

**Legislative Water Commission - 2019 Legislative Recommendations:
Desired Future State Minnesota's Water Resources
August 2018**

DRAFT, for discussion

JRS

In 2008 Minnesota's citizens passed the Clean Water, Land and Legacy Amendment to the Constitution that dedicated a portion of the state sales tax for water. These resources created significant opportunities to achieve a sustainable water future for our state. Much has been accomplished, including research, monitoring, mapping, planning and implementation. However, recent information suggests that improvements to our state's water, when the amendment expires in 2034, may not meet citizen expectations. As the amendment period reaches a half-way point, there is need to reflect and refocus on a desired future state for water for 2034 and beyond. The citizens of Minnesota, local governments, the Clean Water Council, the Lessard-Sams Outdoor Heritage Council, the Legislative-Citizen Commission on Minnesota's Resources, the Administration, and the Legislature each have important roles and responsibilities to work together in prioritizing, funding, implementing, and evaluating environmental programs aimed at improving our water, increasing our return on investment, and reaching a desired future state for water in Minnesota. To ensure adequate and clean water for the future, we must balance long-term plans for conserving and protecting our natural resources with those for ensuring a healthy public and healthy economy. This is a long-term issue that will require our leaders to think about the future and in the best interest of our children and grandchildren.

There are several plans and reports that lay the groundwork for a strategy for the desired future for our water resources. Some of these recommendations have been accomplished. Others are included in the following draft recommendations from the Legislative Water Commission. The recommendations employ an interdisciplinary approach with multiple perspectives and expertise. The draft recommendations follow. They are not listed in priority order:

- 1) **Establish Watershed "Water Bank Accounts"**-- Create a water budget tool for each of the major watersheds in the state, using existing information. Improve our understanding of statewide water balances (bank accounts) as well as water sustainability by enhancing the One Watershed/One Plan program. We can use existing information about groundwater recharge, streamflow, and water use to identify priorities and concerns about water sustainability implementation, based on objective criteria. We are at a point where data exist to incorporate water-budget information into water planning and land-use planning.

- 2) **Implement a Statewide Water Policy**--Statewide water quality and quantity regulation and management is coordinated by state agencies. However, rigorous processes, involving multiple agencies often creates delays in decisions. This could be improved by establishing an interagency/legislative water policy process that includes the Future State of Water. The policy should include specific and emerging issues such as a statewide guide for mineral development that includes constraints, goals, and expectation
- 3) **Increase locally-led water management**--Based on the Governor's Town Hall feedback, our citizens want Clean Water funds allocated at regional levels rather than all at the state level. They also request that funding to be available to nonprofit and citizen volunteer organizations and to tribal partners working toward clean water. Citizens want measurable outcomes, accountability, and clear assessments of whether waters are improving. As a state, we should continue to increase locally-led water management programs that are directed under state goals and guidelines as well as a state water policy. We should continue to support and encourage inter-jurisdictional water planning through the one-watershed/one-plan process.
- 4) **Increase efforts to Control Invasive Species**--The issue of aquatic invasive species was of high importance to the citizens of the state. Many believe that the Legislature, and agencies, do not realize how critical an issue this is to Minnesotans. State rules, education, regulations and penalties need to be increased to preserve and to protect our water resources.
- 5) **Increase the Understanding and Water Management Focus on Ecosystem Services**--Minnesota's water resources contribute to ecosystem services in several ways. These services include water for agricultural, industrial, and residential use; fish, waterfowl, mussels, and other foods; recreation (boating, swimming, fishing, hunting, collecting food, nature viewing; flood control; and aesthetic, spiritual, and cultural values. Research is underway to increase our understanding of how eco-services can be measured in terms of economic value. Ecosystems are interconnected and complex. Human impacts to ecosystem services vary across the state due to differences in climate, geology, soils, topography, and vegetation. Stressors impact ecosystems in a cumulative and interacting ways that are not all related to human activity. Water resource management and policies needs to be focused at watershed scales rather than statewide. There is a need to improve methods used to estimate and manage ecosystem services and to define goals to guide on-the-ground decisions. As a state, we need to enhance our understanding of the connections between hydrology and aquatic biology and aquatic ecology as well as associated eco-services. We need to place more focus on developing criteria for assessing the critical water levels, or flow conditions, required to support ecosystems that including habitat and population-based minimum flows; high-flow protection standards for habitat-forming, and silt-flushing high flows; protections for downstream needs; protection of the natural variability of flows over time (hydrograph shape); and groundwater/surface water interactions.

