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Memorandum

To: Lower Minnesota River West – Comprehensive Watershed Management Partnership Policy Committee
From: Greg Williams, PE, Barr Engineering Co.
Subject: Draft goals for the Lower Minnesota River West Comprehensive Watershed Management Plan
Date: October 6, 2021
Project: 23721014
c:

The Lower Minnesota River West Comprehensive Watershed Management Partnership (Partnership) is in the process of developing a Comprehensive Watershed Management Plan (Plan) via the One Watershed, One Plan (1W1P) framework. A key step in Plan development is establishing measurable goals. Measurable goals help to connect Plan implementation activities to the resource issues and concerns previously identified and will allow the Partnership to assess progress throughout Plan implementation.

The Barr and SEH team and Sibley Soil and Water Conservation District (SWCD) staff initially developed draft goals to address each of the eight priority issue topics. The draft goals were provided to the Plan Steering Team and Advisory Committee and discussed during a September 23, 2021, meeting. The draft goals, as revised per Steering Team and Advisory Committee feedback, are provided as an attachment to this memorandum for review and discussion at the October 14, 2021, Policy Committee meeting. The draft goals are organized into two tables:

- Table X – draft goals for the eight major issue areas
- Table Y – draft surface water quality goals (expanded from Table X to six planning subwatersheds; see attached map)

The goals tables include the following information:

- **Issue priority level** – Level 1 (highest priority), Level 2, or Level 3 (lowest priority)
- **Priority issue** – one of the eight major issue topics identified through stakeholder engagement
- **Specific issue, pollutant, or stressor** – where appropriate, goals have been separated into more specific issues (e.g., nitrate) for organizational purposes
- **Long-term goal** – what we hope to achieve beyond the life of this Plan (provided for context)
- **10-year goal** – what we hope to achieve through implementation of this Plan (i.e., Plan goal)
- **Goal ID** – a unique identifier to allow correlation between Plan implementation activities and applicable goals

- **Related items from Implementation Schedule and associated measures/outputs** – potential implementation activities (and associated measures or outputs) linked to the achievement of each goal.

At this stage in Plan development, Policy Committee review and comment of the draft goals is important to confirm that the goals are focused on the appropriate outcomes, identify and fill potential gaps, and eliminate outcomes that may be overvalued. This review will help to focus the efforts of the Steering Team as we begin to develop the implementation schedule. In this iteration of the goals tables, many of the goals and output measures contain placeholder quantities (e.g., "XXX acres"). We will establish these quantities concurrent with the development of the Plan implementation schedule. An idea of the projects and programs that can feasibly be carried out during the life of the Plan is necessary to estimate what can reasonably be achieved during the Plan life.

Table X Measurable Goals for the Lower Minnesota River West Comprehensive Watershed Management Plan - October 6, 2021 Draft

Issue Level	Priority Issue	Specific Issue, Pollutant, or Stressor	Long-term Goal	10-year Goal	10-year Goal ID	Related items from Implementation Schedule and associated measures/outputs
Level 1	Excessive Erosion and Sedimentation	Near channel and in-channel erosion	Reduce the occurrence and severity of eroded streambanks and associated sediment loss	Increase average runoff retention by increasing watershed storage by XX,000 acre-feet (X inches, or X% of annual runoff)	ESC-1	Estimated increase in watershed storage (XX,000 acre-feet) resulting from implemented projects
				Achieve and maintain ongoing full compliance with MN Buffer Law with emphasis on diverse, high quality buffers	ESC-2	Ongoing education and outreach regarding buffers Site visits to critical areas to promote buffer implementation/maintenance
				Stabilize degraded and eroded ditches through multipurpose drainage management practices and implementation of at least XX multipurpose drainage projects over 10 years (addressing up to X,XXX feet of ditch) prioritizing efforts in public ditch systems	ESC-3	Database of highly degraded streambank as identified by streambank inventory Number of projects to stabilize/restore degraded streambanks/ditches (XX projects, up to XX,000 feet) Number of projects supported via technical support (XX projects, up to XX,000 feet)
		Upland erosion	Reduce the sediment loading to downstream water resources through the expanded us of conservation practices	Reduce upland erosion by increasing the use of cover crops, perennial vegetation, and conservation till strategies relative to baseline (see also degraded soil health goals)	ESC-4	Increased acreage of soil health practices (X,000 acres) Estimated/modeled reduction in sediment loading (see Table 5-3 for values, SWQ-1); 10 outreach events with agra-business (ESC-8); 5 demonstration projects to promote soil health BMPs (SLH-3)
		Instream TSS	Reduce TSS concentrations in watershed streams to <10% of samples exceeding 65 mg/L (April 1 – September 30)	Reduce sediment loading by approximately XXXX tons/year through the implementation of field practices (see surface water quality goals); See **Table X** for subwatershed-specific goals	ESC-5	Implemented projects (number and/or estimated benefit, see surface WQ goals); Number of projects supported via technical support (XX projects, up to XX,000 feet, XX tons reduced); Estimated TSS concentrations from HPSF-SAM or similar models;
Level 1	Degraded Surface Water Quality	Phosphorus (Lakes)	Meet applicable Western Corn Belt Plains water quality standards (TP≤90 ug/L, chl a≤30 ug/L, SD≥0.7 m) and North Central Hardwood Forest water quality standards (TP<60 ug/L, chl a<20 ug/L, SD>1.0 m) in impaired lakes by reducing total phosphorus loading	Reduce phosphorus loading through implementation of practices identified in the Lower Minnesota River TMDL and WRAPS studies - see **Table Y** for goals specific to planning subwatersheds	SWQ-1	Implemented projects (number and/or estimated benefit); see **Table Y** for values
		Phosphorus (Streams)	Reduce phosphorus loading by 45% by 2040	See **Table Y** for subwatershed-specific phosphorus reduction goals	SWQ-2	Implemented projects (number and/or estimated benefit); see **Table Y** for values
		Total Suspended Solids	Reduce TSS concentrations in watershed streams and the Minnesota River to <10% of samples exceeding 65 mg/L (April 1 – September 30)	See **Table Y** for subwatershed-specific sediment reduction goals	SWQ-3	Implemented projects (number and/or estimated benefit); see **Table Y** for values
		Nitrate	Reduce total nitrogen loading by 45% by 2040	See **Table Y** for subwatershed-specific nitrogen reduction goals	SWQ-4	Implemented projects (number and/or estimated benefit); see **Table Y** for values
		E. coli	Reduce *E. coli* concentrations in watershed streams and the Minnesota River to monthly geometric means <126 CFU/100 mL (April 1 - October 31)	Implement structural and non-structural practices to reduce *E. coli* loading	SWQ-5	Implemented projects (number and/or estimated benefit); see **Table Y** for values

