

Table 14a. Watershed-wide strategies and actions proposed for the entire Lake Superior–North watershed. *Italicized comments reference the supporting goal or action from the Lake Superior North One Watershed One Plan document.*

The Waterbody and Location			Water Quality			Strategies	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.							Governmental Units with Primary Responsibility							Estimate d Year to Achieve Water Quality Target
HUC10 Subwatershed	Water body (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service		
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units										
All	All	Lake and Cook Counties	Parameters cited in permit			Construction and Industrial Stormwater permittees—compliance with general permits										X					Ongoing
			Varies	Varies, see Figure 23 and Figure 24 for IBI scores and Table 3 for lake water quality	Varies (see Appendix A for % reductions for TMDLs) Meet or exceed IBI standards in all streams Lakes with downward trends should seek to improve. See HUC 10 tables by subwatersh ed for more information.	Nutrient management/ address subsurface septic systems See Figure 13 for population density	Inventory and assess the potential for septic systems/private wastewater systems to be sources of <i>E. coli</i> and nutrients. Create and maintain a database of SSTS (i.e., owner, age, installer, size, location, construction technique, maintenance records, etc.). Replace all systems deemed imminent threat to public health (e.g., straight pipes, surface seepage). Support increased compliance inspections (in addition to current point of sale inspections). Identify and employ tools for SSTS management which may include deeper setbacks, alternative designs to better manage phosphorus, defining high risk or sensitive SSTS areas, best management for maintenance of systems meeting compliance. Landowner focused education and outreach on septic system maintenance and compliance. Incorporate septic inventory and management information into local lake management plans. Additional setbacks in sensitive areas. In higher density lakeshore areas, Identify opportunities for cluster systems and work with landowners to implement <i>Applicable 1W1P Goals: Create/maintain GIS database.</i> <i>Provide financial assistance for SSTS upgrades.</i> <i>Implement and enforce county SSTS ordinances.</i>	Several lakes inventoried and SSTS updated	Complete inventory of STTS in watersheds with population densities >1 person per square mile and upgrade all systems deemed imminent threat to public health Develop a lake-specific SSTS component for homeowners guide and distribute Identify opportunities to install cluster systems New management tools investigated	100% compliance of SSTS in the watershed Guidebooks/ workshops provided on regular schedule Lake management plans updated	# of septic systems # guidebooks or workshops # of plans	X	X	X	X					2030	

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HUC10 Subwatershed	Water body (ID)	Location and Upstream Influence Counties	Parameter (incl. non- pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR		Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units										
						Fisheries management (streams) See Figure 24 and 25	Improve riparian buffers to provide shade and remain consistent with current buffer requirements (Shoreland Management Act, MN Buffer Law). Protect high quality tributaries that contribute baseflow and spawning habitat, particularly exceptional use streams and cold water streams. Advocate for a healthy fishery with emphasis on key species in specific locations. Implement activities to improve biological diversity and abundance (e.g., habitat restoration, barrier removal, etc.). Evaluate introduced smelt impacts. Applicable 1W1P Goals: Maintain high quality and diverse fishery. Evaluate impacts of beaver and beaver dams on cold water fisheries (water storage, flashiness, bank susceptibility, temperature). Maintain or enhance current brook trout populations. Identify and preserve sites that have high species diversity and/or critical habitat for fish or wildlife. Evaluate implications of single species management. Identify minimum standards of water levels required for in-stream biological uses.		Buffers for all stream reaches consistent with or better than Buffer Law and Shoreland Management Act	Maintain flows and water levels that emulate natural conditions in all streams	% of flows and water levels		X				X		X	X	Ongoing
						Increase stream connectivity See Figure 15	Identify/prioritize the rehabilitation of problematic road or trail and stream intersections. Upgrade and replace culverts identified as barriers to fish passage. Complete updated culvert inventory in Cook County and prioritize culvert replacements/upgrades to address connectivity and fish passage. Take into consideration natural barriers to fish movement such as barrier falls. Properly size and place bridges and culverts for flow, stream stability, and fish passage. Coordinate with transportation departments to ensure bridge or culvert replacements are designed and constructed to eliminate fish passage and erosion problems.	Lake County culvert inventory complete	Complete inventory of culverts in Cook County Updated county culvert standards Annual meetings between DNR and county transportation departments	Replace all culverts identified as barriers to fish passage on trout streams	# of culverts	X	X	X		X				2040	

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								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
							Account for and evaluate beaver activity and dams on biotic passage. <i>Applicable 1W1P Goals:</i> <i>Develop and maintain road construction and maintenance policies that assure free-flowing riparian systems and stream-accessible floodplains that connect Lake Superior with the headwater lakes, streams and wetlands. All stream and wetland crossings will follow the principles of MESBOAC.</i> <i>Update county and SWCD culvert standard to accommodate fish passage and larger storm events.</i>													
						Streambank stabilization and riparian management	Conduct geomorphic analysis of streams to determine high sediment loading locations, failing banks, eroding bluffs and ravines, and priority restoration areas as needed in areas with potential bluff erosion or red clay (see Figure 19 and Figure 20). Mitigate peak flows. Restore natural meander and complexity and address channel incision (e.g., grade control using MESBOAC when possible. Address stream crossings (ATV, forest roads, forest activities, etc.) that are contributing to channel instability or erosion. Address erosion in near-shore areas (bank armoring, bioengineering, etc.). Define riparian management zones and enforce regulations on soil disturbance and tree harvesting. Account for and evaluate beaver activity and dams on flow. Preserve the natural vegetation along stream corridors. Minnesota's buffer initiative requires establishment of up to 50 feet of perennial vegetation along many rivers, streams, and ditches. The Shoreland Management Act contains provisions to protect native vegetation.		Buffers as required by or better than Buffer Law Defined riparian management zones Field verify and measure bluff and bank erosion along 6 streams.	Riparian buffers on all mainstream and tributary streams Upgrade all stream crossings causing erosion Restore degraded stream segments	% with buffers % upgraded Linear feet restored	X	X			X		X	X	Ongoing

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HUC10 Subwatershed	Water body (ID)	Location and Upstream Influence Counties	Parameter (incl. non- pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR		Forest Service
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
						Lake management and shoreland stabilization See Figure 23 and Table 8 for wild rice, cisco and/or lake trout lakes Develop and implement strategy to protect wild rice habitat in the watershed from aquatic invasive species, development, and land management impacts Increase monitoring and determine vulnerability of trout populations in trout lakes Evaluate the condition of the shoreland buffer area and identify areas of disturbance, altered vegetation (e.g., lawns), bare soil, shoreland erosion, and connected flow pathways to roads or larger areas of disturbance in the surrounding watershed. Lakeshore revegetation and buffers. Establish ecological buffer zones around natural features. Research the potential effects of road salt (calcium chloride) on lake ecology.		Complete shoreland survey on priority lakes, including Lake Superior (see Error! Reference source not found.)	Natural buffers around majority of lakeshores	% with buffers	X	X			X		X	X	2040	
						Invasive species control See Figure 22 Implement Lake County and Cook County aquatic invasive species plans. Continue coordination and implementation of activities as part of Arrowhead Invasive Species collaboration. See Forest Management below for strategies that address loss of ash trees due to Emerald Ash Borer. Incorporate aquatic invasive species management into local lake management plans. Incorporate research findings by the Minnesota AIS Research Center into AIS plans. Research the effect of rusty crayfish on aquatic plants and increased potential for shoreland erosion. Research and identify early warning signs of infestations.	Lake & Cook County aquatic invasive species plans Arrowhead invasive species collaboration Current signage on boat landings	Implement County AIS plans	Implement County AIS plans and update as new research becomes available. Expand awareness/evaluations beyond lakes infested to tributaries which may serve as pathways.	# of activities # of trained volunteer inspectors and lakes with outreach programs	X	X			X				Ongoing	
						Land use planning and ordinances Enhanced ordinances that address: - Erosion control and stormwater management on small sites - Low impact development on new sites - Long-term site maintenance - Results of shoreland and stormwater surveys Ordinance development/ revision and workshops focused on water quality protection. Address aggregate extraction to include setback guidance, stormwater and groundwater mgmt. and other appropriate BMPs		Complete plan to address tax forfeited lands and School Trust lands into the future Complete analysis to align buffer regulations	Update all ordinances in consideration of water quality protection Improved permit and variance reviews	# of updates # of reviews	X	X	X		X			2030		