- 6) **Enhance and Improve the Water Appropriation Permit Process:** Develop an automated water-appropriation tool that assesses streamflow depletion based on the cumulative effects of groundwater pumping and stream-water withdrawals. Simplify the water appropriation-permit process (internet-based) for small appropriators to speed-up and simplify the process... Permit criteria should include the effects of total watershed appropriations relative to watershed size, groundwater recharge, summer streamflow, and stream thermal regime. Expand the DNR's authority to designate water-resources management areas. Expand the DNR's authority to adjust appropriations when needed.

- 7) **Recognize the Full Cost and Value of Water:** In one sense all of our water resources are allocated to important uses including natural and human-related needs. Any new use of water needs to be assessed in that context. Managers need to account for the water quality and quantity implications of additional uses of water. State rules should capture the total costs of new allocations. However, other than data related to municipal water supply, little information is available for assessing the value of water and water-related ecosystem services. The price of residential water is extremely variable. Water-based ecosystems provide unquantified aesthetic, spiritual, and cultural value. Other studies indicate that people are willing to pay for improved water quality. We need to assess the costs and benefits of ensuring water sustainability and quantify the economic value of ecosystem services provided by adequately managed streams and lakes. In addition we need to address problems and costs associated with aging water infrastructure and leaking water systems and prioritize areas that are most vulnerable. **Consider increasing appropriations permit costs and connection fees to recognize the full societal costs of using water. Promote conservation pricing**

- 8) **Increase Public Education--** The role of education is undervalued in protecting water resources. The Governor's Town Hall meetings recognized the need for additional water-resources training and education. Minnesotans understand the need to change behavior in order to reach sustainable water-resource goals. They recognize that we need to learn more about how behavior affects water quality; more about the basics of the water cycle, lakes, and rivers; and more about current water resource management efforts and how they can help. The diversity of Minnesota's citizens requires tailored messages and tailored methods of delivery. **Minnesota has many components of a comprehensive water education system, but needs a better overall strategy and systematic approach. Professional training curriculums in land-use planning, engineering, horticulture, and agriculture need more water-resources content.** No system links formal and non-formal, youth and adult water education. Two key messages for all Minnesotans are that there is a strong connection between individual and corporate actions on the land, and that water is important to all living things and to our economic well-being.

- 9) **Control Emerging Contaminants in Waters of the State:** Emerging contaminant affect aquatic biota and potentially human health in ways we do not understand. Continue to fund studies to

understand this problem. Promote legislation that mandates a simple process for the return and disposal of un-used pharmaceuticals.

10) Increase Data, Information and Analysis--Maintain and enhance water information and monitoring programs. Increase emphasis on collecting information to understand water use, water budgets, groundwater, surface water, and aquatic biology and their interactions. Prepare a strategy for generating and managing information needed to integrate water sustainability assessment results into regulatory programs on a statewide basis. Support systematic water sustainability programs by re-assessing data programs in order to collect data that are needed.

11) Increase our Knowledge About our Water Supply and Water Use--Population growth, development in the agricultural and energy sectors, climate variability, pollution, and competition for water all influence our future availability of water (National Science and Technology Council 2007). As a state, we need to improve tools to answer the following question: **“How much water can the people of Minnesota use on a sustainable basis?”** The National Science and Technology Council has identified three challenges to ensuring adequate water supplies: measurement and accounting for water availability and use; development of methods that allow for expansion of freshwater supplies while using existing supplies more efficiently and; development and improvement of predictive management tools. A program focused on water sustainability needs to be based on sound hydrologic and water-use information as well as an understanding of the role of ecosystems. There also are needs for short and long-term predictive methods. These include models and other forecasting tools supported by sound data. Development of a national water census (<http://water.usgs.gov/wsi>) is one of USGS’s seven major strategic directions (USGS 2007). The USGS goal is to provide technical information and tools to evaluate water availability and inform decision making. These resources should be linked to state programs to better integrate water availability, water budgets, water use, and climate-variability information within the state’s water-appropriation and permitting process.