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Issue Level	Priority Issue	Specific Issue, Pollutant, or Stressor	Long-term Goal	10-year Goal	10-year Goal ID	Related items from Implementation Schedule and associated measures/outputs
Level 1	Degraded Surface Water Quality	Fish Index of Biological Integrity	Achieve applicable Fish Indices of Biological Integrity for streams: - Low gradient streams, modified use (Fish IBI = 15) - Low gradient streams, general use (Fish IBI = 42) - Southern headwaters, modified use (Fish IBI = 33) - Southern headwaters, general use (Fish IBI = 55) - Southern streams, modified use (Fish IBI = 35) - Southern streams, general use (Fish IBI = 50) - Southern Rivers, general use (Fish IBI = 49)	Implement structural and non-structural practices to improve FIBI	SWQ-6	Implemented projects (number and/or estimated benefit); see **Table Y** for values; Monitoring of water quality in streams
		Macroinvertebrate Index of Biological Integrity	Achieve the following Macroinvertebrate Indices of Biological Integrity for streams: - Prairie streams, modified use (MIBI = 22) - Prairie streams, general use (MIBI = 41) - Southern streams, modified use (MIBI = 24) - Southern streams, general use (MIBI = 37) - Southern forest streams, modified use (MIBI = 30) - Southern forest streams, general use (MIBI = 41)	Implement structural and non-structural practices to improve MIBI	SWQ-7	Implemented projects (number and/or estimated benefit); see **Table Y** for values; Monitoring of water quality in streams
Level 1	Altered Hydrology and Drainage	Altered Hydrology	Limit the adverse impacts to water quality, flooding, and ecology resulting from hydrologic alteration of the watershed	Increase runoff retention by increasing watershed storage by XX,000 acre-feet (corresponding to X inches, or X% of annual runoff), prioritizing headwater and/or high yield watersheds (based on HSPF modeling)	AHD-1	Estimated increase in watershed storage (XX.XXX acre-ft) resulting from implemented projects; Analysis to identify priority areas for impoundments/storage; Outreach events to promote low impact design (XX events); Outreach events to promote runoff-reducing soil health practices (XX events);
				Manage and restore XXX acres floodplains upstream of the Minnesota River to increase flood risk mitigation, water storage, and ecological functions	AHD-2	Inventory of priority floodplain reconnection/restoration opportunities; Projects to reconnect/restore riparian floodplain (XX projects over 10 years, XXX acres); Floodplain areas added to conservation programs (XXX acres); Updates to floodplain and related ordinances, as needed;
				Implement tile outlet BMPs to reduce discharge rates from tiled watersheds, prioritizing upstream and headwater locations.	AHD-3	Number of tile outlet BMPs implemented; Acres of tiled drainage upstream of implemented BMPs?? (if this can be estimated); Workshops/site visits to promote use of rate control BMPs; -Meet with owners of tiled land to make them aware of potentail mitigation options, new tools, practices, etc/
				Limit the increase of runoff from development through regulation, incentives, and low impact design	AHD-4	Continued application of development/redevelopment with rate control Updates to stormwater and zoning ordinances; Municipal stormwater management workshops (XX events); Cost-share projects for individual stormwater BMPs (e.g., raingardens) (XXX projects)