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								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
							Align and coordinate riparian buffer regulations across federal/state/ and local levels. Identify opportunities to decrease the impact of current and future development. Encourage low impact development design with new construction. Provide educational workshops for landowners to build stewarding skills. Inventory potential for tax forfeited lands or State Trust lands to provide water quality protection or improvements; retain these lands when appropriate. Conservation easements to protect riparian, wetland, and high quality upland areas. Ensure continuation and enforcement of BWCAW use restrictions. Investigate and develop additional setback guidances/rules for development along lakes and streams. Update county and SWCD culvert standard to accommodate fish passage and larger storm events. Evaluate impacts of and increase resiliency to climate change on water resources through planning and ordinance development. Guidance for private land owners on small site erosion control, vegetation management, and good housekeeping.		Complete gaps analysis to identify opportunities for additional water quality protection in current use restrictions and ordinances. One area of concern identified is aggregate extraction in watersheds of coldwater trout streams. Complete small site development guide											
						Stormwater management See Figure 14	Discourage routine ditch dredging with heavy equipment. Follow guidelines included in “Field Guide for Maintaining Rural Roadside Ditches” (U of MN 2014) (http://www.lakesuperiorstreams.org/stormwater/toolkit/contractor/resources/DitchGuide_SeaGrant.pdf). Assess the state of existing roadside ditches and identify priority locations for ditch management (e.g., re-vegetation, armoring). Identify locations that would benefit from stormwater runoff management (e.g., resorts and campground parking lots). Investigate BMP solution by various methods. Incorporate stormwater management at boat landings.	Field guide for maintaining rural roadside ditches	Develop 2 stormwater management plans for critical or high loading developed areas (e.g., golf course)	Conduct stormwater maintenance on a regular schedule Ensure all roads have adequate stormwater management that reduces sediment loading Stormwater management treating majority	# hours conducting maintenance % roads treated % treated	X	X	X						Ongoing

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							Promote and Implement green infrastructure practices and BMPs to reduce pollutant loading. See MPCA Stormwater Manual http://stormwater.pca.state.mn.us/index.php/Information_on_pollutant_removal_by_BMPs . <i>Applicable 1W1P Goals:</i> <i>Develop stormwater management plans on priority riparian land, including golf courses.</i> <i>Inventory, maintain and re-vegetate current ditches with native species.</i> <i>Consider and implement climate change adaptation strategies on all stormwater management projects.</i> <i>Inspect, maintain, update or replace stormwater management systems to increase lifespan.</i>			of developed areas <i>Transition 10% of inventoried ditches in each county to native vegetation</i>	% ditches									
						Forest management See Figure 27 and 28	Expand forestry programs to include management at small scales (e.g., properties under 20 acres). Encourage the development of collaboratives to address forest management activities such as the North Shore Forest Collaborative and those being use in the Sugarloaf and Manitou projects. Develop and implement forest stewardship plans for private lands (Sustainable Forestry Incentive Act, see Figure 17). Promote and periodically revise forest stewardship plans. Develop public/private partnerships to promote forest stewardship. Manage forests to ensure a range of life history traits (e.g., shade, drought, and fire tolerance), especially in riparian areas (Error! Reference source not found.). Follow sustainable forestry practices as outlined in Managing Woodlands on Lake Superior's Red Clay Plain (http://dnr.wi.gov/files/pdf/pubs/fr/fr0385.pdf). Incorporate tree species tolerant of warmer-wetter or hotter-drier conditions (i.e., white pine, red oak, bur oak, white pine, basswood, yellow birch, and sugar maple). Use tools from the DNR (http://www.dnr.state.mn.us/forestry/ecs_silv/interpretations.html and		Increase local forestry management technical assistance/ capacity Open lands assessment completed Ash tree inventory	Forest stewardship plans implemented on 50% of private land Open lands assessment completed every 10 years Open lands or 0-15 age class <60% at subwatershed scale Ash tree inventory Protect prioritized areas Updated ordinances	# of plans # of assessments completed % open lands # of tree inventories % of acres protected # of ordinances	X	X			X			X	

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								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
						http://files.dnr.state.mn.us/forestry/ecssilviculture/treetables.pdf to help select appropriate species. Inventory black ash in buffer and woody wetland areas and determine potential impact to water resources if tree removal occurs. Conduct research to find a suitable tree species to fill the ecological niche of ash trees. Increase protections on high quality areas (e.g., white cedar and black spruce lowlands). Independent collaborative research on black spruce harvesting and regeneration. Incorporate forest management into local lake management plans. Evaluate forest road management (active and inactive). Continue forestry education, outreach and training efforts. Incorporate Firewise management. Encourage and develop protection ordinances on large parcels of undeveloped areas. Evaluate current ordinance guidelines. Encourage long term conservation protection for private forest tracts or land trades. Update forestry ordinances/guidelines to account for climate change and encourage compliance with USDA Forest Service Handbook and Field guide for northern Minnesota forests. Conduct open lands assessment every 10 years. Take action to ensure subwatersheds have <60% of the land in the 0-15 year age class. Define riparian management zones and enforce regulations on soil disturbance and tree harvesting. <i>Applicable 1W1P Goals:</i> <i>Manage the density and composition of the forest canopy to control runoff and extend snowmelt to reduce erosive stream flow volume and rate.</i> <i>Increase the local technical capacity to help landowners implement existing forestry management plans.</i>														
						Education and outreach activities	Encourage development of watershed advocacy groups for residents and landowners.	SWCDs currently have contract for	1-2 new watershed	4-5 new watershed stewardship	# of groups		X		X	X		X		Ongoing

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								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
							Wetland banking and mitigation activities. Preserve and restore/rehabilitate high quality wetland resources through the implementation of the Wetlands Conservation Act and coordination with the MN DNR Protected Waters Program and the USACE Section 404 Permitting Program.													
						Groundwater/ drinking water management See Figure 21	Adoption of BMPs to sustainably manage surface/groundwater quantity. Conduct additional monitoring in groundwater and streams to determine the effect of groundwater withdrawals on streamflow.	Lake County geologic atlas in development	Incorporate results of the hydrogeological atlas into planning efforts Pilot monitoring effort to determine effect of mining on streamflow	Expand ordinances to address surface and groundwater interactions	# of updated ordinances	X		X		X	X			Ongoing
						Aggregate mining management See Figure 16	Consider factors such as water quality, temperature, and/or flow in operational and expansion plans of aggregate mining companies. Also evaluate restoration/reclamation efforts. Applicable 1W1P Goals: Minimize environmental risks to surface waters, groundwater, groundwater dependent natural resources and rare/high quality plant communities where aggregate resources and high value biological and water resources overlap.	Conditional use permits for gravel reviewed annually.		Develop/Update mining ordinances that further protect water quality and quantity	# new/ updated ordinances, policies, rules and # sites applied	X				X				Ongoing

Table 14b. Protection strategies for Nearshore Lake Superior

Note that Nearshore Lake Superior is identified as a targeted geographic area. These are the focus of the first ten years of implementation and therefore have interim ten year milestones.

