miles 1.5 to 4.4 (C.R. 12 to C.R. 6). Priority 1 (miles 1.5 to 2.03) and 2 (miles 2.33 to 3.2).		Connect with landowners; Establish easement process with 1 landowner	Connect with landowners; Establish easement process with 1 landowner	Connect with landowners on how things are going	Connect with landowners on how things are going	# new easements	$200,000			
	N*	Along the Little Devil Track River, acquire access and		Connect with landowners; Establish	Connect with landowners; Establish	Connect with landowners on	Connect with landowners on	# new easements	$195,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		conservation easements covering private lands along miles 0.42 to 1.5 (Fisheries AMA to C.R. 12).		easement process with 1 landowner	easement process with 1 landowner	how things are going	how things are going					
	N*	Acquire access/conservation easements covering the east and west banks of the river in miles 0.47-0.63 (483 ft)	Connect with landowners; Establish easement process with 1 landowner	Connect with landowners; Establish easement process with 1 landowner	Connect with landowners; Establish easement process with 1 landowner	Connect with landowners on how things are going	Connect with landowners on how things are going	# J55 easements # feet	$35,000			
	N*	Acquire access/conservation easements covering the east and west banks of the river in miles 4.44-4.79 (1,841 ft)	Connect with landowners; Establish easement process with 1 landowner	Connect with landowners; Establish easement process with 1 landowner	Connect with landowners; Establish easement process with 1 landowner	Connect with landowners on how things are going	Connect with landowners on how things are going	# of landowners with easements; 1,841 feet of riparian area in easements	$60,000			
	N*	Acquire access/conservation easements covering the east and west banks of the river in miles 3.74-4.08 (1,791 ft)	Connect with landowners; Establish easement process with 1 landowner	Connect with landowners; Establish easement process with 1 landowner	Connect with landowners; Establish easement process with 1 landowner	Connect with landowners on how things are going	Connect with landowners on how things are going	# of landowners with easements; 1,971 feet of riparian area in easements	$60,000			
	N*	Acquire access/ conservation easements covering the east and west banks of the along Devil Track River	Connect with landowners; Establish easement process with 1 landowner	Connect with landowners; Establish easement process with 1 landowner	Connect with landowners; Establish easement process with 1 landowner	Connect with landowners on how things are going	Connect with landowners on how things are going	# easements # feet easements	$200,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		banks to acquire/access 1,000 ft.										
Outreach	Y	Verify noncompliant stream bluff setbacks on private land (per Cook County Buffer Ordinance - ordinance # 61) and work with landowners to address the non-compliant issues.	Verify noncompliant stream bluff setbacks on two miles of river	Verify noncompliant stream bluff setbacks on two miles of river	Verify noncompliant stream bluff setbacks on two miles of river	Verify noncompliant stream bluff setbacks on two miles of river		# verified noncompliant buffer setbacks	$20,000			
	Y	Work with landowners to implement activities and BMPs from Table 18 to address stream bluff setbacks.	Complete 2 projects	Complete 2 projects	Complete 2 projects	Complete 2 projects	Complete 2 projects	# noncompliant setbacks addressed/fixed # feet # projects completed	$300,000	1006.26	485.14	22.07
	N*	Develop an incentive program to help landowners to transition from outhouses to septic systems or vaults or a better system to protect soil and water quality. Incentive program may include sweepstakes for free septic inspection,	Develop incentive program and implement one incentive with 2 landowners	Implement incentive program with 10 landowners	Implement incentive program with 10 landowners	Implement incentive program with 10 landowners	Implement incentive program with 10 landowners	40 septic systems installed	$100,000	26462.19	964.36	0

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		pump out, and SSTS application and low interest loans for SSTS upgrades and replacements.										
	N*	Establish and conduct lead tackle exchange program to reduce lead tackle in lakes and streams and act as incentive to increase landowner engagement. Work with MPCA get the led out program.	Set up incentive program and logistics. Find recycling place to accept lead. Find source of replacement tackle and budget.	Exchange 3lbs of lead tackle for lead-free tackle per year. Max of 0.25lbs per person per year with preference to new participants. Revise/adjust quantities and eligibility after 1st year of the exchange program.	Exchange 3lbs of lead tackle for lead-free tackle per year. Max of 0.25lbs per person per year with preference to new participants.	Exchange 3lbs of lead tackle for lead-free tackle per year. Max of 0.25lbs per person per year with preference to new participants.	Exchange 3lbs of lead tackle for lead-free tackle per year. Max of 0.25lbs per person per year with preference to new participants.	# pounds lead tackle collected # participants in exchange # people reached with lead tackle contamination information	$5,000			
	Y	Work with Hedstrom Lumber Company on site projects and other potential areas for projects to ensure protection for the water quality in the area. Evaluate stream buffers and stormwater management on site to maintain	Landowner connection: install one stormwater management project to reduce sediment and nutrient loading into the stream within the property	Install one stormwater project to reduce water quantity/slow water quantity and treat water before entering nearby surface water; improve 50 ft of stream	Assess and ensure vegetation established and practices are working	Install one stormwater project to reduce water quantity/slow water quantity and treat water before entering nearby surface water; improve 50 ft of stream	Assess and ensure vegetation established and practices are working	# projects installed	$400,000	17.66	3.69	0.49

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		stormwater on site. Meetings, discussions and projects planned out. Work will include ensuring protection of Little Lake Creek that runs through the site.		buffer within property		buffer within property						
	Y	Provide education and outreach 1 x a year to a minimum of one fishing group, Trout Unlimited, Stealheaders, etc. along with one form of a flier or general outreach to fisher people to discontinue the use of felted boots for fishing to reduce the spread of *didymo* in streams in the area.	Develop outreach tool and distribute annually	Update outreach tool and distribute annually	Update outreach tool and distribute annually	Update outreach tool and distribute annually	Update outreach tool and distribute annually	# of groups reached	$20,000			
	Y	Provide bi-annual education and outreach to landowners on forest management and land management resources to maintain high water quality.	Develop workshop and supporting outreach materials	Develop workshop and supporting outreach materials	Develop workshop and supporting outreach materials	Develop workshop and supporting outreach materials	Develop workshop and supporting outreach materials	# of contacts with individuals; # of outreach materials distributed	$40,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
	Y	Bi-annually hold one workshop for landowners on stormwater runoff and conveyances on individual parcels and information on mitigating impacts and protecting resources.	Develop one workshop and supporting outreach materials	Develop one workshop and supporting outreach materials	Develop one workshop and supporting outreach materials	Develop one workshop and supporting outreach materials	Develop one workshop and supporting outreach materials	# of contacts with individuals; # of outreach materials distributed	$30,000			
	Y	Provide information to homeowner's association/lake associations and other groups in the watershed about water quality, land use best management practices and watershed information once a year.	Attend 4 association meetings annually; provide information as requested for meetings	Attend 4 association meetings annually; provide information as requested for meetings	Attend 4 association meetings annually; provide information as requested for meetings	Attend 4 association meetings annually; provide information as requested for meetings	Attend 4 association meetings annually; provide information as requested for meetings	# of contacts with associations	$40,000			
	Y	Increase landowner knowledge on septic system maintenance, winterizing, system functions and impacts of failing system through bi-annual education and outreach opportunities.	One outreach and education opportunity bi-annually targeting to reach 30 landowners	One outreach and education opportunity bi-annually targeting to reach 30 landowners	One outreach and education opportunity bi-annually targeting to reach 30 landowners	One outreach and education opportunity bi-annually targeting to reach 30 landowners	One outreach and education opportunity bi-annually targeting to reach 30 landowners	# of individuals reached	$15,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
	Y	Target lake shore landowners with education and outreach at minimum, bi-annually, about shoreland management to include but not limited to buffers, land use impacts, general shoreland management, rules and regulations and native planting.	Work with 20 landowners bi-annually on shoreland management education; hold one workshop event bi-annually	Work with 20 landowners bi-annually on shoreland management education; hold one workshop event bi-annually	Work with 20 landowners bi-annually on shoreland management education; hold one workshop event bi-annually	Work with 20 landowners bi-annually on shoreland management education; hold one workshop event bi-annually	Work with 20 landowners bi-annually on shoreland management education; hold one workshop event bi-annually	# of individuals reached	$25,000			
	Y	Target River Bluff landowners develop and provide 2 outreach efforts and resource materials about bluff setbacks, buffers, native vegetation, and increase understanding of bluff slumping and impacts	Target 10 landowners with outreach materials on bluffs; hold 2 outreach workshops	Target 10 landowners with outreach materials on bluffs; hold 2 outreach workshops	Target 10 landowners with outreach materials on bluffs; hold 2 outreach workshops	Target 10 landowners with outreach materials on bluffs; hold 2 outreach workshops	Target 10 landowners with outreach materials on bluffs; hold 2 outreach workshops	# of individuals reached	$25,000			
	Y	Develop and distribute 1 education and outreach resource to landowners about drinking water		produce outreach material about drinking water for distribution		Update outreach material about drinking water for distribution to 50 landowners in the watershed		# of products distributed	$15,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		including both surface and ground water information.		to 50 landowners in the watershed								
	Y	Revegetation expectations will have a developed plan and schedule for expectations including standards, materials for educating landowners and guidance for revegetation. Outreach will be a working document and process that is updated as necessary.	Produce one resource outreach material for landowners to aid in revegetation meeting expectations and standards		Update resource outreach material for landowners and distribute		Update resource outreach material for landowners and distribute	# of products distributed	$15,000			
	Y	Develop one workshop and provide educational information to contractors and landowners on low impact development for sites. Information will be used long term and updated as necessary.		develop and facilitate two workshops around low impact development for sites; produce supporting materials for distribution		Update and facilitate two workshops around low impact development for sites; update supporting materials for distribution		# of workshops held # of individuals reached	$10,000			
	Y	Develop and provide a tool for guidance for private			Distribute a tool for landowners for small best		Re-Distribute a tool for landowners for	# of individuals reached	$10,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		landowners on small site erosion control, vegetation management, and small best management landuse practices.			management landuse practices; target 50 landowners		small best management landuse practices; target 50 landowners					
	Y	Educate the public on deterring geese and birds at public beaches and on private lawns to minimize additional waterfowl bacteria sources.		Hold two workshops to educate landowners; target reaching 25 landowners		Hold two workshops to educate landowners; target reaching 25 landowners		# of individuals reached	$10,000			
	Y	Through bi-annual outreach efforts of workshops and supporting documents, build understanding of the connections between terrestrial invasive species management and watershed health.	Hold workshops bi-annually; target 20 landowners per workshop; distribute 1 outreach material		Hold workshops bi-annually; target 20 landowners per workshop; distribute 1 outreach material		Hold workshops bi-annually; target 20 landowners per workshop; distribute 1 outreach material	# of individuals reached	$25,000			
Pasture	Y	Work with landowners to implement cattle farming BMPs in pastures from Table 22		Connect with landowners	Install 2 management practices to control runoff and animal access to streams	Install 2 management practices to control runoff and animal access to streams	Install 2 management practices to control runoff and animal access to streams	# of practices installed	$350,000	512.85	38.98	4.2