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Level 1	Altered Hydrology and Drainage	Altered Hydrology	Limit the adverse impacts to water quality, flooding, and ecology resulting from hydrologic alteration of the watershed	Limit the adverse impacts of drainage alteration through promotion of drainage water management practice by landowners via education, outreach, and cost-share.	AHD-5	Number of cost-share DWM projects completed (XX projects); Number of workshops to promote drainage water management practices (XX events);
				Limit the adverse impacts of drainage alterations through the promotion of multipurpose drainage management projects and implementation of at least XX multipurpose drainage projects over 10 years	AHD-6	Number of multipurpose drainage projects completed (XX projects); Number of workshops outreach events to promote multipurpose drainage projects (XX events); Meetings of planning area drainage authorities to coordinate messaging/outreach (XX events); Annual meeting of drainage authorities to review permitting processes and performance standards (1 meeting/year);
		Landscape Resiliency and Hydrologic Functions	Protect and restore the ability of the landscape to mitigate adverse effects of climate change, increased precipitation, and development	Protect and maintain natural vegetative cover in Rush River, High Island Creek, Bevens Creek, and Minnesota River valleys	AHD-7	Review and recommendations for ordinances updates, as needed; Workshops/events promoting conservation programs (XX events); Continued education and outreach (targeting XXX landowners); Assistance provided to landowners for land management plans (XX plans);
				Protect and increase wetland areas to promote soil health, water quality, and water quantity benefits	AHD-8	Review and recommendations for ordinances updates, as needed; Workshops promoting wetland conservation and function (XX events); Targeted outreach to landowners in high priority wetland areas (XX landowners);
				Increase and maintain enrollment of lands in easement and/or conservation programs (e.g.,, CRP); target X,000 acres	AHD-9	Number of acres enrolled in conservation programs (X,000 acres); Identification of opportunities for enrollment in conservation programs;
Level 1	Excessive Runoff and Flooding	Storage	Increase storage and reduce runoff throughout the Lower Minnesota River West watershed	Increase storage in the watershed by XX,000 acre-feet (corresponding to X inches, or X% of annual runoff), prioritizing headwater and/or high yield watersheds (based on HSPF modeling)	FLD-1	Estimated increase in watershed storage (XX.XXX acre-ft) resulting from implemented projects; Analysis to identify priority areas for impoundments/storage; Outreach events to promote low impact design (XX events); Outreach events to promote runoff-reducing soil health practices (XX events);
		Flood Risk Mitigation	Reduce flood risk to structures and major infrastructure	Characterize current flood risk within the planning area and identify priority flood risk mitigation areas throughout planning area	FLD-2	Development of hydrologic/hydraulic models for planning area; Analysis of flood risk in floodplain areas and ID priority areas; Analysis to identify/evaluate impoundment locations;
	Excessive Runoff and Flooding	Flood Risk Mitigation	Reduce flood risk to structures and major infrastructure	Manage and restore XXX acres floodplains upstream of the Minnesota River to increase flood risk mitigation, water storage, and ecological functions	FLD-3	Inventory of priority floodplain reconnection/restoration opportunities; Projects to reconnect/restore riparian floodplain (XX projects over 10 years, XXX acres); Floodplain areas added to conservation programs (XXX acres); Updates to floodplain and related ordinances, as needed;
				Reduce flood risk to XXX property owners through technical assistance and cost-share funding for localized flood risk minimization practices	FLD-4	Technical assistance provided to property owners (XX owners); Small-scale flood risk mitigation grants implemented (XX grants);

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Issue Level	Priority Issue	Specific Issue, Pollutant, or Stressor	Long-term Goal	10-year Goal	10-year Goal ID	Related items from Implementation Schedule and associated measures/outputs
Level 2	Degraded Soil Health	Cover crops, perennial vegetation, and till strategies	Maintain and improve soil health to increase productivity while protecting and improving the environment	Quantify the use and benefit (e.g., water storage, reduced runoff, increased organic matter) of cover crops, perennial vegetation, till strategies, and residue management throughout the watershed	SLH-1	Increased acres of cover crops/perennial vegetation (X,000 acres); Inventory of soil health best practices; Study and quantification of soil health practice benefits (e.g., reduced runoff, water storage, increased organic matter)
				Identify landowner knowledge gaps and barriers to implementation to design effective communication and assistance programs	SLH-2	- Assessment of soil health implementation barriers - "Menu" of most applicable incentive strategies to promote soil health - Convene group of local implementers to champion/demonstrate practices
				Implement educational programs and demonstration projects to increase awareness of soil health best practices and community capacity to implement BMPs	SLH-3	Convene group of local implementers to champion/demonstrate practices; Increased acres of cover crops/perennial vegetation (X,000 acres); Inventory of soil health best practices and estimated baseline use; Promotion of ag loans for equipment to support conservation till strategies (XX outreach?) Field day events to tour demonstration projects (XX events); Outreach events with agra-business (XX events); Implemented demonstration projects (X projects);
				Estimate baseline use and increase the use of cover crops, perennial vegetation, and conservation till strategies relative to baseline (see Goal ESC-4)	SLH-4	Increased acres of cover crops/perennial vegetation (X,000 acres); Inventory of soil health best practices and estimated baseline use; Field day events to tour demonstration projects (XX events); Outreach events with agra-business (XX events);
Level 2	Protection of Groundwater/Drinking Water Quality	Nitrate and Arsenic	Achieve nitrate and arsenic concentrations below the respective MCLs of 10 mg/L and 10 ug/L in all monitored drinking water supplies	Provide all private well owners access to well testing programs and education about drinking water quality and proper well management	GWQ-1	Number of tested wells (X,000 wells over 10 years); Groundwater quality monitoring report; Educational articles/handouts/digital communications (XX items); Well testing/maintenance clinics (XX events);
		Nitrate and Arsenic	Achieve nitrate and arsenic concentrations below the respective MCLs of 10 mg/L and 10 ug/L in all monitored drinking water supplies	Work with MDA/MDH to establish a database of monitored private wells with elevated levels of Nitrate (concentrations ≥3ppm) and/or arsenic (>10 ug/L); identify wells/areas with chronically high nitrate and/or arsenic concentrations relative to the MCL	GWQ-2	Monitoring plan; Groundwater monitoring report; Groundwater quality monitoring database; Identification of high concentrations/priority areas;
		Nitrate	Achieve nitrate and arsenic concentrations below the respective MCLs of 10 mg/L and 10 ug/L in all monitored drinking water supplies	Reduce nitrogen loading to groundwater through the implementation of field practices and reduction of fertilization rates/increased nitrogen use efficiency (see goal SWQ-1 and SLH-3)	GWQ-3	Implementation of applicable BMPs (e.g., cover crop, reduced fertilizer application) - number of projects and estimated nitrogen load reduction (see surface water quality); Number of nutrient, fertilizer, and/or manure management plans (XXX plans); Increased acres of cover crops/perennial vegetation (X,000 acres); Field days/site visits to promote soil health practices (XX events); Engagement of a nutrient management expert as shared service??