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target
HUC10 Subwatershed	Water-body (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
All	Nearshore Lake Superior	Lake and Cook	Varies	Varies see Figure 7 through Figure 11	Reduce # beach closings to zero	Reduce industrial/ municipal wastewater discharges	Ensure compliance with discharge permits.		Compliance with discharge permits	Compliance with discharge permits	Compliance rate				X					Ongoing
						Stormwater management	Implement BMPs recommended for areas within the red clay plain along Lake Superior (http://dnr.wi.gov/files/pdf/pubs/fr/fr0385.pdf) (Figure 20). Implement green infrastructure practices and BMPs to increase infiltration and reduce flooding and runoff. See MPCA Stormwater Manual http://stormwater.pca.state.mn.us/index.php/Information on pollutant removal by BMPs . Enhance stormwater requirements to reduce peak flows and volume from impervious surfaces (e.g., roads). Identify opportunities for stormwater practice retrofits. Implement stormwater management opportunities to treat direct runoff to beaches. Ensure practices do not attract additional wildlife. Address high concentrations of bacteria along Grand Marais beaches. Watershed strategies apply.		Survey ditches and identify priority areas for upgrades/ maintenance Identify opportunities for stormwater retrofits Implement 2 stormwater BMP projects	Ensure all roads and developed areas apply stormwater BMPs to control pollutant loading	% of roads and areas	X	X	X			X			Ongoing
						Forest management	Watershed strategies apply.		Complete open lands assessment Develop 5 forest stewardship plans Complete USFS North Shore Restoration Project	Conduct 0-15 year age class (open lands) assessments every 10 years Forest stewardship plans on 50% of private lands (parcels over 20 acres in size)	# of assessments completed # of plans % open lands	X	X			X				X

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HUC10 Subwatershed	Water-body (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
										Open lands or 0-15 age class <60% at sub-watershed scale										
						Nutrient management/ address subsurface septic systems)	Watershed strategies apply.	Partial inventory and inspections completed within Near Shore area Upgrade 25% of failing septic systems	Complete inventory and inspection of SSTS 100% of SSTS in compliance	# of systems	X			X						2030
						Invasive species control	Watershed strategies apply.	Boat access sites have information on AIS	Implement County AIS plans	Implement County AIS plans	# of activities	X	X			X				Ongoing
						Land use planning and ordinance	Incorporate effective stormwater management and the impact of increasing imperviousness on water quality and runoff into land use planning efforts (see Stormwater runoff management above), especially in areas with new development Incorporate water quality planning for protection of Lake Superior (downstream receiving water) into county and local plans with emphasis on sediment, nutrient, and bacteria loading control and reduction, when needed. Consider increased trash receptacles and dog waste stations on beaches. Ensure availability of adequate bathroom/shower facilities near public beaches with high traffic. Watershed strategies apply.		Identify gaps in current ordinances to better manage stormwater and impervious growth Identify opportunities to address Lake Superior in local planning efforts	Pet waste and trash receptacles at all public beaches Update ordinances or variance procedures as needed Updated local plans	# of receptacles # of ordinances or procedures # of plans	X	X	X		X	X	X		2030
						Lake management and shoreland stabilization	Address areas within the Lake Superior shoreline erosion hazard zones established in the North Shore Management Plan . <i>Update Coastal Erosion Hazard Map</i> Support efforts to improve the near shore forest. Ensure lakeshore revegetation and buffers are healthy, adequate and resilient to climate impacts. Address erosion problems along the lakeshore and in near-shore areas.		Complete strategy to protect wild rice habitat Address areas within the Lake Superior shoreline erosion hazard zones	All BMPs implemented with red clay soils in mind	# of BMPs	X	X			X	X	X	X	2040

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							Implement BMPs recommended for areas within the red clay plain along Lake Superior (http://dnr.wi.gov/files/pdf/pubs/fr/fr0385.pdf) (Figure 20).													
						Education and outreach	Conduct education and outreach activities related to bacteria in the Grand Marais municipal campground and marina, especially during large events, Tettegouche State Park beaches, and the Chicago Bay boat landing (i.e., proper waste disposal, pet waste disposal and signage to prevent feeding of wildlife). Conduct educational programs on best trail use and leave no trace principles in areas with high recreational use (e.g., Onion River). Watershed strategies apply.	SWCDs currently have contract for education and outreach work in the watershed	Continue implementation of a watershed and water quality education and outreach program Annual education and outreach event at major beaches	Continue implementation of a watershed and water quality education and outreach program Annual education and outreach event at major beaches	# of activities # of outreach events		X		X	X	X	X		Ongoing
						Groundwater/ drinking water management	Adoption of BMPs to sustainably manage surface/groundwater quantity in and near Grand Marais. Watershed strategies apply.		Review ordinances and variance procedures for water quality opportunities	Expand ordinances to address surface and groundwater interactions	# of updated ordinances	X		X		X	X			Ongoing
						Aggregate mining management	Watershed strategies apply.		Review ordinances and variance procedures for water quality opportunities	Expand ordinances to address surface and groundwater interactions	# of updated ordinances	X		X		X				Ongoing

Table 14c. Protection strategies for the Arrow River HUC10 watershed

Note the Mid-Gunflint Trail Lakeshed (Bearskin, Hungry Jack, Leo) was identified as a targeted geographic area in the Arrow River watershed. These are the focus of the first ten years of implementation and therefore the Mid-Gunflint Trail lakes have interim 10-year milestones.

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Arrow River (0401010101)	See Table 3 for lakes No stream monitoring conducted in US portion of the watershed No applicable beaches	Cook	Varies	No impaired streams or lakes	Maintain water quality	Nutrient management/ address subsurface septic systems	Watershed strategies apply.	Completed septic inventory and assessment for homes adjacent to Mid-Gunflint Trail lakes		100% compliance and proper maintenance of systems	% compliance and maintained	X	X	X	X					Ongoing
						Fisheries management (streams)	Watershed strategies apply.													Ongoing
						Increase stream connectivity	Watershed strategies apply.													Ongoing
						Streambank stabilization and riparian management	Watershed strategies apply.													Ongoing
						Lake management and shoreline stabilization	Ensure or increase protection of high quality lakes identified in Table 8 and Figure 22. Lake trout lakes: Daniels, Bearskin, Birch, Dunn, and Moss lakes. Lake trout and cisco lakes: Rose, Duncan, and South lakes. Ensure or increase protection of at-risk lakes identified in Table 11 (Hungry Jack and Birch lakes). Develop management guide for Mid-Gunflint Trail lakes shoreland owners. Watershed strategies apply.		Develop a Mid-Gunflint Trail lakes specific management guide that addresses key stewardship behaviors for lake water quality needs	Implement management guide	% of shoreland managed	X	X			X		X		Ongoing
						Invasive species control	Watershed strategies apply.													Ongoing
						Land use planning and ordinances	Identify areas for shared lake specific concerns and /or collaborative research with bordering nations (e.g., Canada). Watershed strategies apply.	-		Conduct periodic meetings with officials from Canada	Frequency of meetings	X	X	X		X				Ongoing

Table 14d. Protection strategies for the Baptism River HUC10 watershed

Note that the Baptism River catchment is identified as a targeted geographic area. These are the focus of the first ten years of implementation and therefore have a ten year milestone.

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	Estimated Year to Achieve Water Quality Target
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
Baptism River (0401010111)	See Table 2 for list of streams, Table 3 for list of lakes, and Figure 4 for beaches	Lake	Varies	FIBI are > threshold MIBI are > threshold except for	Maintain exceptional and general use thresholds	Nutrient management/ address subsurface septic systems	Ensure proper maintenance of subsurface septic systems around Micmac Lake and clusters of residential development along Baptism River. Watershed strategies apply.		100% compliance and proper maintenance of systems	100% compliance and proper maintenance of systems	% compliance and maintained	X			X					Ongoing
						Fisheries management (streams)	Maintain exceptional use thresholds on West Branch Baptism River, East Branch Baptism River, and Crown Creek. Improve IBI scores for streams identified as at-risk and vulnerable to impairment in section 2.5 (Baptism River, East Branch Baptism, West Branch Baptism, and Hockamin Creek). Protect cold water refuge at Hockamin's confluence with Heffelfinger Creek. Watershed strategies apply.		Maintain flows and water levels that emulate natural conditions in Baptism River and significant tributaries	Maintain flows and water levels that emulate natural conditions in all streams	% of flows and water levels		X		X	X				Ongoing
						Increase stream connectivity	Field-based assessment of the entire Cliffs Erie Railroad/ LTV Grade to determine impacts to fish passage and stream connectivity. Address perched culverts on Hockamin Creek at Heffelfinger Rd, and Breezy Lane. Address barriers to fish on Lindstrom Creek at Cooper Road and at Lax Lake Road with open bottom pipe-arch bridges/crossings. Complete crossing assessment on Lindstrom Creek. Watershed strategies apply.	Recent culvert improvements by MN DNR Forestry	Barriers to fish passage on Hockamin Creek at Heffelfinger Road and Breezy Lane, and Lindstrom at Cooper Road and Lax Lake improved, removed, or replaced Complete crossing assessment on Lindstrom Creek	Complete field base assessment of Cliffs Erie Railroad/LTV Grade All crossings are addressed and undersized culverts replaced	% complete # crossings/ culverts	X	X	X		X				Ongoing
						Streambank stabilization and riparian management	Address ATV crossing on mainstem of Lindstrom Creek. Evaluate and address riparian development on Breezy Lane and Hockamin Creek.		ATV crossing on Lindstrom removed or improved	Riparian buffers on all mainstem and tributary streams	% with buffers	X	X			X		X	X	Ongoing