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
	Y	Implementing rotational grazing practices on 120 acres	Implement rotational grazing on 20 acres	Implement rotational grazing on 20 acres	Implement rotational grazing on 20 acres	Implement rotational grazing on 20 acres	Implement rotational grazing on 20 acres	# acres	$6,000			
	Y	Plant 120 critical areas with vegetation	Plant 20 acres of critical areas with native vegetation	Plant 20 acres of critical areas with native vegetation	Plant 20 acres of critical areas with native vegetation	Plant 20 acres of critical areas with native vegetation	Plant 20 acres of critical areas with native vegetation	# acres	$1,200			
	Y	Exclude cattle/livestock from stream access in 6 pastures	2 cattle exclusions with fencing		2 cattle exclusions with fencing		2 cattle exclusions with fencing	# pastures # acres	$10,000			
	Y	Address and restore 120 acres of heavy use by livestock	Restore 20 acres from heavy use by livestock	Restore 20 acres from heavy use by livestock	Restore 20 acres from heavy use by livestock	Restore 20 acres from heavy use by livestock	Restore 20 acres from heavy use by livestock	# acres restored	$2,000			
	Y	Plant forage/hay on 120 acres	Plant 20 acres of forage/hay crops for pasture	Plant 20 acres of forage/hay crops for pasture	Plant 20 acres of forage/hay crops for pasture	Plant 20 acres of forage/hay crops for pasture	Plant 20 acres of forage/hay crops for pasture	# acres planted	$1,200			
	Y	Managin g manure on 120 acres of pasture	Manage 20 acres of manure in pastures	Manage 20 acres of manure in pastures	Manage 20 acres of manure in pastures	Manage 20 acres of manure in pastures	Manage 20 acres of manure in pastures	# acres	$2,000			
	Y	Prescribed grazing on 120 acres	Implement prescribed grazing on 20 acres	Implement prescribed grazing on 20 acres	Implement prescribed grazing on 20 acres	Implement prescribed grazing on 20 acres	Implement prescribed grazing on 20 acres	# acres	$5,000			
Planning		Assist lake area associations in updating their lake management plans. Develop lake management plans for select lakes in the	Update Devil Track and Binagami Lakes lake management plans					# lake management plans	$20,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		future (e.g, Kemo, Binagami, Elbow, etc.)										
SSTS	N*	Upgrade or replace 20 SSTS in the watershed to reduce TP and E. coli loading through individual, county AgBMP loans, and low-income grants for year-round residents. Use SSTS Risk Assessment Tool in prioritization of SSTS to upgrade and replace.	upgrade 4 SSTS every two years	upgrade 4 SSTS every two years	upgrade 4 SSTS every two years	upgrade 4 SSTS every two years	upgrade 4 SSTS every two years	# SSTS upgraded # SSTS replaced	$580,000	2642.19	964.36	0
Stormwater	Y	Work with other businesses in the watershed on site projects and other potential areas for projects to ensure protection for the water quality in the area. Utilize practices in Table 17 and Table 18.		Landowner connection; install one project from Table A or Table C to reduce sediment and nutrient loading into nearby surface water	Landowner connection: install one project from Table A or Table C to reduce sediment and nutrient loading into nearby surface water	Landowner connection: install one project from Table A or Table C to reduce sediment and nutrient loading into nearby surface water	Landowner connection: install one project from Table A or Table C to reduce sediment and nutrient loading into nearby surface water	# of landowners contacted # of projects installed	$400,000			
Stream	Y	Increase stream connectivity by replacing culverts and removing stream barriers.	identify landowners; develop connections to	complete one project	complete one project	complete one project		# culverts replaced # miles of stream reconnected	$650,000	128.72	15.96	3.86

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
			complete projects									
Woods Creek	Y	Provide technical assistance to remove artificial barriers impacting streamflow, water temperatures, and physical habitat in Woods Creek north of County Road 60	Provide assistance to landowners to remove 1 artificially barrier holding water back from the creek	inspect project; water quality and quantity impacts from barrier removal	Provide assistance to landowners to remove 1 artificially barrier holding water back from the creek	inspect project; water quality and quantity impacts from barrier removal	inspect projects; water quality and quantity impacts from barrier removal	# landowners contacted # landowners worked with # projects installed	$350,000			
	Y	Stabilize one bank (1800 ft) in the lower watershed north of Lindskog Road				Stabilize 1800 feet of bank		# feet stabilized	$1,200,000		91	91
	Y	Replace the culvert at County Road 60 to minimize bank erosion and improve aquatic connectivity.			Develop designs and work with landowners to install project	Install Project	Follow up with inspection and any additional work	Install one culvert following natural channel design	$100,000			
	Y	Facilitate one landowner neighborhood meeting every five years to educate about Woods Creek aquatic species and relationship to water quality, benefits to the landowners and property values and landuse impacts	Develop resource outreach materials and meeting information; hold landowner meeting; distribute materials	Distribute materials	Assess and update resource outreach materials and meeting information; hold landowner meeting; distribute materials.	Distribute materials		# landowners contacted # landowners worked with # projects installed	$20,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
	Y	Update culvert at Woods Creek Crossing (CR 58) using bottomless arch culvert or bridge that is at least at bankfull channel and has natural channel substrate and step/pool morphology through the crossing.			Develop designs and work with landowners to install project	Install project	Follow up with inspection and any additional work	Install one culvert following natural channel design	$100,000	25.7	3.2	0.77
	Y	Work to develop a professionally engineered restoration plan for the stream below mile 2.5 that would disconnect the stream from the drainage ditch and restore it to its original channel, restore wetland function, and limit access to the stream by cattle.	Identify and meet with landowners and water authorities; hire professional engineer; develop plan	hold meeting to inform and distribute plan with stakeholders and partners; work with landowners to implement the plan	implement plan; install 1 project	implement plan; install 1 project	implement plan; install 1 project	1 plan developed # landowners contacted # landowners worked with # projects installed	$300,000	169.2	65.14	105.75
	Y	Remove artificial barrier, restore banks and flowage to a more natural stream channel, install native			Develop designs and work with landowners to install project	Install project	Follow up with inspection and any additional work	Install one culvert following natural channel design	$100,000	25.74	3.19	0.772

