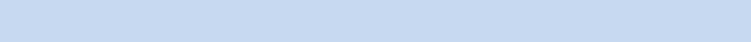
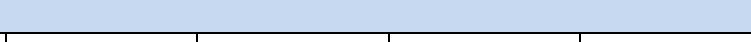
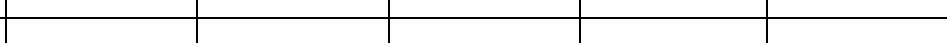
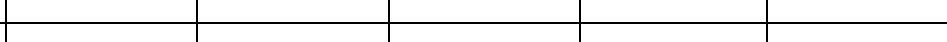
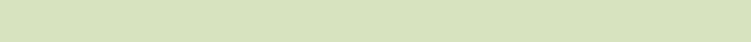
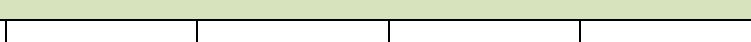
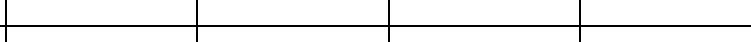
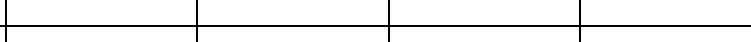
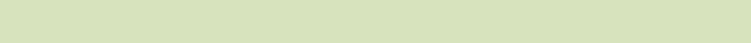
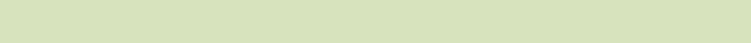
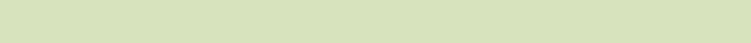
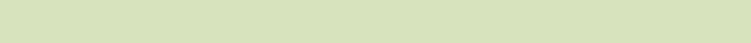
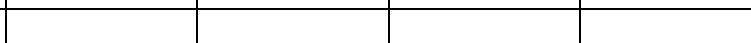
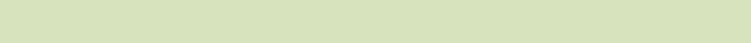
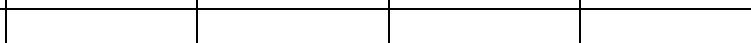
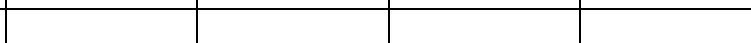
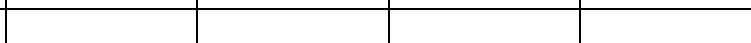
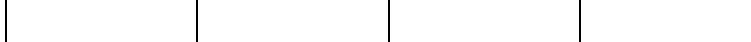


North & East Metro Groundwater Management Area Timing & Progress of Implementation Activities

		Duration (Years)	Ongoing Work	Completed Annually	Completed Semi-Annually						
Action ID	Action					Status	2016	2017	2018	2019	2020
Objective I. Groundwater use in the GWMA does not harm aquifers and ecosystems and does not negatively impact surface waters											
I.1	The DNR will improve monitoring of groundwater levels, basin water levels, stream flows, climate, groundwater-associated biological communities, and water use within the GWMA to inform the DNR permit decisions										
I.1.a	Hydrological and climate monitoring system. The DNR will coordinate with federal, state, and local agencies in these efforts										
I.1.a.i	Evaluate opportunities for stream flow monitoring collaboration or data collection	Ongoing									
I.1.a.ii	Add lake gauges as needed	Complete									
I.1.a.iii	Install DNR observation wells and work with permit holders on reporting groundwater data and adding observation wells	Ongoing									
I.1.a.iv	Weather stations: Identify climate monitoring requirements and add weather stations as needed to provide precipitation, temperature, solar radiation, dew point, and wind speed for improved evapotranspiration estimates										
I.1.a.iv.i	Establish up to two weather stations to provide real time data from the GWMA	Complete									
I.1.a.iv.ii	Participate with cooperators in the monitoring of White Bear Lake evaporation	Complete									
I.1.a.iv.iii	Evaluate the benefits of evaporation monitoring networks on lakes in the GWMA	Ongoing									
I.1.a.iv.iv	Summarize available climatological data related to groundwater management for the new GWMA reporting system	Ongoing									
I.1.b	The DNR will continue to improve information on water use within the GWMA										
I.1.b.i	Refine estimates of groundwater use that does not require a permit (<10,000 GPD or 1MM GPY)	Complete									
I.1.b.ii	Develop guidance for consistent water use reporting categories	Complete									
I.1.c	The DNR will develop and use groundwater models for use in the permit decision process										
I.1.c.i	Develop and use standard groundwater models and methods to predict impacts from groundwater appropriations	Complete									
I.1.c.ii	Support Met Council/USGS refinements of the Metro Model 3 and use to understand groundwater-lake interaction where feasible.	Complete									
I.1.d	Develop additional information on groundwater associated biological communities										
I.1.d.i	Develop GIS model of wet prairie complexes	Complete									
I.1.d.ii	Wetland/native plant community field surveys	Complete									
I.1.e	Create GWMA reporting system for public access to data collected and analysis	Not Started									
I.2	The DNR will develop and apply sustainability thresholds for aquifers, ecosystems and surface waters in the GWMA										