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	Estimated Year to Achieve Water Quality Target
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
						Wetland management	Watershed strategies apply.												Ongoing	
						Groundwater/ drinking water management	Properly abandon ground water wells. Watershed strategies apply.		Locate and inspect abandoned wells within the Baptism River watershed	Properly abandon all wells	# wells	X		X		X	X			Ongoing
						Aggregate mining management	Further evaluate effect of current and legacy sand and gravel mining activities on water quality and altered flow conditions along Baptism River. Watershed strategies apply.		Conduct study on effects of current and legacy sand and gravel mining activities on water quality and altered flow conditions along Baptism River	Develop/Update mining ordinances that further protect water quality and quantity	# new/ updated ordinances /policies/ rules and # of sites applied	X				X				Ongoing

Table 14e. Protection strategies for the Brule River HUC10 Watershed

Note the Mid-Gunflint Trail lakeshed is identified as a targeted geographic area in the Brule River watershed. These are the focus of the first ten years of implementation and therefore the Mid-Gunflint Trail Lakes have interim 10-year milestones.

[illegible]

Waterbody and Location			Water Quality			Strategies	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target
HUC10 Subwatershed	Water body (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
						riparian management	long-lived conifer species in riparian zones, and protection of riparian zones in Assinika Creek. Watershed strategies apply.			and tributary streams Upgrade all stream crossings causing erosion Restore degraded stream segments	% upgraded Linear feet restored									
						Lake management and shoreline stabilization	Implement lakeshore revegetation and buffers on developed lakeshores (e.g., Greenwood and Poplar). Ensure or increase protection of high quality lakes identified in Figure 23 and Table 8. Wild rice lakes: Northern Light, Caribou, Grassy. Lake trout and cisco lakes: Winchell, Vernon. Lake trout lakes: Lux, Vista, Swan, Poplar, Jim, Little Trout, Davis, State. Cisco lakes: Greenwood, Gaskin, Brule. Ensure or increase protection of at-risk lakes identified in Table 11 (Poplar Lake). Shoreland management guide for Greenwood Lake shoreland owners. Watershed strategies apply.		Complete shoreland survey around Greenwood and Mid-Gunflint Trail lakes Develop Greenwood Lake and Mid-Gunflint Trail lakes specific management guides that address key stewardship behaviors for lake water quality needs Implement 2 projects to add/improve near-shore vegetation Identify opportunities to improve or mitigate impacts of past land use alterations; begin implementation with landowners	Implement management guide	% of shoreland managed	X	X			X		X		Ongoing
						Invasive species control	Implement plan to address aquatic invasive species in Greenwood Lake (spiny waterfleas), and Lake Superior	Countywide AIS plans have	Develop and implement lake-specific plan to	Implement AIS plans	# of activities	X	X			X			Ongoing	

Waterbody and Location			Water Quality			Strategies	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.				Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target	
HUC10 Subwatershed	Water body (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR		Forest Service
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
						Aggregate mining management	Further evaluate effect of current and legacy sand and gravel mining activities on water quality and altered flow conditions in Brule River. Watershed strategies apply.			Develop/Update mining ordinances that further protect water quality and quantity	# new, updated ordinances, policies, rules and # sites applied	X				X				Ongoing

Table 14f. Protection strategies for the Cascade River HUC10 watershed

Note: The Cascade River Lower, Middle and Upper catchments are identified as targeted geographic areas. These are the focus of the first ten years of implementation and therefore have 10 year milestones.

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.								Governmental Units with Primary Responsibility							Estimated Year to Achieve Water Quality Target
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service			
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units											
Cascade River (0401010106)	See Table 2 for list of streams and Table 3 for list of lakes	Cook	Varies	FIBI are > upper confidence limit MIBI are > threshold ↓ trend in clarity on Deer Yard Lake	Maintain exceptional and general use thresholds	Nutrient management/ address subsurface septic systems	Watershed strategies apply.												Ongoing			
	Fisheries management (streams)					Maintain exceptional use thresholds for Cascade River. Protect high quality tributaries to Cascade Creek to maintain baseflow and cold-water input. Protect fish spawning habitat and thermal refuge on Thompson Creek prior to its confluence to Cascade River.		Maintain flows and water levels that emulate natural conditions in all streams	Maintain flows and water levels that emulate natural conditions in all streams	% of flows and water levels		X		X	X				Ongoing			
	Increase stream connectivity					Watershed strategies apply.															Ongoing	
	Streambank stabilization and riparian management					Watershed strategies apply.															Ongoing	
	Lake management and shoreline stabilization					Implement lakeshore revegetation and buffers on developed and developing lakeshores (e.g., Deer Yard Lake, Twin Lake and Little Cascade). Address declining trend in transparency in Deer Yard Lake. Ensure or increase protection of lakes identified in Table 8 and Figure 23. Wild rice lakes: Mark, Swamp, and Turtle. Ensure or increase protection of at-risk lakes identified in Table 11 (Deer Yard Lake). Watershed strategies apply.		Natural buffers around majority of lakeshores	Natural buffers around majority of lakeshores	% with buffers	X	X			X		X		Ongoing			
	Invasive species management					Watershed strategies apply.															Ongoing	

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
						Land use planning and ordinances Watershed strategies apply.		Complete gaps analysis to identify opportunities for additional water quality protection in current use restrictions and ordinances	Update ordinances in consideration of water quality protection	# of updates	X	X	X		X				Ongoing	
						Stormwater management	Watershed strategies apply.												Ongoing	
						Forest management	Watershed strategies apply.												Ongoing	
						Education and outreach activities	Watershed strategies apply.												Ongoing	
						Wetland management	Watershed strategies apply.												Ongoing	
						Groundwater/ drinking water management	Watershed strategies apply.												Ongoing	
						Aggregate mining management Watershed strategies apply.		Determine effect of gravel pit on Thompson Creek	Develop modified ordinances/rules or policies to protect Cascade River	# new/ updated ordinances /policies/ rules and # sites applied	X				X				Ongoing	

Table 14g. Protection strategies for the Cross River HUC10 watershed

Note: The Cross River catchment watershed is identified as a targeted geographic area in this HUC 10. They are prioritized in the first ten years of implementation and therefore have 10 year milestones.