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		vegetation along the riparian zone to protect water quality in Woods Creek south from County Road 60.										
	Y	Acquire 2 acres of conservation easements along Woods Creek to benefit protection and restoration efforts		Identify landowners and begin conservation easement work	secure conservation easements are in place			# acres	$60,000	32.76	3.48	0.71
Monitoring	Y	Follow-up with landowners that have implemented shoreland and riparian buffers to ensure buffer maintenance. Follow up to include site visits, photos of area, and measurements as necessary with documentation on file for future use	5 sites per year	5 sites per year	5 sites per year	5 sites per year	5 sites per year	# buffers inspected # landowners assisted # buffer condition assessments (? - solely a brainstorm thought)	$150,000	397.17	136.3	15.32
	Y*	Monitor water temperatures annually by placing temperature records at miles 0.1 (Hwy 61), 4.9 (C.R. 60) and 8.5 (C.R. 8).	Monitor water temps at 4 locations annually for three consecutive years	Monitor water temps at 4 locations annually for three consecutive years	Monitor water temps at 4 locations annually for three consecutive years	Monitor water temps at 4 locations annually for three consecutive years	Monitor water temps at 4 locations annually for three consecutive years	Amount of data collected	$20,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		Beginning in 2022, monitor water temperatures at station 7.5 for three consecutive years.										
	Y*	Survey all habitat improvement sites in miles 0.0 to 1.9 and determine whether repairs or enhancements, or additional improvements are needed	Complete survey of habitat	Complete survey of habitat	Complete survey of habitat	Complete survey of habitat	Complete survey of habitat	# surveys # adaptations	$5,000			
	Y*	Monitor Devil Track Lake, Kemo Lake, Elbow Lake Binigami Pine Lake - annually, 5 times, once per month from May - September for total phosphorus, chlorophyll-a, e-coli, transparency, depth profile of temperature, pH, dissolved oxygen, conductivity, and other parameters as they arise.	Monitor annually 5 times per lake; submit data to MPCA	Monitor annually 5 times per lake; submit data to MPCA	Monitor annually 5 times per lake; submit data to MPCA	Monitor annually 5 times per lake; submit data to MPCA	Monitor annually 5 times per lake; submit data to MPCA	# of samples taken annual Data submitted annually	$65,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
	Y*	Stream monitoring Woods Creek, Devil Track River, Junco Creek, tributaries and other streams as necessary for total phosphorus, chlorophyll-a, *E. coli*, transparency, pH, temperature, pH, dissolved oxygen, conductivity and other parameters as they arise.	Monitor stream sites 5 times per season; submit data to MPCA	Monitor stream sites 5 times per season; submit data to MPCA	Monitor stream sites 5 times per season; submit data to MPCA	Monitor stream sites 5 times per season; submit data to MPCA	Monitor stream sites 5 times per season; submit data to MPCA	# of samples taken annual Data submitted annually	$65,000			
	Y*	Devil Track River and Little Devil Track River - Synoptic sampling for sediment loading in Devil Track River and Little Devil Track River for a minimum of 2 seasons from Spring - Fall	Following large rain events greater than 1.5 inches perform synoptic sampling for sediment loading; enter data into database for watershed	Following large rain events greater than 1.5 inches perform synoptic sampling for sediment loading; enter data into database for watershed	Following large rain events greater than 1.5 inches perform synoptic sampling for sediment loading; enter data into database for watershed	Following large rain events greater than 1.5 inches perform synoptic sampling for sediment loading; enter data into database for watershed	Following large rain events greater than 1.5 inches perform synoptic sampling for sediment loading; enter data into database for watershed	# of samples taken annual Data submitted annually	$25,000			
	Y*	Establish a monitoring plan for determining if and how nutrients or bacteria are coming from kennels and reaching groundwater or	monitoring plan developed and begin monitoring at 6 locations; submit data annually to MCPA EQuIS database;	Continue monitoring at 6 sites; Assess data; share with stakeholders and partners; monitor following rain	Continue monitoring at 6 sites; Assess data; share with stakeholders and partners; monitor following rain	Continue monitoring at 6 sites; Assess data; share with stakeholders and partners; monitor following rain	Continue monitoring at 6 sites; Assess data; share with stakeholders and partners; monitor following rain	# of samples taken; # of data submitted	$70,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		surface water from dog kennels. Monitoring to include after rain events and non-rain event sampling for a minimum of 3 seasons from Spring - Fall to determine the effectiveness of the BMPs applied to kennels.	monitor following rain events 1.5 inches;	events 1.5 inches; submit data annually to MPCA EQuIS database	events 1.5 inches; submit data annually to MPCA EQuIS database	events 1.5 inches; submit data annually to MPCA EQuIS database	events 1.5 inches; submit data annually to MPCA EQuIS database					
	Y*	Establish monitoring plan for better understanding algae blooms in lakes and implement the plan and that load reduction activities in this plan are effective.	establish monitoring plan for 5 lakes; monitor the lakes	establish monitoring plan for 5 lakes; monitor the lakes; analyze data	establish monitoring plan for 5 lakes; monitor the lakes; analyze data; share data and land use practices to mitigate blooms	establish monitoring plan for 5 lakes; monitor the lakes; analyze data; share data and land use practices to mitigate blooms	establish monitoring plan for 5 lakes; monitor the lakes; analyze data; share data and land use practices to mitigate blooms	established plan for monitoring	$40,000			
	N	Establish and implement a monitoring plan for nutrients to better understand *didymo* in rivers and streams and assist partners in their efforts and outreach to stakeholders.	Monitor 2 streams annually for didymo 5 times a season working with partners	Monitor 2 streams annually for didymo 5 times a season working with partners	Monitor 2 streams annually for didymo 5 times a season working with partners	Monitor 2 streams annually for didymo 5 times a season working with partners	Monitor 2 streams annually for didymo 5 times a season working with partners	8 streams monitored for didymo Completed plan for monitoring Established partnerships	$12,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
	Y*	Devil Track River - Deploy temperature monitors at stream miles 0.48, 1.12, 2.55, and 2.90, and at stream mile 0.0 of the tributary at mile 2.71 (S-67-1-1) in two consecutive years of every eight, beginning in 2021 to measure the effectiveness of this plan.	deploy 5 temperature monitors and collect data	deploy 5 temperature monitors and collect data	deploy 5 temperature monitors and collect data	deploy 5 temperature monitors and collect data	deploy 5 temperature monitors and collect data	Monitors deployed Data collected	$8,000			
	Y*	Monitor water temperatures at stream miles 1.5, 3.2, and 4.3 in 2021, 2025, and 2029. Monitor water temperatures in tributaries S-67-2-1 (road crossing) and S-67-2-3 (upper and lower crossings of C.R. 8) in 2021, 2025, and 2029 to measure the effectiveness of this plan.	deploy 6 temperature monitors and collect data			deploy 6 temperature monitors and collect data		Monitors deployed Data collected	$8,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
	Y*	Monitor tributary S-67-2-3 for signs of siltation from the gravel pit and other developments that occur on the tributary to measure the effectiveness of this plan.										
	Y*	Monitor water temperatures in this Monker Creek from June-October using recording thermometers once every 5 years at stream miles 0.04, 0.83, and 1.83 to measure the effectiveness of this plan.	deploy 3 temperature monitors and collect data			deploy 3 temperature monitors and collect data		Monitors deployed Data collected	$8,000			
	Y*	Place recording thermometers at miles 0.2, 1.0, and 5.5 every even-numbered year, beginning in 2020 to monitor water temperatures over the open-water season. Place a recording thermometer at	deploy 4 temperature monitors and collect data	deploy 4 temperature monitors and collect data		deploy 4 temperature monitors and collect data		Monitors deployed Data collected	$8,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		about mile 10.1 in 2022, 2026, and 2030 to monitor water temperatures in SR 3 to measure the effectiveness of this plan.										
	Y*	Place recording thermometers at miles 1.1 and 2.3 of the Pine Lake tributary in 2022, 2026, and 2030 to monitor water temperatures in that stream to measure the effectiveness of this plan.	deploy 2 temperature monitors and collect data		deploy 2 temperature monitors and collect data			Monitors deployed Data collected	$8,000			
	Y*	Monitor summer water temperatures at stream miles 0.0, 3.2, and 6.19 in Elbow Creek in 2021, 2025, and 2029 to measure the effectiveness of this plan.	deploy 3 temperature monitors and collect data		deploy 3 temperature monitors and collect data			Monitors deployed Data collected	$8,000			
	Y*	Monitor summer water temperatures using recording thermometers at miles 0.54, 2.63, and 3.52 in two	deploy temperature monitors and collect data at 3 locations	deploy temperature monitors and collect data at 3 locations	deploy temperature monitors and collect data at 3 locations	deploy temperature monitors and collect data at 3 locations	deploy temperature monitors and collect data at 3 locations	Monitors deployed Data collected	$8,000			

Category	Eligibility	Activity and BMPs	Milestones					Assessment	Cost	Reductions		
			2-year (2024)	4-year (2026)	6-year (2028)	8-year (2030)	10 year (2032)			N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
		consecutive years of every eight, to measure the effectiveness of this plan.										

* Activities denoted with N* are not eligible for Section grant funding, but may be used as match. Section 319 grant eligibility for the activities denoted with Y* will be evaluated on a case-by-case basis.

Element a. Sources identified

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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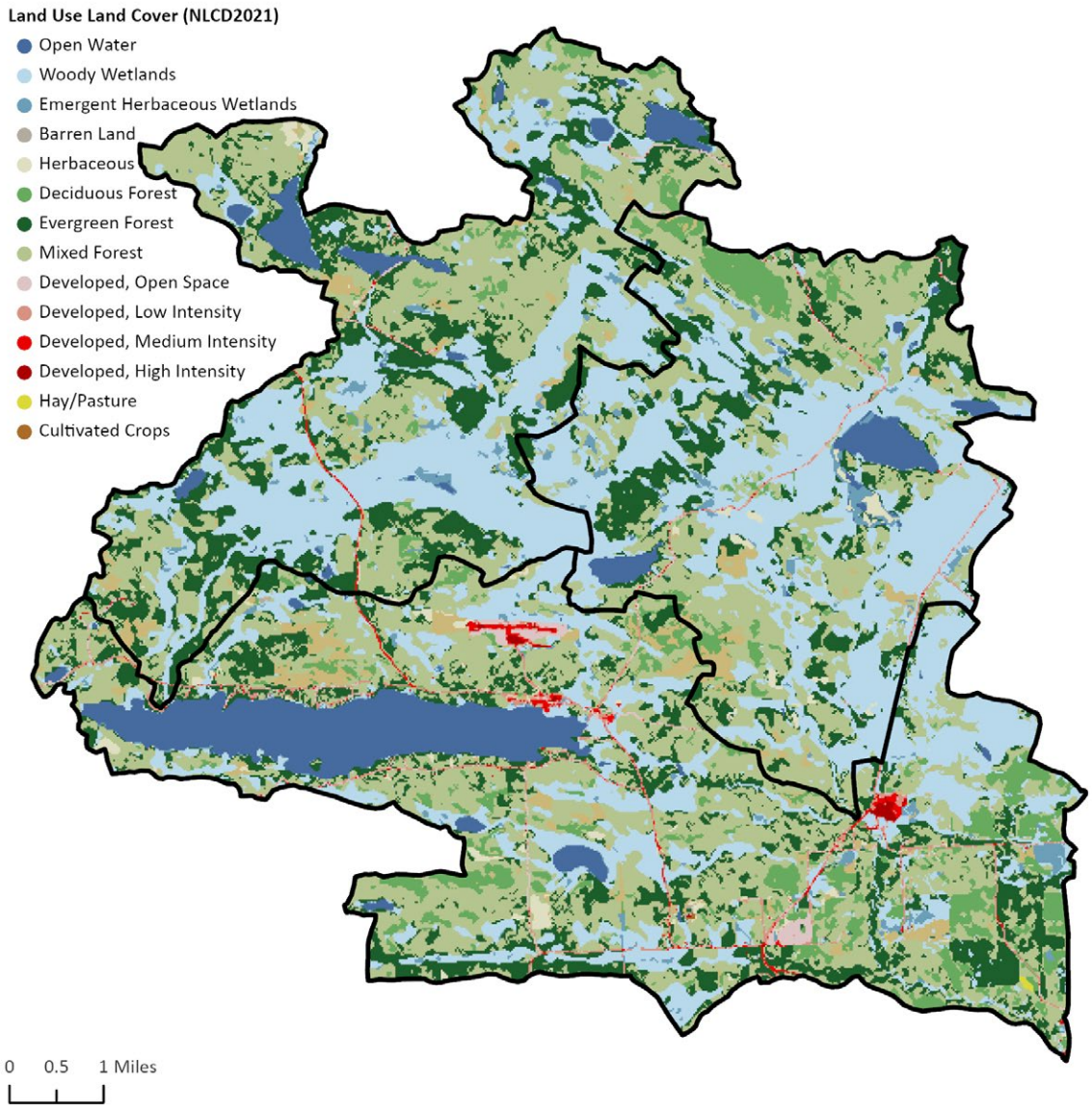
With the overall good health of the watershed's waterbodies, the magnitude of the pollutant sources affecting water quality is limited. However, there are pollutant sources that can be controlled to protect the water quality in the watershed. The majority of the lakeshed surrounding Devil Track Lake is privately owned. There is an old dam located at the outlet of the lake which discharges to Devil Track River. Woods Creek is also very developed and has been altered on individual properties through various land use practices. Devil Track River flows into Lake Superior and is 8.7 miles in length. Most of the aggregated land use is wetlands and forest (Table 9 and Figure 4).