12) Recharge and Re-use of excess water: Begin to value wastewater and storm water as a resource and not as a liability. Assess the state to prioritize areas with the most critical and significant wastewater system repair needs. Identify and promote mechanisms to address areas with leaky septic systems. Identify, prioritize, allow and promote areas where groundwater recharge of wastewater and storm water is feasible. Allow for managed recharge. Protect areas where enhance recharge makes hydrologic sense. Assess and allow water reuse where appropriate.

13) Water quality degradation is a prominent issue in our state. The state has made good progress in characterizing drivers, stressors, and issues that affect water quality. We now have a good picture of how changes to chemical, physical, and biological components have led to

present water-quality conditions in our rivers, lakes, and groundwater. Many areas of Minnesota have are relatively undisturbed and have a high degree of attainment of designated beneficial uses. Other areas show measurable effects on water quality associated with particular land uses and human activities. These changes affect the quality and safety of drinking water; the presence of toxins; the quality of recreational waters; the support of healthy aquatic communities; and many other ecological benefits from flood control to spiritual fulfillment. **We need to better identify these areas and tailor our management practices individually with respect to water-quality protection, preservation and improvement.**

14) **Keeping Water on the Land:** Slowing runoff to streams will reduce erosion as well as reducing the impacts of nutrients, sediment and other contaminants. Focus on retaining water on the land, in all parts of the state, to improve groundwater and surface water quality. Best-management practices are key to improving the quality of our waters. **Identify conservation practices most likely to reduce the impacts of our uses of the land when tailored to specific landscapes and land uses across the state.** This should be a next-step in BMP implementation. Leverage state and federal funding programs to maximize land-owner involvement and enrollment in conservation practices using existing programs and incentives.

15) **Address our Aging Wastewater and Drinking Water Infrastructure:** Conduct cost-effectiveness reviews of best-management practices at drinking water and wastewater facilities: The societal benefits of cleaner water, resulting from improvements in wastewater and drinking water facilities practices are difficult to measure because they are qualitative. Therefore, we need to move toward with infrastructure-improvement decisions based on cost-effectiveness reviews that examine feasible alternatives to meet required needs relative to the cost. Recommend that wastewater and drinking water facilities undergo an “alternatives review” process that includes improvements to best-management practices. Move forward with pilots of watershed-scale trading programs that involves stakeholders: Identify efficiencies for regional drinking water and wastewater administration, operation and maintenance. Define the level of infiltration and inflow considered excessive--above which corrective action should be funded. Address and fund improvements to our aging infrastructure. The U.S. Environmental Protection Agency (EPA) estimates that in the next 20 years more than \$6 billion will be needed to improve drinking water systems throughout Minnesota. The Minnesota Pollution Control Agency (MPCA) estimates that in the next 20 years more than \$4.5 billion will be needed to improve public wastewater systems, and more than \$1.2 billion to upgrade and maintain individual wastewater systems.

16) **Plan for an uncertain future: Prepare policy and manage water in the face of uncertain future conditions** that considers emerging contaminants, emerging technology, changing demographics, technology and land use, climate change, economic uncertainty, and aging infrastructure. Formulate a plan to better understand the importance that water and water use plays in providing ecological services. Include a process address the impacts of long-term

variations in precipitation and temperature on water supply and on ecological services. Adopt a state-wide climate change adaptation policy. Develop policy to guide adaptation for changes that likely will occur to landscapes, biota, hydrology and infrastructure. New technology and industry growth may exert demands on water resources and technology may provide avenues to improve water quality and water sustainability. Our understanding of existing and potential technologies often is insufficient to evaluate all impacts. New technology needs to be carefully considered relative to feasibility and potential unintended consequences. Consider funding projects, within established funding programs such as the LCCMR that involve technological uncertainty. In to order initiate a future-state process--strengthen communication and ties between the Legislative Water Commission and the Environment and Natural Resources Committees in the House and Senate.