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
Cross River (0401010109)	See Table 2 for list of streams, Table 3 for list of lakes, and Figure 4 for beaches	Cook and Lake	Varies	FIBI are > threshold MIBI are > threshold except for upstream Wanless Creek site	Exceptional and general use thresholds	Nutrient management/ address subsurface septic systems	Watershed strategies apply.												Ongoing	
						Fisheries management (streams)	Maintain exceptional use thresholds in Cross River, Two Island River, Houghtaling Creek and Wanless Creek. Improve IBI scores for streams identified as at-risk and vulnerable to impairment in section 2.5 (Cross River, Two Island River, Wilson Creek, and Houghtaling Creek). Maintain very cold water temperatures in Fredenberg Creek. Increase canopy cover along Two Island River upstream of confluence with Fredenberg Creek. Discourage non-native species (e.g. Tadpole Madtom on Wilson Creek). Watershed strategies apply.		Tree planting along Two Island River upstream of Fredenberg Creek	Maintain flows, water levels, and temperatures that emulate natural conditions in all streams	% of flows, temperature, and water levels		X			X		X	X	Ongoing
						Increase stream connectivity	Upgrade three crossings along Fredenberg Creek (Railroad, Fly Ash Road, and County Road 1). Limit future road and trail crossings. Maintain ecological connectivity throughout area's road-stream interactions. Replace undersized culverts at Forest Road 1855 on Wanless Creek with properly sized and installed structure. Field-based assessment of the entire Cliffs Erie Railroad/ LTV Grade to determine impacts to fish passage and stream connectivity.	Crossing upgrades underway on Four Mile Grade USFS, assisted by U of MN, completed a Cross River evaluation of dam structures	Complete field based assessment of Cliffs Erie Railroad/LTV Grade and upgrade priority crossings	Replace all culverts identified as barriers to fish passage on trout streams (Frendenberg Creek, Two Island River)	# stream crossings	X	X	X		X				X

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility							Estimated Year to Achieve Water Quality Target	
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR		Forest Service
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
							Watershed strategies apply.													
						Streambank stabilization and riparian management	Evaluate and address the likely impacts of historical logging on the Cross River and past activities (log drives, dams and bank protection structures, and stream channel straightening). Watershed strategies apply.	USFS, assisted by U of MN, completed a Cross River evaluation of dam structures	Geomorphic assessment of Cross River Upgrade all stream crossings causing erosion in Cross River	Upgrade all stream crossings causing erosion Restore degraded stream segments	# stream crossings # stream segments	X	X	X		X			X	
						Lake management and shoreline stabilization	Implement lakeshore revegetation and buffers on developed and developing lakeshores (e.g., Hare Lake and Wilson Lake). Shoreland management guides for shoreland owners. Ensure or increase protection of high quality lakes identified in Table 8 and Figure 23. Wild rice lakes: Crooked (West and East Bay), Four Mile, Richey, and Toohey). Watershed strategies apply.			Natural buffers around majority of lakeshores	% with buffers	X	X			X		X	X	
						Invasive species management	Implement plan to address aquatic invasive species (zebra mussels) in Crooked and Artlip lakes and threat of spiny water flea infestation in White Fish and Elbow lakes. Watershed strategies apply.	Countywide AIS plans have been developed		AIS plans developed and implemented	# activities	X	X			X				
						Land use planning and ordinances	Watershed strategies apply.												Ongoing	
						Stormwater management	Watershed strategies apply.												Ongoing	
						Forest management	Watershed strategies apply.												Ongoing	
						Education and outreach activities	Watershed strategies apply.												Ongoing	
						Wetland management	Watershed strategies apply.												Ongoing	

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target
								Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	
HUC10 Subwa- tershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction			Strategy Type	Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal									
						Groundwater/ drinking water management	Watershed strategies apply.												Ongoing	
						Aggregate mining management	Further evaluate effect of current and legacy sand and gravel mining activities on water quality and altered flow conditions along Ninemile Creek. Watershed strategies apply.			Develop/Update mining ordinances that further protect water quality and quantity	# new/ updated ordinances/ policies/ rules and # sites applied	X				X				Ongoing

Table 14h. Protection strategies for the Devil Track River HUC10 watershed

Note: Targeted geographic areas include Devil Track Lake. This is a focus of the first ten years of implementation and therefore has interim 10-year milestones.

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
Devil Track River (0401010105)	See Table 2 for streams and Table 3 for lakes	Cook	Varies	FIBI are > upper confidence interval MIBI range from below threshold to above confidence interval Several exceptional use streams (and lakes of biological significance) Devil Track Lake: 12.1 µg/L TP, 3m Secchi depth	Reverse declining trend in water clarity in Devil Track Lake Maintain exceptional use and FIBI scores Improve MIBI scores that are < the threshold (Figure 25)	Nutrient management / address subsurface septic systems	Ensure outhouses around Trout Lake are maintained properly. Watershed strategies apply.	Completed septic inventory and assessment for homes adjacent to Devil Track Lake. All failing systems upgraded	Assure all compliant systems managed well	100% compliance and proper maintenance of systems	% compliance and maintained	X	X	X	X					Ongoing
						Fisheries management (stream)	Maintain exceptional use thresholds for Devil Track River, Kimball Creek, Little Devil Track River, Elbow Creek, Woods Creek, and Kadunce River. Conduct management activities in Woods Creek: - Protect high quality headwater tributary to Woods Creek to maintain baseflow and coldwater inputs. - Restore ability to support brook trout in Woods Creek above mile 2.0. - Investigate effects of private impoundments on water temperature, streamflow, and physical habitat conditions in Woods Creek. - Protect fish spawning habitat and thermal refuge area in Lower Woods Creek to its confluence with Devil Track River. Watershed strategies apply.		Develop a management plan for the Devil Track system that addresses protection and improvement needs	Maintain flows and water levels that emulate natural conditions in all streams	% of flows and water levels		X		X	X				
						Increase stream connectivity	Update culvert at Woods Creek Crossing (CR 58) using bottomless arch culvert or bridge that is at least as wide as the bankfull channel (14.5 feet) and that has natural channel substrate and a step/pool morphology through the crossing. Address constructed impoundments in headwaters of Woods Creek. Watershed strategies apply.		Develop a management plan for the Devil Track system that addresses protection and improvement needs	Replace all culverts identified as barriers to fish passage on trout streams	# of culverts	X	X			X				

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
									Update Woods Creek Crossing (CR 58)											
						Streambank stabilization and riparian management	Develop and implement a Woods Creek Restoration project that includes: - Establishment of a stable vegetated buffer/RMZ along Woods Creek. - A natural stream channel improvement project that re-aligns/re-meanders Woods Creek through the original stream channel downstream of CR 60 or the best alternate option. - Improved agricultural management in Woods Creek. Work with landowner to provide stable crossings for cattle, farm equipment, etc. Address heavily-eroded bank on Woods Creek, upstream of Cook County Road 58 and other areas of bank erosion, channel widening, and substrate embeddedness to improve physical habitat as noted in the Stressor ID report. Address areas of instability along the lower part of Devil Track River (as identified in the Stressor ID report). Address eroding stream bank on Little Devil Track (power line crossing just upstream of the Gunflint Trail). Watershed strategies apply.		Develop a management plan for the Devil Track system that addresses protection and improvement needs Upgrade stream crossings as needed including Woods Creek at CR 58 Restore degraded stream segments including Woods Creek downstream of CR60 and banks/bluffs in red clay areas	% with buffers % upgraded Linear feet restored	X	X			X		X	X		On-going
						Lake management and shoreline stabilization	Implement lakeshore revegetation and buffers on developed lakeshores (e.g., Devil Track Lake). Ensure or increase protection of high quality lakes identified in Table 8 and Figure 23. Wild rice lake: Elbow. Lake trout lakes: Kemo and Trout. Lake trout and cisco lake: Pine. Ensure or increase protection of at-risk lakes identified in Table 11 (Devil Track Lake). Address decreasing trend in clarity in Devil Track Lake.		Complete shoreland survey around Devil Track Lake Develop a lake specific management guide that addresses key stewardship behaviors for lake water quality needs Implement 3 small-scale, projects to	Implement management guide	% of shoreland managed	X	X			X		X	2035	

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.				Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target		
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR		Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units										
							Shoreland management guide for Devil Track Lake shoreland owners. Evaluate and address likely impact of past watershed land use alterations and development in the Devil Track Lake watershed such as forest harvest activities and large conversions (airports, road networks, industrial mill and gravel mining). Watershed strategies apply.		add near-shore vegetation for Devil Track Lake Identify opportunities to improve or mitigate impacts of past land use alterations; begin implementation with landowners												
						Invasive species control	Implement plan to address aquatic invasive species in Devil Track Lake (spiny waterfleas), and monitor tributaries for potential AIS impacts. Address areas of spotted knapweed around Devil Track Lake. Watershed strategies apply.	Countywide AIS plans have been developed	Develop and implement lake-specific plan to address AIS in Devil Track Lake Incorporate AIS plans into lake management plans	Implement AIS plans	# of activities	X	X			X					Ongoing
						Land use planning and ordinances	Collaborate with individual landowners to ensure that ongoing development does not degrade habitat and water quality in the Little Devil Track River. Identify opportunities to decrease the impact of current and future development around the City of Grand Marais. Encourage low impact development design with new construction. Provide educational workshops for landowners to build stewarding skills. Watershed strategies apply.			Landowners understand impact of development of water quality in Little Devil Track River	# landowners	X	X	X		X					2030
						Stormwater management	Complete planning and implement Grand Marais stormwater management plan. Watershed strategies apply.	Grand Marais stormwater plan expected to be completed in 2018	Identify stormwater retrofit opportunities in Devil Track Lake watershed Implement 2 small scale stormwater projects around Devil Track Lake (residential, airport)	Stormwater management treating majority of developed areas	% of acres treated	X	X	X							Ongoing
						Forest management	Watershed strategies apply.												Ongoing		