Table 9. Summary of land uses from PLET in acres

Watershed	SHG	Developed* 2.6%	Cropland 0.01%	Pastureland 3.3%	Forest 94%	Total
040101010502 - Junco Creek	C	78.28	0	777.94	12479.22	13335.44
040101010503 - Elbow Creek	C	183.92	0	294.45	11567.19	12045.56
040101010504 - Devil Track River	C	870.22	22.91	367.39	16835.27	18095.79

* The PLET uses the term "urban"

Figure 4. Land use map for Devil Track River Watershed



Pollutant loading

The pollutant loading estimates for each watershed are summarized in Table 3.

Human-influenced sources of phosphorus to the lakes and streams are primarily storm runoff from developed land, failing septic systems, and road ditch erosion. Other human-influenced sources include aggregate mining operations, timber harvests without best management practices, and historical logging. The runoff sources are particularly critical along the shoreline of the lakes and riparian areas of the streams. Sediment inputs to the streams are associated with erosion from poorly vegetated areas, whether in developed areas, along roads, in open areas, or along streambanks. Pollutant loading for the entire Devil Track Watershed is summarized in Table 10.

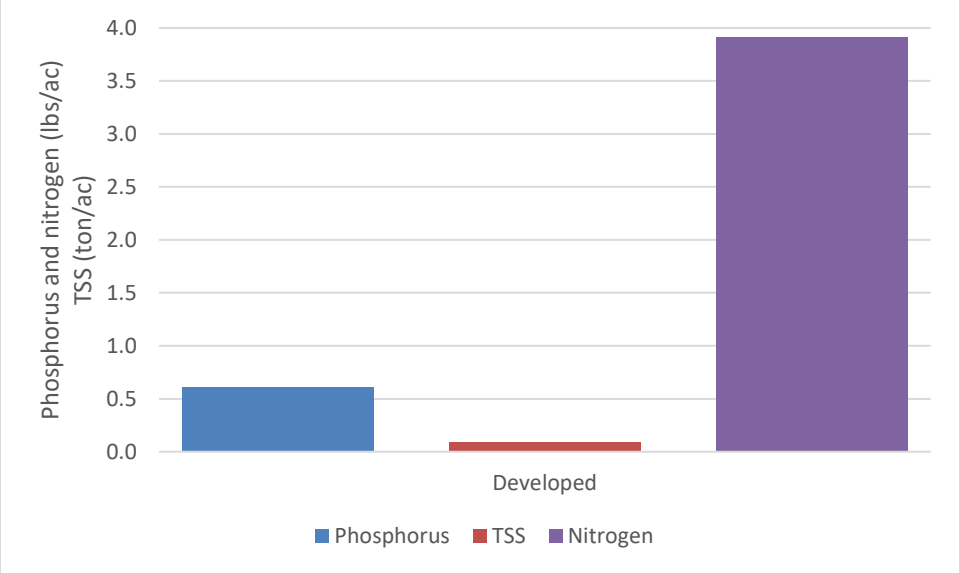
Table 10. Pollutant loading by land use in the Devil Track Watershed (PLET) (% rounded)

Sources	N load (lb/yr)	% N load	P load (lb/yr)	% P load	Sediment load (t/yr)	% TSS load
Developed	4431.24	23%	685.29	13.64%	100.2	23%
Cropland	167.68	0.9%	23.24	0.46%	4.82	1.1%
Pastureland	5078.42	26%	436.78	8.69%	49.8	11%
Forest	7080.41	37%	3397.52	67.61%	125.15	29%
Septic	2462.19	12.7%	964.36	19.19%	0	0.0%
Streambank	320.19	2%	123.27	2.45%	200.12	46%
TOTAL	**19347.96**		**5025.48**		**433.61**	

Developed lands

Developed land use is a high contributor of all pollutants although it represents less than 3% of the total acreage in the Devil Track Watershed. Developed lands include residences/seasonal dwellings, roads, commercial business, and industries such as gravel mining. The estimated load per acre of developed lands in Devil Track Watershed is illustrated in Figure 5.

Figure 5. Estimated pollutant yield from developed land use calculated using PLET



Cropland

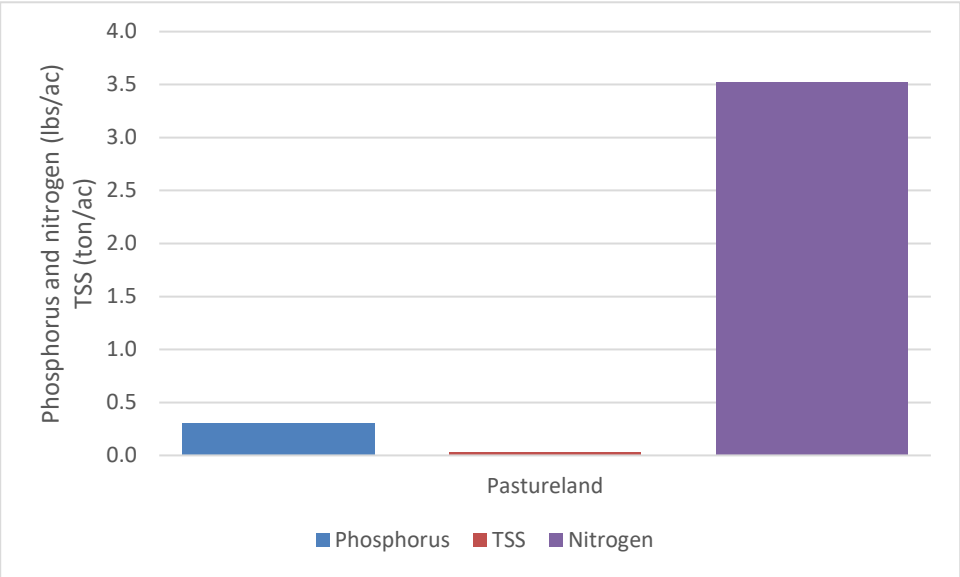
Cropland comprises less than 3% of total acreage in the Devil Track Watershed. Although cropland is a high loading land use by acre, the load is insignificant relative to other land uses. Agricultural producers will be encouraged to adopt best management practices (BMPs) when possible but will have little impact on the overall loading in the watershed. Loading from cropland is less than one percent of the pollutant load in the watershed.

Pastureland

Pasture lands represent a small percentage of the land use (slightly over 3%) but contribute a significant amount of loading relative to its area. Pastured animals with access to the riparian areas and streams

increase both TSS and nutrient loading to the stream. Estimated pollutant yield from pastureland is illustrated in Figure 6.

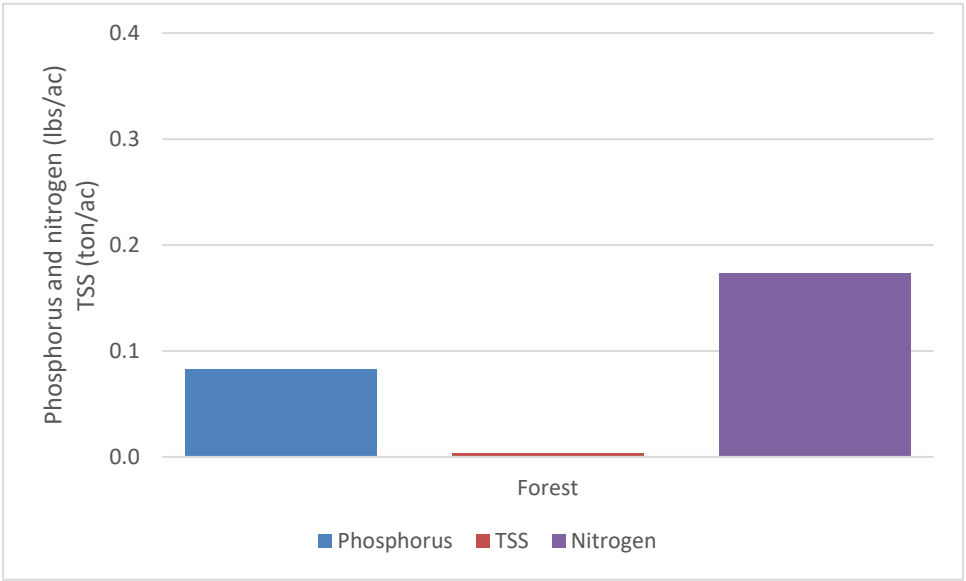
Figure 6. Estimated pollutant yield from pastureland use calculated using PLET



Forested

Forested lands make up approximately 94% of the Devil Track Watershed. The forested lands contribute higher amounts of pollutants; however, it is far less relative to its area (Figure 7). Mature forests are low contributors of nutrient and sediment loading to the watershed. Younger forests and forest harvesting can increase the pollutant loads by increasing erosion. Forested lands also provide shade and temperature control to streams for fish habitat.