17) Protect Our Lakes: Consider a comprehensive program and policy for lake sustainability--

Consider policy/legislation/incentives aimed at protecting lakes, based on a tired approach that considers lake status. Consider rigorous legislation focused on stopping the progression of invasive species across lakes. Provide additional agency support to understand stressors and best-management practices to preserve and to enhance deep lakes. Provide program support to assess lakes across the state, focused on the potential effects of climate change and management practices that can mitigate those impacts. Provide analyses, funding and incentives, and support legislation to address and to fix inadequate septic systems. Support legislation to limit liability for de-icing applicators and property owners. Promote legislation focused on eliminating emerging contaminants from wastewater across the state. **Prioritize funding opportunities, within established programs, to increase environmental and conservation land easements in watersheds that contain lakes needing protection.** Provide funding for a sentinel lakes program. Incorporate robust water- budget information into water planning for lakes. Consider legislation and incentives aimed at protecting shorelines of lakes.

18) Protect our Rivers and Groundwater: Plan to continue efforts supported by the Clean

Water, Land and Legacy Amendment, beyond 2034. Continue to provide stable funding for monitoring, planning, restoration and protection activities for rivers, streams, and groundwater. Address drinking water protection, subsurface sewage treatment systems, analysis and restoration of impairments from nonpoint and point contamination, and watershed research and tool development. The Amendment has resulted in fundamental changes and improvements in sustainable management of waters in the state. We need to ensure that progress continues as we move from assessment to implementation.

Background

In 2008 Minnesota's citizens passed the Clean Water, Land and Legacy Amendment to the Constitution that dedicated a portion of the state sales tax for water. These resources created significant opportunities to achieve a sustainable water future for our state. Much has been accomplished, including research, monitoring, mapping, planning and implementation. However, recent information suggests that improvements to our state's water, when the amendment expires in 2034, may not meet citizen expectations. As the amendment period reaches a half-way point, there is need to reflect and refocus on a desired future state for water for 2034 and beyond. The citizens of Minnesota, local governments, the Clean Water Council, the Lessard-Sams Outdoor Heritage Council, the Legislative-Citizen Commission on Minnesota's Resources, the Administration, and the Legislature each have important roles and responsibilities to work together in prioritizing, funding, implementing, and evaluating environmental programs aimed at improving our water, increasing our return on investment, and reaching a desired future state for water in Minnesota. To ensure adequate and clean water for the future, we must balance long-term plans for conserving and protecting our natural resources with those for ensuring a healthy public and healthy economy.

Minnesota's water management priorities have changed over time, from policy based on wetland drainage to protection and restoration; from farming practices that did not recognize adverse impacts on natural resources and natural systems to adoption of soil and water conservation practices; and from discharge of raw sewage and pollutants into water bodies to implementation of water quality standards. **Although Minnesota is recognized as a leader in water-resources management, we do not have a comprehensive state water policy.** Strengths include ensuring that basic human water needs are met; ensuring that water remains an important economic asset for Minnesota; and reversing destructive trends in water use.

Minnesota's water management has been shaped on our reliance on agriculture. When Minnesota achieved statehood, one of the first laws enacted allowed private corporations to be formed for the purpose of draining lands and creating privileges. In 1931, creation of the state Department of Conservation brought recognition of the adverse impacts of wide-scale drainage, and practices were adopted to reduce drainage. In 1937, the Legislature established our public waters system, a water appropriation permit program, and programs regulating construction of systems to appropriate water, dams, and waterway structures.

In 1947, the Legislature amended water laws to include in the concept of public waters. In the 1950's it adopted the "Save the Wetlands" program, which used state and federal money to buy wetlands for state wildlife management areas. Also in the 1950s, reporting requirements were developed for large water users, and watershed districts were granted authority to levy taxes for water management. In the 1960s, the Department of Conservation warned that some parts of the Twin Cities metropolitan area were approaching a margin of safety between water supply and demand was small. In 1967 the Minnesota Pollution Control Agency (MPCA) was formed.