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Level 2	Protection of Groundwater/Drinking Water Quality	*E. coli*	Reduce the occurrence of *E. coli* contamination of groundwater supplies	Reduce *E. coli* loading through management of SSTS, un-sewered discharges, and feedlots	GWQ-4	Projects to address non-functioning SSTS (XXX over 10 years); Projects to improve feedlots (XX over 10 years) (SWQ-8); Number of nutrient, fertilizer, and/or manure management plans (XXX plans); Promote Ag BMP low interest loan program and low income SSTS grant opportunities to address non-compliant SSTS (XX loans/grants); Educational articles/handouts/digital communications (XX items);
		Well Management	Reduce the risk of groundwater contamination through proper well management	Minimize groundwater contamination by sealing and/or providing cost sharing to seal XX private wells.	GWQ-5	Projects to seal abandoned wells (XX projects); Well testing/maintenance clinics (XX events);
		Arsenic	Reduce the number of wells exceeding recommended concentrations of arsenic	Provide technical assistance and/or cost-share funding for treatment of XX wells with high arsenic concentrations	GWQ-7	Technical support and/or funding to address XX wells with high arsenic; Educational articles/handouts/digital communications (XX items); Well testing/maintenance clinics (XX events); Pursue grants with MDH/partners to provide arsenic mitigation cost share (X opportunities)
Level 3	Threatened Groundwater Supply	Groundwater sustainability	Maintain sustainable groundwater supply for future use	Promote the implementation of groundwater conservation and sustainability practices (e.g., recharge)	GWS-1	Cost-share projects for individual stormwater BMPs (e.g., raingardens) (XXX projects) Projects to capture and reuse stormwater (X projects) Educational communication via handouts, articles, or digital communications (XX items)
				Characterize the state and trend of groundwater supplies and use in the watershed	GWS-2	Study and quantification of soil health practice benefits; Development of a groundwater monitoring strategy ; Assessment of groundwater trends;
Level 3	Threats to Fish, Wildlife, and Habitat	Wetlands	Preserve the quality and quantity of natural areas	Preserve the quality and quantity of wetlands	FWH-1	Recommended updates to wetland and zoning ordinances, as needed; Technical assistance for projects focused on wetland restoration (X projects); Continued implementation of Wetland Conservation Act; Workshops promoting wetland conservation and function (XX events); Targeted outreach to landowners in high priority wetland areas (XX landowners);
		Sites of biological significance		Preserve sites of biological significance	FWH-2	Technical assistance for invasive species and natural conservation projects (X projects over 10 years) Education via digital communication and/or articles (XX activities) Recommended updates to ordinances, as needed
		Stream corridors	Preserve the quality of natural areas adjacent to stream and river corridors	Protect and preserve natural areas adjacent to stream corridors through easements and enrollment of XXXX acres in conservation programs and targeted outreach	FWH-3	Enrollment of areas in conservation programs (XXXX acres); Identification of priority areas for targeted outreach Targeted outreach to landowners in priority areas (XXX landowner contacts)
		Invasive species	Limit the presence and impact of invasive species	Characterize the presence and impact of invasive species, and cooperate with partners to mitigate impacts	FWH-4	Projects to address invasive species (X projects over 10 years) Database of invasive species present; Coordination with County weed inspectors (X meetings) Outreach events with lake associations (X events) Number of invasive species management plans (XX plans).
		Fish and Macroinvertebrates	See fish and macroinvertebrate IBI goals above under degraded surface water quality of lakes and streams	see surface water quality goals	FWH-5	see surface water quality goals