Figure 7. Estimated pollutant yield in forested lands (PLET)



SSTS

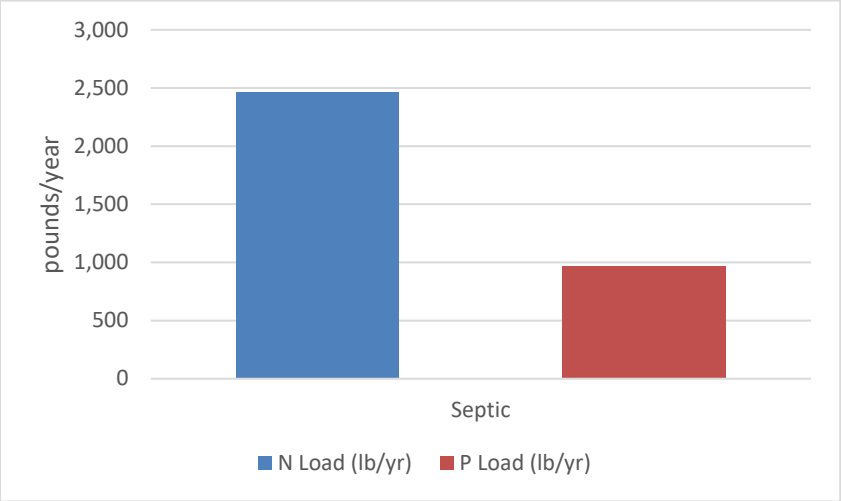
Failing or non-compliant SSTS contribute to nutrient loading in the Devil Track Watershed. Total number of SSTS in Devil Track Watershed are summarized in Table 11. In addition to SSTS, there are 87 outhouses in the Watershed. The 87 outhouses must be properly maintained or upgraded to a conforming system per Cook County septic ordinances.

Table 11. Estimated numbers of SSTS in Devil Track Watershed (PLET)

Watershed	# SSTS	Outhouses
040101010502 - Junco Creek	6	2
040101010503 - Elbow Creek	7	4
040101010504 - Devil Track River	383	79

It is estimated that there are approximately 20 SSTS that need to be upgraded or replaced. The estimated pollutant loads from SSTS are illustrated in Figure 8.

Figure 8. Nitrogen and phosphorus contributions from failing and/or noncompliant SSTS (PLET)



Streambank

Streambank erosion is a significant source of sediment loading (Table 12), contributing about 111 t/yr of sediment to the system (PLET). Additionally, streambank and channel erosion also contribute about 178 lbs/yr and 69 lbs/yr of nitrogen and phosphorus.

The *Lake Superior North Stressor Identification (SID) Report* (2019) identifies channel and bank instability as a stressor to physical habitat (Table 14). A *Bank Assessment for Non-point source Consequences of Sediment (BANCS)*, developed by Rosgen (2006), was conducted to determine the most imperiled reaches. The study is fully described in the SID but estimates that a 2.4-mile reach contributes most of the sediment to the system (MPCA, 2019). Figure 9 describes the estimated erosion rates and percent total sediment load.

Table 12. Estimated nutrient and sediment loading from streambank erosion

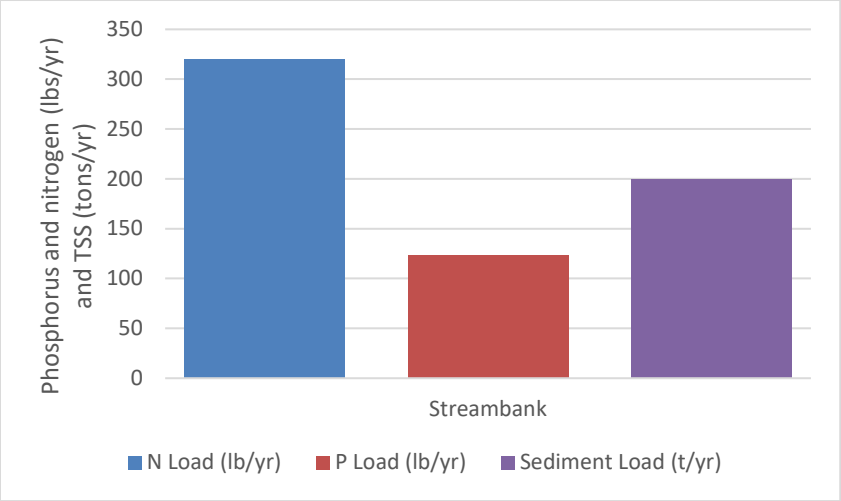
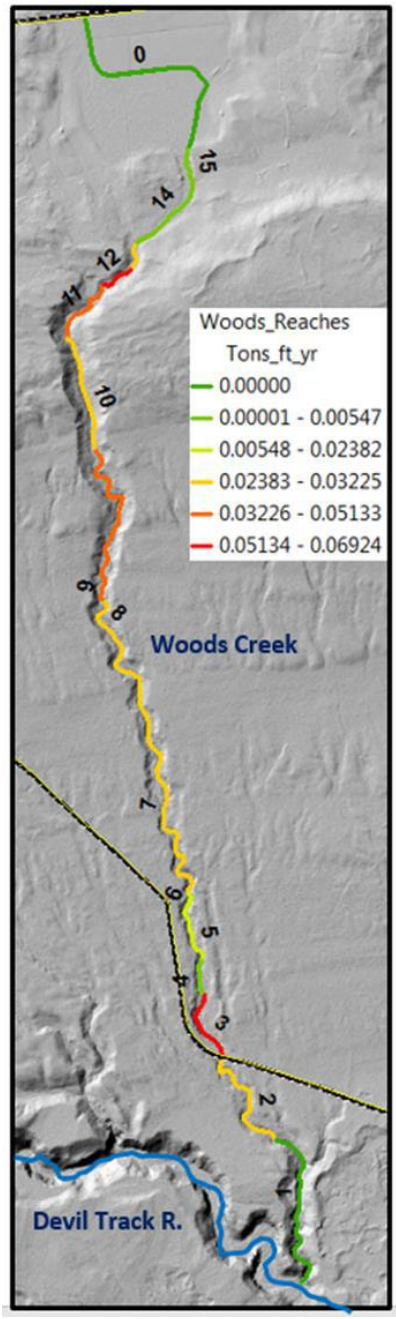
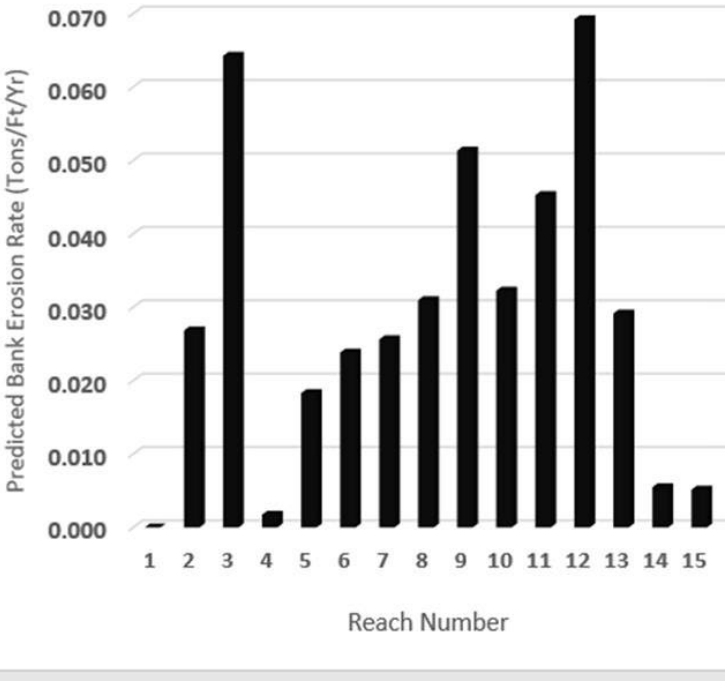


Figure 9. Predicted bank erosion rates in Woods Creek (MPCA, 2019, p. 73, Figure 49)



Reach	Total Tons	Reach Length	Tons/Ft/Yr.	% of Total
1	0*	1613′	0.000*	0.0%*
2	30	1126′	0.027	8.4%
3	43	664′	0.064	11.9%
4	0	251′	0.002	0.1%
5	10	561′	0.018	2.9%
6	3	109′	0.024	0.7%
7	51	1974′	0.026	14.1%
8	38	1240′	0.031	10.7%
9	91	1782′	0.051	25.5%
10	31	972′	0.032	8.7%
11	31	678′	0.045	8.6%
12	15	210′	0.069	4.1%
13	10	338′	0.029	2.7%
14	4	747′	0.005	1.1%
15	2	308′	0.005	0.4%
TOTAL	***359***	***12572***	***0.029***	***100.0%***



There are 10 streambank reaches on the Little Devil Track River that are high sediment contributors. The PLET model estimated the load contributions in Table 13.