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
						Education and outreach activities	Watershed strategies apply.											Ongoing		
						Wetland management	Protect high quality wetlands near Grand Marais from future development impacts. Watershed strategies apply.		Complete assessment of wetlands in Devil Track Lake watershed Identify opportunities for conservation easements and functional uplift in Devil Track Lake watershed	Protection of priority wetlands	acres of wetland	X	X			X		X		Ongoing
						Groundwater / drinking water management	Investigate groundwater-surface water interactions in Little Devil Track and implement needed changes to protect groundwater inputs. Watershed strategies apply.			Expand ordinances to address surface and groundwater interactions	# of updated ordinances	X		X	X	X	X			Ongoing
						Aggregate mining management See Figure 16	Further evaluate effect of current and legacy sand and gravel mining activities on water quality and altered flow conditions in Junco Creek, Kimball Creek, Kadunce River, and Devil Track Lake. Watershed strategies apply.		Determine effect of mining on Devil Track Lake/River	Develop modified ordinances/rules or policies to protect Devil Track Lake/River based on study outcomes	# new/ updated ordinances/ policies/ rules and # sites applied	X				X				Ongoing

Table 14i. Restoration and protection strategies for Flute Reed River HUC10 watershed

Note – Flute Reed River is identified as a targeted geographic area and is prioritized in the first ten years of implementation and therefore has 10 year milestones. The full geographic boundary of this HUC10 encompasses tribal lands of the Grand Portage Band of the Minnesota Chippewa. No strategy opportunities are listed for tribal lands other than continued collaboration and dialog on resource management issues of shared interest.

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
Flute Reed River (0401010103)	See Table 2 for streams and Table 3 for lakes	Cook	TSS, others	FIBI and MIBI are > threshold One lake of biological significance (Cuffs Lake; see Figure 22)	19-96% reduction in TSS in Flute Reed River Reverse increasing trend in phosphorus in Flute Reed River Improve FIBI and MIBI scores such that all scores are > upper confidence interval (Figure 23 and Figure 24)	Nutrient management/ address subsurface septic systems	Watershed strategies apply.												Ongoing	
						Fisheries management (streams)	Protect high quality headwater area to maintain baseflow and coldwater inputs. Conduct biological monitoring (fish/macroinvertebrates) in Flute Reed and tributaries near Tom Lake Rd to verify presence/absence of Brook Trout and other coldwater aquatic life. Improve IBI scores for streams identified as at-risk and vulnerable to impairment in section 2.5 (Flute Reed River). See Increased Stream Connectivity strategies. See Streambank Stabilization and Riparian Management strategies. Watershed strategies apply.	Fishery management plan has been developed by the DNR Existing wetland bank in Flute Reed headwaters	Conduct additional biological monitoring Study effect of beavers and channel succession on fishery	Maintain flows and water levels that emulate natural conditions	% of flows and water levels		X		X	X				2030
						Increase stream connectivity	Replace existing undersized/perched culverts with properly sized and installed culverts or bridges at Camp 20 Road and Tom Lake Road. Ensure that proper grade control is installed. Work with county and other agencies to prioritize and upgrade crossings. Emphasize climate change resiliency in infrastructure planning and rehabilitation. Modify/Remove strategic active and failed beaver dams to enhance fish passage and availability of spawning habitat. Implement a long-term monitoring effort within beaver impacted reaches to observe changes in	Existing beaver dams have been mapped	Update crossings at Camp 20 Road and Tom Lake Road Study effect of beavers and channel succession on water quality Evaluate the impact of failed dams, and causes of failures	Replace all culverts identified as barriers to fish passage	# of culverts	X	X			X				2030

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
							stream temperature, suspended and bedded sediment, and physical habitat conditions. Watershed strategies apply.													
		Streambank stabilization and riparian management	Preserve areas with relatively in-tact forested riparian corridor (e.g., Flute Reed R. Reaches FLR 015 through FLR 018 as identified in the Stressor ID report). Monitor succession of channels that were previously impounded by beaver dams over time. Manage for free-flowing channel with highly vegetated banks and floodplain connectivity. Install localized grade control structures near advancing head-cuts to prevent further channel incision and improve physical habitat. Address Otis Creek overflows to the Flute Reed River. Watershed strategies apply.			Successful streambank stabilization projects have been completed as part of Great Lakes Restoration Initiative grant Otis Creek project initiated.	Restore riparian vegetation on all mainstream and tributary streams Study effect of beavers and channel succession on water quality	Riparian buffers on all mainstream and tributary streams Restore degraded stream segments identified in the Stressor ID	% with buffers Linear feet restored	X	X		X	X		X	X	Ongoing		
		Lake management and shoreline stabilization	Watershed and nearshore strategies apply.													Ongoing				
		Invasive species control	Implement plan to address aquatic invasive species in tributaries to Lake Superior. Watershed strategies apply.			Countywide AIS plans have been developed		Implement AIS plans	# of activities	X	X			X				Ongoing		
		Land use planning and ordinances	Consider additional guidance on building in clay-rich areas and reducing potential development related impacts. Ensure erosion control and stormwater management on small sites, and long-term site maintenance and good housekeeping to minimize erosion including vegetation establishment and other appropriate cover in clay-rich areas. Watershed scenario modeling to determine possible impacts of general or specific development goals. Community engagement in development pattern and design across the watershed should continue.				Develop a Flute Reed specific management guide that addresses key stewardship behaviors for stream water quality needs	Conduct periodic meetings with officials from the Grand Portage Band of Chippewa	Frequency of meetings	X	X	X						2030		

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.				Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target		
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR		Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units										
							Several landowners control large acreages suitable for smaller lot sizes in the sensitive clay soils area. Identify opportunities for dialog on shared resource issues and areas for independent collaborative research with Grand Portage Band of Minnesota Chippewa. Watershed strategies apply.														
						Stormwater runoff management	Conduct ditch maintenance activities to establish vegetation as needed. Watershed strategies apply.	Field guide for maintaining rural roadside ditches is available	Assessment of roadside ditches Vegetation established in all roadside ditches	100% of roadside ditches vegetated and well maintained	Feet of stabilized ditch	X	X	X							2030
						Forest management	Forest management to deter increases in beaver activity in key stream management areas like the riparian corridor. Propagation of conifer and other species that are undesirable to beaver harvest. Emphasize long lived conifers and northern hardwood species in critical riparian locations of the watershed and climate change resiliency in species selection. Consider additional guidance for forestry activities that minimizes soil erosion in clay-rich areas. Develop and implement forestry guidelines to ensure less than 60% open (non-forested) lands in the watershed. Work with private land owners to develop Forest Stewardship Plans. Watershed strategies apply.		Develop watershed-specific forestry guidelines and distribute to all landowners in watershed Develop 3 Forest Stewardship Plans	Forest Stewardship Plans implemented for majority of watershed Majority of harvesting activities conducted under water quality-based forestry guidelines Open lands <60%	% of forested acreage under plans % of forested acres managed % of open lands	X	X			X			X	Ongoing	
						Education and outreach activities	Provide information and hands-on workshops to landowners on stream crossings (e.g., ATV, driveway), forest management activities, BMPs for private ditches, beaver management, and habitat improvement projects. Tie education and outreach activities to protecting Chicago Bay (Lake Superior).	Flute Reed Partnership	Conduct annual workshop for watershed residents Update the Flute Reed Partnership watershed plan	Continue implementation of a watershed and water quality education and outreach program	# of outreach efforts	X	X	X		X		X		Ongoing	

Table 14j. Protection strategies for the Manitou River HUC10 watershed

Note: No areas within the Manitou River HUC10 watershed are identified as targeted geographic areas and therefore there are no interim 10 year milestones.