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Issue Area	Subwatershed	Specific Issue, Pollutant, or Stressor	Long-term Goal	10-year Goal	10-year Goal ID	10-year Goal Measures
Degraded Surface Water Quality	Bevens Creek/NE Sibley County	Phosphorus (Washington Lake)	Continue to meet North Central Hardwood Forest water quality standards in Washington Lake (TP<60 ug/L, chl a<20 ug/L, SD>1.0 m)	Implement structural and non-structural projects and practices to reduce watershed TP loading to Washington Lake by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year estimated using HSPF-SAM or similar	SWQ-1.1	Up to XX implemented projects; Washington Lake watershed TP load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year estimated using HSPF-SAM or similar
		Phosphorus	Reduce phosphorus loading by 45% (from average 1980-1996 conditions) by 2040; (45% reduction equals 79,000 lbs/year TP based on HSPF watershed loading estimates)	Implement structural and non-structural projects and practices to reduce watershed TP loading by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in Bevens Creek	SWQ-2.1	Up to XX implemented projects; watershed TP load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in Bevens Creek
		Total Suspended Solids	Reduce TSS concentrations to <10% of samples exceeding 65 mg/L (April 1 – September 30) by reducing TSS loading in the watershed	Implement structural and non-structural projects and practices to reduce watershed sediment loading by up to XXX tons/year (as estimated at field scale) and XXX tons/year in Bevens Creek	SWQ-3.1	Up to XX implemented projects; watershed sediment load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in Bevens Creek
		Nitrate	Reduce total nitrogen loading by 45% (from average 1980-1996 conditions) by 2040; (45% reduction equals 1,527,000 lbs/year TN based on HSPF watershed loading estimates)	Implement structural and non-structural projects and practices to reduce watershed TN loading by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in Bevens Creek	SWQ-4.1	Up to XX implemented projects; watershed TN load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in Bevens Creek
		E. coli	Reduce TSS concentrations to <10% of samples exceeding 65 mg/L (April 1 – September 30) by achieving loading capacity identified in the Lower Minnesota River TMDL (see TMDL)	Implement structural and non-structural practices to reduce *E. coli* loading	SWQ-5.1	Implementation of projects and practices to address non-functioning SSTS (XXX over 10 years watershed-wide), and feedlots (X over 10 years watershed-wide); see Implementation Schedule
		Fish Index of Biological Integrity	Achieve applicable Fish Indices of Biological Integrity for streams: - Southern headwaters, modified use (FIBI = 33) - Southern headwaters, general use (FIBI = 55) - Southern streams, modified use (FIBI = 35) - Southern streams, general use (FIBI = 50)	Implement structural and non-structural practices to improve FIBI (update with strategies specific to this planning area)	SWQ-6.1	Implementation of projects and practices to address stressors including TP, TSS, N, and altered hydrology (see related Implementation Schedule Items)
		Macroinvertebrate Index of Biological Integrity	Achieve applicable Macroinvertebrate Indices of Biological Integrity for streams: - Southern streams, general use (MIBI = 37) - Southern forest streams, modified use (MIBI = 30) - Southern forest streams, general use (MIBI = 41)	Implement structural and non-structural practices to improve MIBI (update with strategies specific to this planning area)	SWQ-7.1	Implementation of projects and practices to address stressors including TP, TSS, N, and altered hydrology (see related Implementation Schedule Items)

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Issue Area	Subwatershed	Specific Issue, Pollutant, or Stressor	Long-term Goal	10-year Goal	10-year Goal ID	10-year Goal Measures
Degraded Surface Water Quality	High Island Creek	Phosphorus (High Island Lake)	Meet Western Corn Belt Plains water quality standards in High Island Lake (TP<90 ug/L, chl a<30 ug/L, SD>0.7 m) by reducing total phosphorus loading by 85% (see TMDL)	Implement structural and non-structural projects and practices to reduce watershed TP loading to High Island Lake by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year estimated using HSPF-SAM or similar	SWQ-1.2a	Up to XX implemented projects; High Island Lake watershed TP load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year estimated using HSPF-SAM or similar
		Phosphorus (Silver Lake)	Meet North Central Hardwood Forest water quality standards in Silver Lake (TP<60 ug/L, chl a<20 ug/L, SD>1.0 m) by reducing total phosphorus loading by 89% (see TMDL)	Implement structural and non-structural projects and practices to reduce watershed TP loading to Silver Lake by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year estimated using HSPF-SAM or similar	SWQ-1.2b	Up to XX implemented projects; Silver Lake watershed TP load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year estimated using HSPF-SAM or similar
		Phosphorus (Bakers Lake)	Continue to meet Western Corn Belt Plains water quality standards in Bakers Lake (TP<90 ug/L, chl a<30 ug/L, SD>0.7 m)	Implement structural and non-structural projects and practices to reduce watershed TP loading to Bakers Lake by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year estimated using HSPF-SAM or similar	SWQ-1.2c	Up to XX implemented projects; Bakers Lake watershed TP load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year estimated using HSPF-SAM or similar
		Phosphorus (Round Grove Lake)	Continue to meet Western Corn Belt Plains water quality standards in Round Grove Lake (TP<90 ug/L, chl a<30 ug/L, SD>0.7 m)	Implement structural and non-structural projects and practices to reduce watershed TP loading to Round Grove Lake by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year estimated using HSPF-SAM or similar	SWQ-1.2d	Up to XX implemented projects; Round Grove Lake watershed TP load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year estimated using HSPF-SAM or similar
		Phosphorus	Reduce phosphorus loading by 45% (from average 1980-1996 conditions) by 2040; (45% reduction equals 54,600 lbs/year TP based on HSPF watershed loading estimates)	Implement structural and non-structural projects and practices to reduce watershed TP loading by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in High Island Creek	SWQ-2.2	Up to XX implemented projects; watershed TP load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in High Island Creek
		Total Suspended Solids	Reduce TSS concentrations to <10% of samples exceeding 65 mg/L (April 1 – September 30) by reducing TSS loading in the watershed	Implement structural and non-structural projects and practices to reduce watershed sediment loading by up to XXX tons/year (as estimated at field scale) and XXX tons/year in High Island Creek	SWQ-3.2	Up to XX implemented projects; watershed sediment load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in High Island Creek
		Nitrate	Reduce total nitrogen loading by 45% (from average 1980-1996 conditions) by 2040; (45% reduction equals 1,102,000 lbs/year TN based on HSPF watershed loading estimates)	Implement structural and non-structural projects and practices to reduce watershed TN loading by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in High Island Creek	SWQ-4.2	Up to XX implemented projects; watershed TN load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in High Island Creek
		E. coli	Reduce TSS concentrations to <10% of samples exceeding 65 mg/L (April 1 – September 30) by achieving loading capacity identified in the Lower Minnesota River TMDL (see TMDL)	Implement structural and non-structural practices to reduce *E. coli* loading	SWQ-5.2	Implementation of projects and practices to address non-functioning SSTS (XXX over 10 years watershed-wide), and feedlots (X over 10 years watershed-wide); see Implementation Schedule
		Fish Index of Biological Integrity	Achieve applicable Fish Indices of Biological Integrity for streams: - Low gradient streams, modified use (FIBI = 15) - Southern headwaters, modified use (FIBI = 33) - Southern headwaters, general use (FIBI = 55) - Southern streams, modified use (FIBI = 35) - Southern streams, general use (FIBI = 50)	Implement structural and non-structural practices to improve FIBI (update with strategies specific to this planning area)	SWQ-6.2	Implementation of projects and practices to address stressors including TP, TSS, N, and altered hydrology (see related Implementation Schedule Items)
		Macroinvertebrate Index of Biological Integrity	Achieve applicable Macroinvertebrate Indices of Biological Integrity for streams: - Prairie streams, modified use (MIBI = 22) - Prairie streams, general use (MIBI = 41) - Southern streams, general use (MIBI = 37) - Southern forest streams, general use (MIBI = 43)	Implement structural and non-structural practices to improve MIBI (update with strategies specific to this planning area)	SWQ-7.2	Implementation of projects and practices to address stressors including TP, TSS, N, and altered hydrology (see related Implementation Schedule Items)