		Duration (Years)	Ongoing Work	Completed Annually	Completed Semi-Annually						
Action ID	Action					Status	2016	2017	2018	2019	2020
I.2.a	Use safe yield thresholds for aquifers					Ongoing	██████████	██████████	██████████	██████████	██████████
I.2.b	Prepare report to legislature with recommendations for thresholds for negative impacts to surface waters					Complete	██████████				
I.2.c	The DNR will use specified thresholds (Obj I.2.b) for determining negative impacts to streams from groundwater appropriations										
I.2.c.i	Coordinate studies and work with permitted groundwater users having potential negative impacts on trout streams within the GWMA					Ongoing	██████████	██████████	██████████	██████████	██████████
I.2.d	The DNR will develop thresholds of negative impacts to water basins and wetlands as required by Minn. Stat. sec. 103G.287, subd. 2										
I.2.d.i	Work with others to evaluate susceptibility of selected water basins to groundwater-level changes in the GWMA					Ongoing		██████████	██████████		
I.2.d.i.a	Work with USGS to model total annual volume withdrawn from White Bear Lake due to permitted groundwater appropriations					Complete		██████████	██████████		
I.2.d.i.b	Adjust permits if withdrawals from White Bear Lake exceed sustainability thresholds					Not Started			██████████	██████████	██████████
I.2.d.i.c	Use procedures outlined in MN Rules part 6115.0740 to resolve water use conflicts identified in analysis of White Bear Lake					Not Started			██████████	██████████	██████████
I.2.d.i.d	Set a protective elevation for White Bear Lake					Complete	██████████				
I.2.d.ii	Determine sustainability thresholds for withdrawals from wetlands in the GWMA due to groundwater appropriations					Not Started				██████████	██████████
I.2.d.ii.a	Manage appropriations to meet the sustainability thresholds					Ongoing	██████████	██████████	██████████	██████████	██████████
I.3	The DNR groundwater appropriation permits will integrate sustainability limits, individual and cumulative permit analysis, and will include evaluation of existing permits within the GWMA										
I.3.a	Evaluate new permit applications individually and in conjunction with other appropriation permits					Ongoing	██████████	██████████	██████████	██████████	██████████
I.3.b	Review existing permits in the GWMA within 5 years					Ongoing		██████████	██████████	██████████	██████████
I.3.c	Limit current and future appropriations where needed to meet sustainability limits					Not Started			██████████	██████████	██████████
I.4	The DNR will communicate the status of Objective 1										
I.4.a	Create a new GWMA reporting system					Not Started			██████████	██████████	██████████
I.4.b	List applications for new or amended water appropriation permits in the GWMA reporting system					Not Started			██████████	██████████	██████████
I.4.c	Hold two GWMA Advisory Team meetings per year					Ongoing	██████████	██████████	██████████	██████████	██████████
I.4.d	Increase education and outreach to the public about groundwater use in the GWMA					Ongoing	██████████	██████████	██████████	██████████	██████████
I.4.e	The DNR will encourage counties to participate in the County Geologic Atlas program										
I.4.e.i	Complete Anoka County Geologic Atlas					Complete	██████████	██████████			
I.4.e.ii	Invite Ramsey County to participate in update to County Geologic Atlas					Complete			██████████	██████████	██████████