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
Manitou River (0401010110)	See Table 2 for list of streams and Table 3 for list of lakes No applicable beaches	Cook and Lake	Varies	FIBI are > threshold MIBI are > threshold	Maintain exceptional and general use thresholds	Nutrient management/ address subsurface septic systems	Watershed strategies apply.												Ongoing	
						Fisheries management (streams)	Maintain exceptional use thresholds on Manitou River Manitou River, South Branch, and Caribou River. Improve IBI scores for streams identified as at-risk and vulnerable to impairment in section 2.5 (Manitou, and South Branch Manitou). Watershed strategies apply.			Maintain flows and water levels that emulate natural conditions in all streams	% of flows and water levels		X			X		X	X	Ongoing
						Increase stream connectivity	Field-based assessment of the entire Cliffs Erie Railroad/ LTV Grade to determine impacts to fish passage and stream connectivity. Address barrier to fish passage on Junction Creek. Watershed strategies apply.			Complete field base assessment of Cliffs Erie Railroad/LTV Grade All crossings from analysis are addressed	% complete # crossings	X	X	X		X				Ongoing
						Streambank stabilization and riparian management	Watershed strategies apply.												Ongoing	
						Lake management and shoreline stabilization	Implement lakeshore revegetation and buffers on developing lakeshores (e.g., Delay Lake and Ninemile Lake). Ensure or increase protection of high quality lakes identified in Table 8 and Figure 22. Wild rice lakes: Hoist, Cabin, Cramer, Bluebill, and Round Island. Ensure or increase protection of at-risk lakes identified in Table 11 (Divide). Address road erosion into Echo Lake. Watershed strategies apply.			Lakeshore revegetation and buffers on all developing lakeshores	Linear feet of buffers/ revegetation	X	X			X		X		Ongoing

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.							Governmental Units with Primary Responsibility							Estimated Year to Achieve Water Quality Target
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service		
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units										
						Invasive species management	Watershed strategies apply.												Ongoing		
						Land use planning and ordinances	Watershed strategies apply.												Ongoing		
						Stormwater management	Watershed strategies apply.												Ongoing		
						Forest management	Maintain and expand the Upper Manitou Forest Preserve lands .	2,450 acres in forest preserve		Expanded area(s) in the forest preserve	Acres	X	X			X			X	Ongoing	
							Watershed strategies apply.														
						Education and outreach activities	Watershed strategies apply.												Ongoing		
						Wetland management	Watershed strategies apply.												Ongoing		
						Groundwater/ drinking water management	Watershed strategies apply.												Ongoing		
						Aggregate mining management	Further evaluate effect of current and legacy sand and gravel mining activities on water quality and altered flow conditions along Lake Superior coast and Ninemile Creek.				Develop/update mining ordinances that further protect water quality and quantity	# new/ updated ordinances/ policies/ rules and # of sites applied	X				X				Ongoing
							Watershed strategies apply.														

Table 14k. Protection strategies for Pigeon River HUC10 watershed

Note: McFarland Lakeshed and the Mid-Trail lakes (East Bearskin) are identified as targeted geographic areas in this HUC 10. They are prioritized in the first ten years of implementation and therefore have 10 year milestones.

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target	
HUC10 Subwa- tershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non- pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service		
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units										
Pigeon River (0401010102)	See Table 2 for list of streams and Table 3 for list of lakes No applicable beaches	Cook	Varies	FIBI are > upper confidence interval MIBI range from below the threshold to above the confidence interval See Table 3 for lake water quality Tom Lake: ↓ trend in water clarity	Reverse ↓ trend in water clarity in Tom Lake Maintain EU and FIBI scores Improve MIBI scores that are < the threshold (Figure 25)	Nutrient management/ address subsurface septic systems	Watershed strategies apply.	Completed septic inventory and assessment for homes adjacent to Tom and McFarland lakes	Assure all compliant systems managed well Complete septic inventory and inspection for East Bearskin Lake, work with the USFS lease lot program	100% compliance and proper maintenance of systems	% compliance and maintained	X	X	X	X					Ongoing	
						Fisheries management (streams)	Maintain exceptional use thresholds in Irish Creek and Swamp River and upper reach of Portage Brook. Maintain good water quality in headwater lakes and encourage forest management practices that promote stream shading and reduce erosion. Maintain cool water temperatures in Stump River. Determine impact of historic logging, beaver activity, and surface water base flow on temperature. Watershed strategies apply.			Maintain flows and water levels that emulate natural conditions in all streams	% of flows and water levels		X			X		X	X	Ongoing	
						Increase stream connectivity	Stream crossing connectivity analysis for major roads (e.g., Gunflint Trail). Watershed strategies apply.			Complete connectivity analysis All crossings from analysis are addressed	% complete # crossings	X	X	X		X					Ongoing
						Streambank stabilization and riparian management	Assess influence of glacial lake clay soils in lower reaches of Stump River on sediment loading and turbidity in the Stump and downstream reaches of Pigeon River.			Restoration of eroded stream reaches	Linear feet restored	X	X			X		X	X		Ongoing

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
							Define riparian management zones and enforce regulations on soil disturbance and tree harvesting in Portage Brook catchment. Watershed strategies apply.													
						Lake management and shoreline stabilization	Implement lakeshore revegetation and buffers on developed lakeshores (e.g., McFarland Lake and Tom Lake). Shoreland management guides for McFarland and East Bearsin Lake shoreland owners. Address decreasing trend in water clarity in Tom Lake. Ensure or increase protection of high quality lakes identified in Table 8 and Figure 22 Lake trout lakes: North Fowl, Moose (38003600), South Fowl, Teal, Prout. Lake trout and cisco lakes: Moose (16004300), West Pike, Clearwater, Flour. Cisco lakes: McFarland, East Pike. Lake trout lakes: Mountain, East Bearskin, Alder, and Crystal lakes. Ensure or increase protection of at-risk lakes identified in Table 11 (Tom). Watershed strategies apply.		Complete shoreland survey around McFarland and East Bearskin lakes Develop McFarland Lake and East Bearskin Lake specific management guides that address key stewardship behaviors for lake water quality needs Implement 4 small-scale, projects to add near-shore vegetation for McFarland Lake and East Bearskin Lake Identify opportunities to improve or mitigate impacts of past land use alterations; begin implementation with landowners	Implement management guide	% of shoreland managed	X	X			X		X		Ongoing
						Invasive species control	Implement plan to address aquatic invasive species (spiny water fleas) in Caribou, Pine North and South Fowl, and Flour lakes and the Pigeon River. Evaluate Rainbow smelt impact in Chester Lake, an introduced exotic invasive fish species. Watershed strategies apply.	Countywide AIS plans have been developed	Incorporate AIS plans into lake management plans	Implement AIS plans	# of activities	X	X			X				Ongoing
						Land use planning and ordinances	Identify opportunities to dialog on shared resource issues and areas for independent collaborative			Conduct periodic meetings with officials from	Frequency of meetings	X	X	X		X				Ongoing

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
							research with bordering nations (e.g., Canada and Grand Portage Band of Minnesota Chippewa). Watershed strategies apply.			Canada and the Grand Portage Band of MN Chippewa										
						Stormwater runoff management	Watershed strategies apply.		Implement 2 small scale stormwater projects around McFarland and East Bearskin lakes	Stormwater management treating majority of developed areas	% of acres treated	X	X	X					Ongoing	
						Forest management	Implement recommendations of the USFS ShokoShoe project. See project map https://www.fs.usda.gov/nfs/11558/www/nepa/104430_FSPLT3_3872101.pdf Watershed strategies apply.	Plan approved for the ShokoShoe project area	Implement ShokoShoe project efforts	Implement ShokoShoe project efforts	# acres with projects implemented							X	Ongoing	
						Education and outreach activities	Watershed strategies apply.		Education and outreach approach developed for Mid-Trail lakes and McFarland Lake	Implementation of education and outreach activities	# of outreach efforts		X		X		X		Ongoing	
						Wetland management	Watershed strategies apply.												Ongoing	
						Groundwater/ drinking water management	Watershed strategies apply.												Ongoing	

Table 14I. Protection Strategies for the Poplar River HUC10 watershed.