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Issue Area	Subwatershed	Specific Issue, Pollutant, or Stressor	Long-term Goal	10-year Goal	10-year Goal ID	10-year Goal Measures
Degraded Surface Water Quality	North Branch Rush River	Phosphorus (Titlow Lake)	Meet Western Corn Belt Plains water quality standards in Titlow Lake (TP<90 ug/L, chl a<30 ug/L, SD>0.7 m) by reducing total phosphorus loading by 82% (see TMDL)	Implement structural and non-structural projects and practices to reduce watershed TP loading to Titlow Lake by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year estimated using HSPF-SAM or similar	SWQ-1.3	Up to XX implemented projects; Titlow Lake watershed TP load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year estimated using HSPF-SAM or similar
		Phosphorus (Indian Lake)	Continue to meet Western Corn Belt Plains water quality standards in Indian Lake (TP<90 ug/L, chl a<30 ug/L, SD>0.7 m)	Implement structural and non-structural projects and practices to reduce watershed TP loading to Indian Lake by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year estimated using HSPF-SAM or similar	SWQ-1.4	Up to XX implemented projects; Indian Lake watershed TP load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year estimated using HSPF-SAM or similar
		Phosphorus	Reduce phosphorus loading by 45% (from average 1980-1996 conditions) by 2040; (45% reduction equals 51,300 lbs/year TP based on HSPF watershed loading estimates)	Implement structural and non-structural projects and practices to reduce watershed TP loading by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in the North Fork Rush River	SWQ-2.3	Up to XX implemented projects; watershed TP load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in the North Fork Rush River
		Total Suspended Solids	Reduce TSS concentrations to <10% of samples exceeding 65 mg/L (April 1 – September 30) by achieving loading capacity identified in the Lower Minnesota River TMDL (see TMDL)	Implement structural and non-structural projects and practices to reduce watershed sediment loading by up to XXX tons/year (as estimated at field scale) and XXX tons/year in the North Fork Rush River	SWQ-3.3	Up to XX implemented projects; watershed sediment load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in the North Fork Rush River
		Nitrate	Reduce total nitrogen loading by 45% (from average 1980-1996 conditions) by 2040; (45% reduction equals 1,190,000 lbs/year TN based on HSPF watershed loading estimates)	Implement structural and non-structural projects and practices to reduce watershed TN loading by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in the North Fork Rush River	SWQ-4.3	Up to XX implemented projects; watershed TN load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in the North Fork Rush River
		E. coli	Reduce TSS concentrations to <10% of samples exceeding 65 mg/L (April 1 – September 30) by achieving loading capacity identified in the Lower Minnesota River TMDL (see TMDL)	Implement structural and non-structural practices to reduce *E. coli* loading	SWQ-5.3	Implementation of projects and practices to address non-functioning SSTS (XXX over 10 years watershed-wide), and feedlots (X over 10 years watershed-wide); see Implementation Schedule
		Fish Index of Biological Integrity	Achieve applicable Fish Indices of Biological Integrity for streams: - Low gradient streams, modified use (FIBI = 15) - Southern headwaters, modified use (FIBI = 33) - Southern headwaters, general use (FIBI = 55) - Southern streams, modified use (FIBI = 35)	Implement structural and non-structural practices to improve FIBI (update with strategies specific to this planning area)	SWQ-6.3	Implementation of projects and practices to address stressors including TP, TSS, N, and altered hydrology (see related Implementation Schedule Items)
		Macroinvertebrate Index of Biological Integrity	Achieve applicable Macroinvertebrate Indices of Biological Integrity for streams: - Prairie streams, modified use (MIBI = 22) - Southern streams, general use (MIBI = 37)	Implement structural and non-structural practices to improve MIBI (update with strategies specific to this planning area)	SWQ-7.3	Implementation of projects and practices to address stressors including TP, TSS, N, and altered hydrology (see related Implementation Schedule Items)