		Duration (Years)	Ongoing Work	Completed Annually	Completed Semi-Annually						
Action ID	Action					Status	2016	2017	2018	2019	2020
I.4.e.iii	Complete Washington County Geologic Atlas					Complete					
I.5	The DNR will improve access to data collected and analyzed by other organizations in the GWMA										
I.5.a	Support and participate in a data management system, including website improvements					Ongoing					
I.5.b	Pursue hydrologic data collected by other organizations in the GWMA					Ongoing					
I.6	Community water supply plans include actions in response to negative impacts on surface waters due to groundwater withdrawals					In Progress					
I.7	The DNR will promote groundwater recharge in the GWMA, consistent with sound water quality management										
I.7.a	Work with others to identify important groundwater recharge areas and opportunities to enhance recharge					Ongoing					
I.7.b	Support LGU efforts to protect important groundwater recharge areas through zoning and land use planning					Ongoing					
I.7.c	Update groundwater sensitivity maps for the GWMA					Complete					
Objective II. Groundwater use in the GWMA is reasonable, efficient, and complies with water conservation requirements											
II.1	The DNR will ensure that groundwater users are complying with water conservation requirements in their water supply plans and permits										
II.1.a	Include water conservation requirements in appropriation permits					Ongoing					
II.1.a.i	Work with Met Council to evaluate and update conservation goals					Ongoing					
II.1.b	Evaluate compliance with permit conservation requirements by permit					Ongoing					
II.1.c	Evaluate conservation actions when considering amendment requests					Ongoing					
II.1.d	Partner with LGUs to develop conservation requirements					Ongoing					
II.1.e	Update information used to develop water conservation requirements					Complete					
II.2	The DNR will improve communication about and promote the values of water conservation in the GWMA										
II.2.a	Promote lessons learned about water conservation by water users in the GWMA					Ongoing					
II.2.b	Report on water conservation practices being used in the GWMA					Complete					
II.2.c	Provide assistance to LGUs to encourage and implement water conservation measures that do not require a DNR appropriations permit					Ongoing					
II.2.d	Include links to organizations with water conservation information on DNR website					Complete					

		Duration (Years)	Ongoing Work	Completed Annually	Completed Semi-Annually						
Action ID	Action					Status	2016	2017	2018	2019	2020
II.3	Work with other organizations to promote water storage, water re-use, and use of viable alternative water sources to conserve groundwater					Ongoing					
II.4	The DNR will promote the use of water conservation strategies in community water supply planning in the GWMA										
II.4.a	Require that water supply plans include measureable conservation goals.					Ongoing			— — —	— — —	— — —
Objective III. Groundwater use in the GWMA does not degrade water quality											
III.1	The DNR will include compliance with local, state, and federal water quality regulations as permit conditions										
III.1.a	Identify water quality regulations that apply to groundwater use and clarify how best to include them in appropriation permits					Ongoing					
III.2	The DNR will ensure that permitted appropriations do not degrade water quality by moving known contaminants										
III.2.a	Evaluate new permit applications for their potential to move known contaminants					Ongoing					
III.2.b	Evaluate all existing permits in the GWMA for their role in moving contaminants					In Progress		— — —	— — —	— — —	
III.3	Ensure that water supply plans take into account contaminant plume management					In Progress		— — —	— — —	— — —	
III.4	The DNR will improve communication about known contaminants and pollution management in the GWWA										
III.4.a	Use the GWMA reporting system to describe the status of pollution plume management in the GWMA					Not Started					
Objective IV. Groundwater use in the GWMA does not create unresolved well interferences or water use conflicts											
IV.1	Continue to review permit applications to identify and reduce the likelihood of well interferences and water use conflicts					Ongoing					
IV.2	Resolve well interferences and water use conflicts applying the framework outlined in statute and rule					Ongoing					
IV.3	Improve information on aquifer characteristics in the GWMA to identify and reduce the interferences and conflicts prior to permit approval					Ongoing	— — —	— — —	— — —	— — —	— — —
IV.4	Increase education and awareness about resolving well interferences and conflicts					Ongoing	— — —	— — —	— — —	— — —	— — —
Objective V. All groundwater users in the GWMA have the necessary permits to use groundwater											
V.1	The DNR will improve its capacity to detect unpermitted groundwater use										
V.1.a	Complete periodic analysis to identify potential unpermitted groundwater use in the GWMA and take appropriate action					Ongoing					
V.1.b	Complete follow-up review of applications made for preliminary well approvals					Ongoing					
V.1.c	Provide updated information to well drillers and consultants on existing laws and the water appropriation permit application process as it is available					Ongoing		— — —	— — —	— — —	— — —

		Duration (Years)	Ongoing Work	Completed Annually	Completed Semi-Annually						
Action ID	Action					Status	2016	2017	2018	2019	2020
V.1.d	Facilitate the public's ability to report unpermitted use					Complete			██████████	██████████	██████████
V.2	The DNR will ensure that permitted volumes reflect actual use and use does not exceed permitted volumes										
V.2.a	Evaluate water use reports and contact permit holders whose reports indicate inaccuracies					Ongoing	██████████	██████████	██████████	██████████	██████████
V.2.b	Bring permittees into compliance when reported use is higher than established in permit					Ongoing	██████████	██████████	██████████	██████████	██████████
V.2.c	Work with permit holders to adjust permitted volume to better match actual use and need					Ongoing		██████████	██████████	██████████	██████████
V.3	The DNR will ensure that water users comply with conditions on appropriation permits										
V.3.a	Work with permit holders to bring them into compliance with their permit conditions					Ongoing	██████████	██████████	██████████	██████████	██████████