Table 13. Estimated Little Devil Track River streambank load contribution (PLET, 2023)

Reach	Length ft	Height ft	Lateral recession	Rate	Annual TSS load t/yr	Load reduction TSS t/yr
LDT 1	75	10	Severe	0.4	12	11.4
LDT 2	75	10	Severe	0.4	12	11.4
LDT 3	75	10	Severe	0.4	12	11.4
LDT 4	75	10	Severe	0.4	12	11.4
LDT 5	75	10	Severe	0.4	12	11.4
LDT 6	75	8	Moderate	0.24	5.76	5.472
LDT 7	75	8	Moderate	0.24	5.76	5.472
LDT 8	75	8	Moderate	0.24	5.76	5.472
LDT 9	75	8	Moderate	0.24	5.76	5.472
LDT 10	75	8	Moderate	0.24	5.76	5.472

Stressors

The stressor identification study completed for Woods Creek identified stressors to aquatic life along with areas of high-quality conditions for aquatic life. The stressors are summarized in Table 14.

Table 14. Summary of primary stressors to aquatic life in the Woods Creek Watershed (MPCA, 2018)

Stressor/threat	Summary
Physical habitat degradation	Symptoms of stream channel instability (bank erosion, channel widening, and substrate embeddedness) are reducing habitat quality in several reaches of Woods Creek (e.g Reach 3). These areas support fewer wild Brook Trout than more stable reaches (e.g. Reach 8) Much of the channel instability and habitat loss in Woods Creek can be attributed to a major flood event that occurred in the watershed in the summer of 2008. Approximately 0.5 miles of Woods Creek has been channelized downstream of CR 60 to drain riparian wetlands. Habitat conditions were not assessed within this reach but were rated as poor based on channel instability and habitat loss associated with most channelized streams. DNR reported that silt has accumulated in the channel in the low-gradient reach below RM 2.4 (below Cook County Road 60). The main flow of Woods Creek has forced into to a drainage ditch developed by the landowner. Cattle have been allowed to cross the stream just below mile 2.4 resulting in additional bank erosion and channel widening.
Aquatic organism passage barriers	Natural barriers to fish migration, such as bedrock and boulder waterfalls and beaver dams, were observed throughout Woods Creek. These limit the ability of fish and other aquatic organisms to move freely under many flow conditions. The concrete road culvert at the CR 58 crossing is undersized, lacks natural substrate on the bottom of the culvert, and has an outlet drop (perched). Biological data provide evidence that a very limited number of adult Steelhead Rainbow Trout have successfully passed through this culvert in recent years during high streamflow events in the spring. However, the improper design and installation of this culvert likely impedes passage of most trout and non-game species, especially at younger life stages.
Flashiness, stream power, and altered hydrology	A2 and A3 stream types (Rosgen, 1996) are common in the Woods Creek watershed. These stream types generate high stream power due to steep slopes and highly entrenched valleys. Large quantities of sediment have been transported and deposited along Woods Creek due to flood events in the past 10 years. Downstream of CR 60, the main channel of Woods Creek is ditched for approximately 0.5 miles. This ditched channel along with the deforested land in this area increases the hydrological “flashiness” (i.e., high frequency, short duration runoff events) and likely contributes to erosion of streambanks and streambed in reaches that are more prone to downcutting or widening (e.g., those lacking floodplain connectivity or bedrock- reinforced banks and bed) Aerial photos of the watershed show a series of private dams on Woods Creek near the intersection of CR 58 and CR 60. These impoundments may alter streamflow, increase water temperatures, and affect channel stability and habitat types. Numerous beaver dams are also present in this reach.

Potential contamination of groundwater is a concern both as a source of drinking water for individual households and businesses and as a source of pollutants to surface waters from shallow subsurface flows. The Minnesota Geological Survey and Minnesota Department of Natural Resources is developing a geological atlas for Cook County that will provide important information to land users and planners for the protection of the natural resources in the watershed. Legacy and current sand and gravel mining activities are of specific interest for water and pollutant loads from both surface and lateral subsurface flows coming from the mines. The SWCD will also survey landowners about the source of their drinking water and use to identify potential drinking water quality concerns in the watershed.

Element b. Estimated 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 implementation activities described in Table 8 will meet the protection goal of the 298 lbs/yr TP reduction. Table 8 summarizes the total number of practices and the reductions needed to achieve the protection goal for this watershed. This section provides an estimate of reductions by practice, based on an average size, for future implementation decisions. Additional practices for each of the land uses are included in this section, with associated estimated reductions. Those practices are not included in Table 15, but may be implemented. If implemented, those practices will exceed the protection goals of the watershed partners and provide additional loading reductions.

Total reductions

Total reductions for the implementation and activities described in Table 8 exceed the reduction goal to protect the Devil Track Watershed. The reductions are summarized in Table 15.

Table 15. Total estimated reductions for the practices planned in the Devil Track Watershed (PLET)

Watershed	N reduction (lbs/yr)	P reduction (lbs/yr)	Sediment reduction (tons/yr)
040101010502 - Junco Creek	409.11	77.82	4.82
040101010503 - Elbow Creek	581.18	82.37	6.63
040101010504 - Devil Track River	1729.6	345.45	220.97
TOTAL	**2719.89**	**505.64**	**232.42**

Developed areas BMP reductions

The practices for developed areas described in Table 8 were calculated using the PLET model BMP calculator. The reductions associated with the specific practices described in the table are summarized in Table 16. The suite of practice reductions (Table 17) are not included in the combined reductions.

Table 16. Combined developed area BMP reductions (PLET)

	TN reduction lbs/yr	P reduction lbs/yr	TSS reduction t/yr
040101010502 - Junco Creek	41.34	5.49	1.01
040101010503 - Elbow Creek	116.07	15.56	2.85
040101010504 - Devil Track River	241.53	31.08	5.88
Total reductions	**398.94**	**52.13**	**9.74**

Best management practices in developed areas may also be selected from multiple options described below. The practices and the estimated reductions per practice are summarized in Table 17. Implementation of these practices will be continued as funding, staff, and landowner willingness is present. These reductions are not included in Table 15.

Table 17. Suite of developed area practices and associated reductions for an average practice (PLET, 2022)

Practices	N (lbs/yr)	TP (lbs/yr)	TSS (t/yr)
Install rain gardens in low areas where stormwater is already collecting	0.8	0.16	0.02
Reduce impervious surfaces	26.62	2.66	0.5
Maintain stormwater on the property by installing a rain barrel or rain garden	0.8	0.16	0.02
Maintain forested area and natural vegetation away from landscape	--	--	--
Install biofiltration basin and biofiltration basins	2.54	0.48	0
Ensure natural stormwater flow paths are well vegetated with native species	1.06	0.22	0.04
Install conveyance best management practices to include grass or vegetated swales or other methods of flow diversion	0.27	0.12	0.04

Shoreline and riparian BMP reductions

Best management practices in shoreline and riparian may also be selected from multiple options described below. The practices and the estimated reductions per practice are summarized in Table 18. Implementation of these practices will be continued as funding, staff, and landowner willingness is present. Reductions from the suite of shoreline and riparian BMPS are not included in Table 15.

Table 18. Suite of shoreline and riparian BMPs with estimated reductions for an average practice (PLET, 2022)

Practice	N (lbs/yr)	TP (lbs/yr)	TSS (t/yr)
Lake Shoreline Area - 200 ft of buffer/per lake	79.4	27.2	3.1
Riparian Area - 400 ft of buffer area/stream	80.7	38.9	1.8
Native plants should be planted. Observe what is already in the area and mimic the plants in the area.	4.9	0.5	0.1
Plant trees	27	8.3	0.06
Install new plants and seeding to ensure biodiversity and increase native plants	4.9	0.5	0.1
Maintain stormwater on the property by installing a rain barrel or rain garden	0.8	0.2	0.02

Practice	N (lbs/yr)	TP (lbs/yr)	TSS (t/yr)
Install rain gutters and direct water to area away from surface water and direct water to area to minimize erosion	0.8	0.2	0.02
Ensure natural stormwater flow paths are well vegetated with native species	4.9	0.5	0.1
Maintain forested area and natural vegetation away from landscape	4.9	0.5	0.1
Use of coir logs and natural vegetation and methods to slow or stop erosion	80.7	38.9	8

Forestry BMP reductions

The forestry practices described in Table 8 were calculated using the PLET model BMP calculator. The reductions associated with the specific practices described in the table are summarized in Table 19.

Table 19. Combined forestry BMP reductions (PLET, 2022).

	TN reduction lbs/yr	P reduction lbs/yr	TSS reduction t/yr
040101010502 - Junco Creek	14.78	42.72	1.42
040101010503 - Elbow Creek	13.47	36.66	1.24
040101010504 - Devil Track River	37.5	37.5	1.28
Total reductions	**65.75**	**116.88**	**3.94**

Best management practices in forested lands may also be selected from multiple options described below. The practices and the estimated reductions per practice are summarized in Table 20. Implementation of these practices will be continued as funding, staff, and landowner willingness is present. The reductions from the suite of forestry practices are not included in Table 15.

Table 20. Suite of forestry practices and associate reductions (PLET, 2022)

	Reductions		
Practice	N (lbs/yr)	TP (lbs/yr)	TSS (t/yr)
Reforestation using native species and species adapted for climate resiliency following logging practices	35.24	9.92	1.18
Ensure buffers in place for riparian areas prior to logging practices and other stormwater practices necessary are in place	80.70	38.91	1.77
Manage forest pests and revegetate following pest control and removal practices as necessary	27.01	8.25	0.06
Forestry management plans	3.03	29.23	0.95
Control terrestrial invasive species through species specific targeted methods - pulling or spraying or cutting and removing infected trees	14.82	6.5	0.31
Ensure boot cleaners are updated at trail heads for terrestrial invasive species seeds	--	--	--
Education and outreach to landowners and loggers on practices to benefit water quality	--	--	--
Offer tree sales, support methods for landowners to plant trees	--	--	--

Practice	Reductions		
	N (lbs/yr)	TP (lbs/yr)	TSS (t/yr)
Management of understory (invasive species (e.g., buckthorn) management, shade)	14.82	6.5	0.31

Pasture BMP reductions

The pasture practices described in Table 8 were calculated using the PLET model BMP calculator. The reductions associated with the specific practices described in the table are summarized in Table 21.