Table X Measurable Goals for the Lower Minnesota River West Comprehensive Watershed Management Plan - October 6, 2021 Draft

Issue Area	Subwatershed	Specific Issue, Pollutant, or Stressor	Long-term Goal	10-year Goal	10-year Goal ID	10-year Goal Measures
Degraded Surface Water Quality	Middle Branch Rush River	Phosphorus	Reduce phosphorus loading by 45% (from average 1980-1996 conditions) by 2040; (45% reduction equals 51,700 lbs TP/year based on HSPF watershed loading estimates)	Implement structural and non-structural projects and practices to reduce watershed TP loading by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in the Middle Fork Rush River	SWQ-2.4	Up to XX implemented projects; watershed TP load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in the Middle Fork Rush River
		Total Suspended Solids	Reduce TSS concentrations to <10% of samples exceeding 65 mg/L (April 1 – September 30) by achieving loading capacity identified in the Zumbro River TMDL (see TMDL)	Implement structural and non-structural projects and practices to reduce watershed sediment loading by up to XXX tons/year (as estimated at field scale) and XXX tons/year in the Middle Fork Rush River	SWQ-3.4	Up to XX implemented projects; watershed sediment load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in the Middle Fork Rush River
		Nitrate	Reduce total nitrogen loading by 45% (from average 1980-1996 conditions) by 2040; (45% reduction equals 1,236,000 lbs/year TN based on HSPF watershed loading estimates)	Implement structural and non-structural projects and practices to reduce watershed TN loading by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in the Middle Fork Rush River	SWQ-4.4	Up to XX implemented projects; watershed TN load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in the Middle Fork Rush River
		E. coli	Reduce TSS concentrations to <10% of samples exceeding 65 mg/L (April 1 – September 30) by achieving loading capacity identified in the Lower Minnesota River TMDL (see TMDL)	Implement structural and non-structural practices to reduce *E. coli* loading	SWQ-5.4	Implementation of projects and practices to address non-functioning SSTS (XXX over 10 years watershed-wide), and feedlots (X over 10 years watershed-wide); see Implementation Schedule
		Fish Index of Biological Integrity	Achieve applicable Fish Indices of Biological Integrity for streams: - Low gradient streams, modified use (FIBI = 15) - Low gradient streams, general use (FIBI = 42) - Southern headwaters, modified use (FIBI = 33) - Southern headwaters, general use (FIBI = 55) - Southern streams, modified use (FIBI = 35) - Southern streams, general use (FIBI = 50) - Southern Rivers, general use (FIBI = 49)	Implement structural and non-structural practices to improve FIBI (update with strategies specific to this planning area)	SWQ-6.4	Implementation of projects and practices to address stressors including TP, TSS, N, and altered hydrology (see related Implementation Schedule Items)
		Macroinvertebrate Index of Biological Integrity	Achieve applicable Macroinvertebrate Indices of Biological Integrity for streams: - Prairie streams, modified use (MIBI = 22) - Southern streams, modified use (MIBI = 24) - Southern streams, general use (MIBI = 37)	Implement structural and non-structural practices to improve MIBI (update with strategies specific to this planning area)	SWQ-7.4	Implementation of projects and practices to address stressors including TP, TSS, N, and altered hydrology (see related Implementation Schedule Items)