Note: The Poplar River was identified as a targeted geographic area in the Poplar River watershed. * Poplar was recently delisted in the draft 2018 303(d) list.

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility									
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	Estimated Year to Achieve Water Quality Target	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units										
Poplar River (0401010107)	See Table 2 for list of streams and Table 3 for list of lakes No applicable beaches	Cook	Varies	Poplar River impaired for TSS/turbidity* ↓ trend in P, TSS, and Total Kjeldahl N at Poplar River site S000-261 (Table 3) ↓ trend in P in Caribou Lake FIBI are > threshold MIBI range from below the threshold to above the confidence interval See Table 4 for lake water quality	Exceptional and general use thresholds Maintain ↓ trend in P, TSS, and Total Kjeldahl N in Poplar River	Nutrient management/ address subsurface septic systems	Conduct septic inventory for developed areas (e.g., Poplar River and near shore Lake Superior). Watershed strategies apply.	SSTS inventory and compliance on Spruce Creek SSTS inventory on Caribou lake complete, compliance underway, in lake TP reductions documented. SSTS inspections on Pike Lake completed.	Identify opportunities to install cluster systems around Polar River	100% compliance and proper maintenance of systems	% compliance and maintained	X			X					Ongoing	
						Fisheries management (streams)	Maintain intact riparian zones along Tait River and Onion River to provide shade. Maintain exceptional use threshold for Mistletoe Creek. Improve IBI scores for streams identified as at-risk and vulnerable to impairment in section 2.5 (Mistletoe Creek). Improve FIBI score for Caribou Creek. Maintain good water quality in headwater lakes and encourage forest management practices that promote stream shading and reduce erosion.			Maintain flows and water levels that emulate natural conditions in all streams	% of flows and water levels		X			X		X	X	Ongoing	
						Increase stream connectivity	Connectivity analysis on Poplar River. Watershed strategies apply.		Connectivity analysis on Poplar River	Complete connectivity analysis All crossings from analysis are addressed	% complete # crossings										Ongoing
						Streambank stabilization and riparian management	Watershed strategies apply.														

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility									
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	Estimated Year to Achieve Water Quality Target	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units										
						Lake management and shoreline stabilization	Implement lakeshore revegetation and buffers on developed lakeshores (e.g., Pike and Caribou). Increased protection of wild rice lakes identified in Table 8 and Figure 22. Bigsby, White Pine, Christine, Gust, and Rice lakes. Identify opportunities to decrease the impact of current and future development around Pike and Caribou lakes. Encourage low impact development design with new construction. Provide educational workshops for landowners to build stewarding skills. Watershed strategies apply.			Natural buffers around majority of lakeshore, beginning with developed shorelines (Caribou and Pike)	% with buffers	X	X			X			X		Ongoing
						Invasive species management	Watershed strategies apply.												Ongoing		
						Land use planning and ordinances	Maintain and inspect BMPs and efforts conducted in the Poplar River TMDL implementation plan. Guidance for private shoreland owners on small site erosion control, vegetation management, and good housekeeping on developed areas (e.g., Tofte area, Lutsen Resort, Lutsen Mountains resort/ Ski Hill and other nearby commercial areas). Ensure water quality protection concepts are integrated into other land management planning efforts (e.g., Lutsen Resort, Lutsen Mountains resort/Ski Hill master development plan). Protect high-quality resources (lightly developed, high quality lakes, brook trout streams with rare macroinvertebrates, etc.) in the upper Poplar River from further degradation due to development. Watershed strategies apply.	Poplar River TMDL implementation plan completed	Continued maintenance and inspection of BMPs installed during implementation of the Poplar River TMDL Incorporate water quality protection into land use planning efforts in the Poplar River subwatershed	Continued maintenance and inspection of BMPs installed during implementation of the Poplar River TMDL	% maintained	X	X	X						Ongoing	
						Stormwater management	Maintain and inspect BMPs and efforts conducted in the Poplar River TMDL implementation plan.		Continued maintenance and inspection of BMPs	Continued maintenance and inspection of	% maintained	X	X	X						Ongoing	

Table 14m. Protection strategies for Temperance River HUC10 watershed

Note: No ten year milestones since no targeted geographic areas.

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.					Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service	
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units									
Temperance River (0401010108)	See Table 2 for list of streams, Table 3 for list of lakes, and Figure 4 for beaches	Cook	Varies	FIBI are > threshold MIBI are > threshold	Maintain exceptional and general use thresholds	Nutrient management/ address subsurface septic systems	Watershed strategies apply.	Partial SSTS inventory, inspection and compliance within TSSSD boundary	Complete inspection for remaining properties within TSSSD	100% compliance and proper maintenance of systems	% compliance and maintained	X			X					Ongoing
						Fisheries management (streams)	Maintain exceptional use thresholds for Heartbreak Creek, Sixmile Creek and Temperance River. Maintain thermal refuge in Sixmile Creek and Heartbreak Creek. Improve IBI scores for streams identified as at-risk and vulnerable to impairment in section 2.5 (Sixmile Creek and Temperance River). Preserve near reference-quality aquatic habitats in lower Temperance River subwatershed. Watershed strategies apply.			Maintain flows and water levels that emulate natural conditions in all streams	% of flows and water levels		X		X	X				Ongoing
						Increased stream connectivity	Increase connectivity between large and small tributaries throughout watershed. Address impact of beaver activity on upper reaches of Plouff Creek. Watershed strategies apply.			Increased connectivity throughout watershed	% connected	X	X	X		X				Ongoing
						Streambank stabilization and riparian management	Watershed strategies apply.													Ongoing
						Lake management and shoreline stabilization	Ensure or increase protection of lakes identified in Table 8 and Figure 22. Wild rice lakes: Kelly, Peterson, Moore, and Jack. Lake trout and cisco lake: Alton. Watershed strategies apply.			Review of effectiveness of current protection methods (ordinances, access, management plans, etc.)	# of reviews	X	X			X		X		Ongoing

Waterbody and Location			Water Quality			Strategies (see key below)	Strategy scenario showing estimated scale of adoption to meet 10-year milestone and final water quality targets. Scenarios and adoption levels may change with additional local planning, research showing new BMPs, changing financial support and policies, and experience implementing the plan.							Governmental Units with Primary Responsibility								Estimated Year to Achieve Water Quality Target	
HUC10 Subwatershed	Waterbody (ID)	Location and Upstream Influence Counties	Parameter (incl. non-pollutant stressors)	Current Conditions (load or conc.)	Goals / Targets and Estimated % Reduction		Strategy Type	Estimated Adoption Rate				Counties	SWCDs	Cities/Townships	MPCA	DNR	MDH	BWSR	Forest Service				
								Current strategy adoption level, if known	Interim 10-year Milestone	Suggested Goal	Units												
						Invasive species management	Watershed strategies apply.																Ongoing
						Land use planning and ordinances	Consider pursuing the Temperance River as a candidate for the Wild and Scenic Rivers Act designation.			Additional protections in place for the Temperance River	# of protections (ordinances, etc.)	X	X	X		X		X			Ongoing		
							Watershed strategies apply.																
						Stormwater management	Watershed strategies apply.																Ongoing
						Forest management	Develop strategy to slow or reverse Black Ash die-off.			Black Ash forest management strategy developed and implemented	% complete	X	X			X				X	Ongoing		
							Watershed strategies apply.																
						Education and outreach activities	Watershed strategies apply.													Ongoing			
						Wetland management	Watershed strategies apply.													Ongoing			
						Groundwater/ drinking water management	Watershed strategies apply.													Ongoing			
						Aggregate mining management	Further evaluate effect of current and legacy sand and gravel mining activities on water quality and altered flow conditions in Temperance River and along Lake Superior shoreline.			Develop/Update mining ordinances that further protect water quality and quantity	# new/ updated ordinances/ policies/ rules and # applied	X				X				Ongoing			