Table 21. Combined pasture BMP reductions (PLET, 2022)

Watershed	TN reduction lbs/yr	P reduction lbs/yr	TSS reduction t/yr
040101010502 - Junco Creek	352.98	29.61	2.39
040101010503 - Elbow Creek	514.53	39.12	4.21
040101010504 - Devil Track River	513.19	39.121	4.21
Total reductions	**1380.7**	**107.851**	**10.81**

Best management practices in pastureland may also be selected from multiple options described below. The practices and the estimated reductions per practice are summarized in Table 22. Implementation of these practices will be continued as funding, staff, and landowner willingness is present. The reductions from the suite of forestry practices are not included in Table 15.

Table 22. Suite of pasture practices and associate reductions (PLET, 2022)

Practice	N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
Cattle exclusion from streams and lakes	134.61	11.35	1.26
Alternative water sources	24.16	1.89	0.31
Rotational grazing	74.86	3.43	0
Manure management	26.81	5.88	0
Prescribed Grazing	72.82	3.65	0.56
Forage & Hay Planting (n pasture)	31.51	1.96	0
Heavy Use Exclusion	33.65	3.12	0.56
Critical Area Planting	32.73	3.48	0.71

Streambank restoration reductions

Streambank restoration reductions are summarized in Table 23. The table is organized from the most critical loading streambank to the least. These streambank restoration activities are included in the overall reduction estimates for the Devil Track Watershed (Table 15).

Table 23. Critical loading streambank restoration ranked by highest loading banks (BANCS and PLET)

Rank	Reach descriptions					Reductions		
	Reach	BEHI	Height	Length	Total TSS load (t/yr)	N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
1	3	High	12	86.4	18.95	28.75	11.07	17.97

Rank	Reach descriptions					Reductions		
	Reach	BEHI	Height	Length	Total TSS load (t/yr)	N (lbs/yr)	P (lbs/yr)	TSS (t/yr)
2	11	High	10	83.5	15.26	23.15	8.91	14.47
3	9	High	10	75.7	13.85	20.9	8.04	13.06
4	3	Moderate	7.5	123	11.34	16.83	6.48	10.52
5	2	Moderate	3.5	436.5	11.24	18.05	6.95	11.28
6	7	High	8	73.7	10.8	16.21	6.24	10.13
7	9	High	7	80.9	10.3	15.71	6.05	9.82
8	2	High	5	103.3	9.4	14.17	5.46	8.86
9	9	Moderate	12	38.9	9.4	14.19	5.46	8.87
10	9	Moderate	5	196.8	7.2	10.89	4.19	6.81

Additional streambank restoration in Woods Creek is included in Table 8 with reductions summarized in Table 24. Landowner names are known to the SWCD; however, due to privacy are omitted from this plan. These reductions are included in Table 15.

Table 24. Reductions from streambank restoration in Woods Creek Watershed (PLET, 2022).

Banks	Reductions		
	N (lbs/yr)	TP (lbs/yr)	TSS (t/yr)
Stabilize one bank in the lower watershed north of Lindskog Road to reduce sediment entering the creek, minimize natural sedimentation distribution, reduce impacts to water temperatures and fish habitats (per 100 ft of restoration)	17.17	5.46	8.86
Restore 1600 LF of stream through [Unnamed] farmstead including channel and floodplain shaping, restore streambed substrate, riparian buffer incl. planting with conifers for stream shading. Incentive this work by improving the operation of the farmstead (i.e., soil productivity testing, improve existing land that is under performing for its hay/pasture potential, low-water fjord)	274.72	87.36	141.76

Streambank restorations in the Little Devil Track River reductions are calculated using PLET and are summarized in Table 25.

Table 25. Estimated streambank restorations in the Little Devil Track River (PLET, 2023)

Little Devil Track reach	TN reduction lbs/yr	P reduction lbs/yr	TSS reduction t/yr
LDT 1	18	7	11
LDT 2	18	7	11
LDT 3	18	7	11
LDT 4	18	7	11
LDT 5	18	7	11
LDT 6	9	3	5
LDT 7	9	3	5
LDT 8	9	3	5

Little Devil Track reach	TN reduction lbs/yr	P reduction lbs/yr	TSS reduction t/yr
LDT 9	9	3	5
LDT 10	9	3	5
Total reductions	**135**	**52**	**84**

SSTS reductions

The nutrient reductions for the replacement of 20 failing SSTS and addressing 87 outhouses are summarized in Table 26. These reductions are included in Table 15.

Table 26. Pollutant reductions due to the upgrade/replacement of SSTS

	N reduction (lbs/yr)	P reduction (lbs/yr)
20 SSTS/87 outhouses replaced	2,462.19	964.36

Element c. Best management practices

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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A variety of best management practices (BMPs) and nonpoint source management activities will be used to protect the waterbodies in the Devil Track River from pollutant, stream channel, and aquatic habitat degradation and achieve the water quality goals for the resources. The BMPs and management activities are described in the implementation strategies section (Table 8). Many of the BMPs and management activities are derived from the Lake Superior North WRAPS report.

In addition to the BMPS and nonpoint source management activities described in this NKE plan, the Cook County comprehensive land use plan and comprehensive water management plan along with stormwater, zoning, septic, and subdivision ordinances provide local authorities for protecting the natural resources in the Devil Track River watershed. The county also manages the Minnesota Wetland Conservation Act that provides protections for wetlands in the watershed.

Developed area restoration

An emphasis will be placed on maintaining the natural land cover in the watershed. Development pressures along the shorelines of the lakes and streams in the watershed are particularly of concern. Runoff and erosion from roads are also important given the relatively small footprint of human activities in the watershed. Repairing erosion features near road ditches, gullies, and ravines will be completed with the specific activities listed in Table 8. In some areas, the suite of practices described in Table 18 will be implemented where appropriate and landowners agree.

The SWCD will assist the Devil Track Lake association in updating their lake management plan to aid in the implementation of lakeshore BMPs along the lake. Lake management plans for Kemo, Binagami, and Elbow Lakes will be developed in the future.

Four boat launches will be improved in Devil Track Lake to decrease stormwater runoff and loading to the lake.

Forestry BMPs

Protecting and enhancing the upstream forest habitat by implementing vegetative buffers, stormwater management and restoration, and protection of forest and lakeshore lands. Implementation of these types of diverse activities and pest management leads to improving forest health and resilience. Forest health is the most critical aspect of these management activities. Proper management involves bringing the forest back onto balance of diversity, stand improvement, and other practices.

Protection of these lands will be through private forest management including the Sustainable Forest Incentive Act (SFIA), forestry plans, and conservation easements. The forestry management plans will include riparian management, erosion controls, protection of existing forests, stream crossing management, and other water quality improving BMPs. Forestry BMPs improve water quality in multiple ways including slowing rain runoff, filtration of water, increasing plant and tree diversity, and reducing sediment and nutrient loading.

Streambank restorations

The implementation activities for Woods Creek will include a number of activities in the implementation table. They will focus on three areas of the stream. The first is a culvert replacement at the downstream road crossing of the stream. The second is a suite of activities at the second road crossing of the stream including stream re-alignment and re-meandering, buffer establishment, and stable cattle and farm equipment crossings. The third is the area upstream of the second road crossing that will include additional investigations to evaluate the effects of private impoundments on water temperature, streamflow, and physical habitat conditions and the presence of brook trout in this portion of the stream and adjoining tributary.

Protection activities in the Woods Creek watershed include maintaining the forest in the watershed, planting trees in open areas, channel restoration in the stream's headwaters and culvert and streambank erosion control in the lower reaches of the stream.

Approximately 33% of the total predicted annual bank erosion is generated by 10 individual streambanks or unstable bluffs (Figure 50). The majority of these features are valley wall slumps with high erosion potential, bank heights of over 7 feet, and lengths of 40 feet or longer. In addition to erosion caused by stream processes, several large bluffs are eroding due to freeze-thaw cycles and groundwater bank seeps. (Lake Superior North SID, 2018, p. 72).

Little Devil Track River has 10 streambanks identified for streambank restoration.

Critical areas

Critical areas for management activities for the lakes include the relatively small footprint of lakeshore development where septic systems need upgrades and shoreline areas are eroding or are mowed to the water's edge. Critical areas for management activities for the streams include eroding riparian areas and water pathways from pasture, dog mushing kennels, gravel pits, and roads. Riparian bluffs with private landowner buildings within 500 feet of the bluff are critical for infrastructure protection. Maintenance of

the forest throughout the watershed is also critical to protecting the water quality of the lakes and streams.

Efforts to protect and preserve high quality habitats and ecological function are equally as important as restoration goals in this watershed. Several high-quality and/or ecologically significant areas within the Woods Creek Watershed are listed in Table 27.