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Issue Area	Subwatershed	Specific Issue, Pollutant, or Stressor	Long-term Goal	10-year Goal	10-year Goal ID	10-year Goal Measures
Degraded Surface Water Quality	South Branch Rush River	Phosphorus (Clear Lake)	Meet Western Corn Belt Plains water quality standards in Clear Lake (TP<90 ug/L, chl a<30 ug/L, SD>0.7 m) by reducing total phosphorus loading by 50% (see TMDL)	Implement structural and non-structural projects and practices to reduce watershed TP loading to Clear Lake by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year estimated using HSPF-SAM or similar	SWQ-1.4	Up to XX implemented projects; Clear Lake watershed TP load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year estimated using HSPF-SAM or similar
		Phosphorus	Reduce phosphorus loading by 45% (from average 1980-1996 conditions) by 2040; (45% reduction equals 61,700 lbs/year TP based on HSPF watershed loading estimates)	Implement structural and non-structural projects and practices to reduce watershed TP loading by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in the South Fork Rush River	SWQ-2.5	Up to XX implemented projects; watershed TP load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in the South Fork Rush River
		Total Suspended Solids	Reduce TSS concentrations to <10% of samples exceeding 65 mg/L (April 1 – September 30) by reducing TSS loading in the watershed	Implement structural and non-structural projects and practices to reduce watershed sediment loading by up to XXX tons/year (as estimated at field scale) and XXX tons/year in the South Fork Rush River	SWQ-3.5	Up to XX implemented projects; watershed sediment load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in the South Fork Rush River
		Nitrate	Reduce total nitrogen loading by 45% (from average 1980-1996 conditions) by 2040; (45% reduction equals 1,304,000 lbs/year TN based on HSPF watershed loading estimates)	Implement structural and non-structural projects and practices to reduce watershed TN loading by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in the South Fork Rush River	SWQ-4.5	Up to XX implemented projects; watershed TN load reduction up to XXX lbs/year (as estimated at field scale) and XXX lbs/year in the South Fork Rush River
		E. coli	Reduce TSS concentrations to <10% of samples exceeding 65 mg/L (April 1 – September 30) by achieving loading capacity identified in the Lower Minnesota River TMDL (see TMDL)	Implement structural and non-structural practices to reduce *E. coli* loading	SWQ-5.5	Implementation of projects and practices to address non-functioning SSTS (XXX over 10 years watershed-wide), and feedlots (X over 10 years watershed-wide); see Implementation Schedule
		Fish Index of Biological Integrity	Achieve applicable Fish Indices of Biological Integrity for streams: - Low gradient streams, modified use (FIBI = 15) - Low gradient streams, general use (FIBI = 42) - Southern headwaters, modified use (FIBI = 33) - Southern headwaters, general use (FIBI = 55) - Southern streams, modified use (FIBI = 35) - Southern streams, general use (FIBI = 50)	Implement structural and non-structural practices to improve FIBI (update with strategies specific to this planning area)	SWQ-6.5	Implementation of projects and practices to address stressors including TP, TSS, N, and altered hydrology (see related Implementation Schedule Items)
		Macroinvertebrate Index of Biological Integrity	Achieve applicable Macroinvertebrate Indices of Biological Integrity for streams: - Prairie streams, modified use (MIBI = 22) - Prairie streams, general use (MIBI = 41) - Southern streams, modified use (MIBI = 24) - Southern streams, general use (MIBI = 37)	Implement structural and non-structural practices to improve MIBI (update with strategies specific to this planning area)	SWQ-7.5	Implementation of projects and practices to address stressors including TP, TSS, N, and altered hydrology (see related Implementation Schedule Items)

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Issue Area	Subwatershed	Specific Issue, Pollutant, or Stressor	Long-term Goal	10-year Goal	10-year Goal ID	10-year Goal Measures
Degraded Surface Water Quality	Minnesota River (Le Sueur and Belle Plain)	Phosphorus	Reduce phosphorus loading by 45% (from average 1980-1996 conditions) by 2040; (45% reduction equals 8,100 lbs/year TP based on HSPF watershed loading estimates)	Implement structural and non-structural projects and practices to reduce watershed TP loading to the Minnesota River by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year from the Le Sueur and Belle Plain subwatersheds	SWQ-2.6	Up to XX implemented projects; watershed TP load reduction up to XXX lbs/year to Lake Pepin from the Le Sueur and Belle Plain watershed
		Total Suspended Solids	Reduce TSS concentrations to <10% of samples exceeding 65 mg/L (April 1 – September 30) by reducing TSS loading in the watershed	Implement structural and non-structural projects and practices to reduce watershed sediment loading to Lake Pepin by up to XXX tons/year (as estimated at field scale) and XXX tons/year from the Le Sueur and Belle Plain subwatershed	SWQ-3.6	Up to XX implemented projects; watershed sediment load reduction up to XXX tonsyear to Lake Pepin from the Le Sueur and Belle Plain watershed
		Nitrate	Reduce total nitrogen loading by 45% (from average 1980-1996 conditions) by 2040; (45% reduction equals 186,000 lbs/year TN based on HSPF watershed loading estimates)	Implement structural and non-structural projects and practices to reduce watershed TN loading to Lake Pepin by up to XXX lbs/year (as estimated at field scale) and XXX lbs/year from the Le Sueur and Belle Plain subwatershed	SWQ-4.6	Up to XX implemented projects; watershed TN load reduction up to XXX lbs/year to Lake Pepin from the Le Sueur and Belle Plain watershed
		E. coli	Reduce *E. coli* concentrations to monthly geometric means <126 CFU/100 mL (April 1 - October 31) by achieving *E. coli* loading capacity identified in the Lower Minnesota River TMDL (see TMDL)	Implement structural and non-structural practices to reduce *E. coli* loading	SWQ-5.6	Implementation of projects and practices to address non-functioning SSTS (XXX over 10 years watershed-wide), and feedlots (X over 10 years watershed-wide); see Implementation Schedule
		Fish Index of Biological Integrity	Achieve applicable Fish Indices of Biological Integrity for streams: - Southern headwaters, modified use (FIBI = 33) - Southern headwaters, general use (FIBI = 55)	Implement structural and non-structural practices to improve FIBI (update with strategies specific to this planning area)	SWQ-6.6	Implementation of projects and practices to address stressors including TP, TSS, N, and altered hydrology (see related Implementation Schedule Items)
		Macroinvertebrate Index of Biological Integrity	Achieve applicable Macroinvertebrate Indices of Biological Integrity for streams: - Prairie streams, modified use (MIBI = 22) - Southern streams, general use (MIBI = 37)	Implement structural and non-structural practices to improve MIBI (update with strategies specific to this planning area)	SWQ-7.6	Implementation of projects and practices to address stressors including TP, TSS, N, and altered hydrology (see related Implementation Schedule Items)