Table 27. Priority protection areas in the Woods Creek watershed

Location	Description
Woods Creek Headwaters	Upstream of CR 60 (TWP 62 RNG 1 SEC 35 & 36)
Unnamed Tributary (Unnamed Creek S-67-1-1)	Major tributary entering Woods Creek at RM 2.71
Lower Woods Creek to Confluence with Devil Track River	Focus on CR 58, including the impassable road culvert and bank erosion areas near and downstream of this crossing

Another area of interest in the Devil Track watershed is Little Devil Track River. Most of the Little Devil Track's private parcels remain relatively undeveloped, but due to its proximity to Grand Marais, this area may experience increased development in the near future. Protection strategies may require collaboration with individual landowners to ensure that ongoing development does not degrade habitat and water quality in the Little Devil Track River. Opportunities for improvement include stabilization of at least one eroding streambank that was noted in the course of biomonitoring surveys; this location corresponds with a power line clearing a short distance upstream of the Gunflint Trail. Please also note, the Little Devil Track River drains the outskirts of the watershed's largest developed area (Grand Marais), and the river's lower reaches are completely surrounded by private land. Poor land use practices in developing areas may contribute to water quality degradation and should be an ongoing concern in this watershed.

Element d. Expected 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.

It is expected that the full implementation of this plan will be approximately $9 million.

The Cook County SWCD will coordinate and collaborate with individual landowners, agencies, and organizations through their programs to incentivize the protection, restoration, and management of the waterbodies in the Devil Track River watershed. The activities and BMPs will be implemented through the programs of the SWCD. Efforts within these programs are accomplished through SWCD provision of technical assistance and cost-share programs to landowners and enhanced by state and federal programs that offer similar incentives.

The Technical Assistance program provides for SWCD staff to assist landowners by performing site visits to address stormwater issues, erosion control issues, vegetation management and other conservation concerns. They also advise on restoration of damaged areas and recommend specific best management

practices (BMPs) to manage stormwater and prevent erosion and soil loss. Additional activities completed through this program include:

a. Provide assistance for public demonstration projects that prevent erosion and protect water quality.
b. Provide technical and educational assistance to private and public entities to protect groundwater and surface water quality.
c. Encourage and support water conservation through implementation of watershed-wide water conservation strategies.
d. Encourage forest management practices in privately held upland forests.
e. Participate in the North Shore Forest Collaborative.
f. Support efforts to renew and implement adaptive forestry management practices that respond to climate change.
g. Conduct site assessments and maintain an inventory of public and private projects in need of funding and coordinate survey and design activities with the SWCD Technical Service Area III.
h. Give presentations and interactive education to schools and community groups on SWCD priority topics.
i. Coordinate Rain Gauge and Snow Rules programs with community volunteers.
j. Communicate with other agencies to discuss available district programs and services.
k. Secure funding for and participate in the local and regional Envirothon program.
l. Coordinate the County Tree Sale.
m. Review and comment on County requests for variances, conditional use permit applications, shoreline plantings, seed mixes, gutter systems and other conservation related issues.
n. Review DNR water permits and provide input to minimize impacts to land and water resources.
o. Provide technical assistance, conservation education, and policy recommendations to local governments.
p. Assist landowners with developing restoration plans related to enforcement activities.
q. Assist other agencies with stormwater and erosion and sediment control policy development and training when appropriate.
r. Participate in the Minnesota Association of Soil and Water Conservation Districts policy activities including the Annual Meeting, Area 3 Resolutions, and Legislative Days.
s. Serve on the Laurentian Resource Conservation & Development (RC&D).
t. Serve on the MN Association of SWCDs - Forestry Committee.
u. Participate in Cook County Coalition of Lake Associations, and other concerned groups, meetings when appropriate.
v. Assist counties in distributing septic system and property owner's resource guides.
w. Explore opportunities for wetland restoration and creation in Cook County.
x. Assist the City of Grand Marais with stormwater issues and other conservation needs.
y. Work with the Cook County Highway Department on stream crossings, barriers, and other issues where the SWCD can support efforts to benefit soil and water quality.

z. Serve, support, and collaborate state and federal partners in conservation projects.

The SWCD will coordinate with other programs including the Minnesota Lake Superior Coastal Program, Great Lakes Restoration Initiative, and the Lake Superior Lakewide Management Plan (LaMP), Minnesota Sea Grant, Natural Resources Research Institute.

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.

Education and outreach activities for this NKE plan are framed by the activities described in the Cook County Comprehensive Water Plan and the Lake Superior North One Watershed, One Plan for Cook County and the Lake Superior North HUC8 watershed, respectively. Specific activities for the Devil Track River watershed are listed in the strategies implementation table (Table 8).

NKE education and outreach activities will target lakeshore landowners, river riparian area landowners, and upland landowners. The lake associations for the lakes in the watershed are important partners in these efforts given their vested interest in maintaining the water quality of their lakes. Volunteers that monitor precipitation, lakes, and streams are also key partners. There is one homeowner's association in the Devil Track River watershed. The Cook SWCD supports the associations by providing technical and informational support, monitoring assistance, help with lake management plan development, and resources to use for outreach and growing the community of association members. Beyond the association, education, outreach, and information sharing take place during annual workshops, through newspaper articles and inserts, radio interviews, presentations at schools, coordination of field day events, and take-home outreach resources.

The education and outreach activities will encourage community members to participate in conservation projects by attending public meetings and events, coordinating community activities around conservation projects including water quality and AIS monitoring, establishing community leadership roles, and establishing communication tools to allow both agencies and citizens to participate in watershed conservation issues.

Element f. Reasonably expeditious schedule

A schedule for implementing the activities and NPS management measures identified in this plan that is reasonably expeditious.

Timelines for proposed implementation are shown Table 8.

Implementation activities described in Table 8 will yield estimated reductions greater than estimated reductions needed to reach water quality standards within 10 years.

Element g. Milestones

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

The milestones column in Table 8 provide interim, measurable milestones for determining successful implementation of practices.

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.

The entries in the assessment column of Table 8 provide the measures that will be used to determine the degree that various practices have been implemented in the watershed.

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.

Physical, chemical, and biological monitoring is a critical component of an adaptive management approach.

Water quality monitoring will be conducted on five lakes in the Devil Track watershed to document that good water quality of the lakes is maintained or increased. Lake monitoring will include the parameters related to lake eutrophication. The lakes and water quality parameters are listed in Table 28. Water

sampling will be done every year to ensure a complete data set in which to evaluate average conditions along variations between and within years. The lakes will be sampled one time a month from May through September of each year.

Table 28. Lakes and water quality parameters to be monitored

Lake	Parameter
Devil Track	Total phosphorus
Kemo	Chlorophyll-*a*
Elbow	Transparency (Secchi depth)
Binigami	Depth profile of temperature, pH, dissolved oxygen, and conductivity
Pine	

Water quality monitoring will be conducted on five streams in the Devil Track watershed to document that good water quality of the lakes is maintained or increased. Stream monitoring will include parameters associated with nutrient and sediment loading. The streams and water quality parameters are listed in Table 29. Water sampling will be done every year to ensure a complete data set in which to evaluate changes over time accounting for the variability associated with weather conditions from year to year. Water samples will be collected during base and storm event flows with a target of collecting 15 samples per year from April through September of each year.

Table 29. Streams and water quality parameters to be monitored

River/stream	Parameter
Devil Track	Total phosphorus
Little Devil Track	Total suspended solids
Woods Creek	Transparency (Secchi transparency)
Junco Creek	Flow
Tributary TBD	Field measurements of temperature, pH, dissolved oxygen, and conductivity
	E. coli at beaches

Streamflow will be measured at two sites by establishing gaging sites that measure stream stage that are combined with a depth-discharge rating curve from a range of flow measurements. A site near the mouth of the Devil Track River will serve as the long-term base site while the second site may be rotated to provide shorter-term load calculations and flow characterizations to measure load reductions and changes in flow associated with the protection management activities.

Biological monitoring will be completed once a year for macroinvertebrates and fish in the five streams listed in Table 29 in conjunction with the MPCA and DNR. Monitoring will include determining if wild brook trout still inhabit Woods Creek and a major tributary upstream of County Road 60.

Physical monitoring of the streams will be conducted to document improvements in streambank condition and stability through the application of the Bank Assessment for Non-point source Consequences of Sediment (BANCS). Streambank erosion will be estimated using two tools within BANCS, the Bank Erosion Hazard Index (BEHI) and Near-Bank Stress (NBS), and associated measurements of individual streambanks and channel patterns. The methods are described in *Assessment of River Stability and Sediment Supply (WARSSS)* (Rosgen, 2006). Additional monitoring and analyses will be conducted using the Brook Trout Suitability Assessment, Pfankuch Stability Index, and stream connectivity measurements as described in the Lake Superior North Stressor Identification

Report (MPCA, 2018). This monitoring will be completed after streambanks restoration projects have had time to stabilize.

Continuous stream water temperature monitoring will be conducted at various locations in the streams to make sure cold water temperatures are protected or to measure improvements following management activities.

Citizen monitoring of the lakes and streams will be expanded in the watershed. Citizen monitoring measures transparency of the water via a Secchi disc for lakes and a Secchi tube for streams.

Culvert conditions will be observed using the culvert inventory in Cook County to better understand infrastructure and conditions that may impede or restrict flow and biological connectivity, or conversely serve as grade control structures in streams that may benefit stream stability.

As implementation activities are conducted in the watershed, an evaluation of the before and after conditions can be useful to aid in future project planning. In addition to flow and water quality monitoring, a broader assessment of ecological function and restoration could be used to assess various components of the stream system and overall effectiveness of the implementation activity.

Certain toxins and pollutants can interfere with aquatic recreation uses and impact human and animal health. These include outbreaks of harmful algal blooms (e.g., blue-green algae, other toxic algal blooms) and bacteria contamination. Monitoring for these incidents will help ensure the safety of recreators (Table 30).

Table 30. Samples June-September

Type	***E. coli***	**Algae**
Lakes	Weekly	As necessary
Streams	Weekly	As necessary
Beaches	Weekly	As necessary
Resorts/campgrounds	Weekly	As necessary

The overall cost for the monitoring to evaluate the effectiveness of the activities in this plan to protect the water quality of the Devil's Track River watershed is $30,000 per year.

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