In 1972, Congress passed the Federal Water Pollution Control Act 1972 as well as the Safe Drinking Water Act. These laws drove state legislation to understand surface-water pollution sources, educate the public, and regulate water quality. Laws included the Environmental Rights Act and the Environmental Policy Act as well as legislation protecting water resources; expansion of the public waters definition to include certain wetland types and the start of a public waters inventory; consideration of environmental concerns before improving drainage systems; creation of the Water Pollution Control Fund for wastewater treatment facilities; and environmental program coordination

In 1977 the Legislature created the Water Planning Board. During the 1980s, the Legislature adopted recommendations of the Water Planning Board calling for a new local role in statewide comprehensive water planning and establishment of a consolidated board of water and soil resources to administer local water planning and related programs. Policy programs were created to prevent pollution and to address nonpoint pollution. Discovery of pesticides in Minnesota groundwater increased awareness of the importance of land use/surface water/groundwater connections. **In the 1990s, the Legislature established the Legislative Water Commission, called for no net loss of wetlands under the Wetland Conservation Act, and enacted measures to deal with emergency drought concerns, nutrient loading in water bodies, and nonpoint pollution issues.** It also proposed water retention for new developments and required public water supply planning and the elimination of wasteful water uses. *(Adapted from "Minnesota Water Sustainability Framework" and supporting documents: University of Minnesota, Water Resources Center, 2011)*

Over the past 30 years, several plans, reports and papers have been prepared by agencies and non-profit organizations. These documents lay the groundwork for a strategy for the desired future state of our water resource and for a formal state water policy. Some of these reports and plans are described in the following narrative and some of the recommendations have been accomplished. Others are included in the recommendations from the Legislative Water Commission. The recommendations employ an interdisciplinary approach with multiple perspectives and expertise. A summary of some of the reports and plans follow:

1989: Minnesota Groundwater Act: The Groundwater Protection Act of 1989 (Act established a state groundwater degradation prevention goals, programs and measures. Prior to the 1980's, there was little federal or state regulation that related to groundwater. In the late 1980's, all levels of government began to understand the importance of groundwater as well as the contamination and depletion that were occurring to the resource. The Act contain a non-degradation goal and health risk-limits for drinking water. The CT also addressed agricultural chemicals by providing a process to implement a strategy for nutrient management. It singles our sensitive areas for special protection. It contained provisions designed to protect groundwater contamination through new, existing, or unsealed abandoned wells and borings. It prohibited once through cooling permits in most areas. The Act established a wellhead protection program. Nonpoint issues, such as pesticides that leach into groundwater, and runoff that leaches into surface water also are addressed by the Act. However, the Act focused on groundwater quality and is basically silent to sustainability as a water quantity issue. The Act contains several areas that are important to Minnesota's water future.

1999: The U. S. Geological Survey (USGS) prepared an extensive report that outlines information required for the analysis of groundwater systems in order to manage groundwater for sustainability. The categories of information include information to understand the physical framework, hydrologic budgets and stress, and the chemical framework of groundwater systems. Generally, agencies in Minnesota have made good progress in using this document to guide efforts to address future water needs. The Minnesota's Groundwater Atlas program is an example of the high level of technical analysis being done in our state. Work like the Atlas Program (MGS and DNR) is an example that is a goal for most other states in the Midwest.

Impaired Waters program (G16). In 2004, recommendations were developed for the design of an impaired-waters program. The Minnesota Environmental Initiative led this collaborative effort at the request of the Minnesota Pollution Control Agency. More than sixty organizations contributed to the process. The process resulted in 31 recommendations that defined the scope of the impaired-waters program and outlined strategies for the program's funding, priority setting, and identification and restoration of impaired waters. This process provided for

a comprehensive assessment of the state's surface waters every 10 years, accelerated and prioritized TMDL report development and restoration activities and proposed a dedicated source of funding to accomplish these efforts. Recommendations also focused on watershed assessments, the Total Maximum Daily Load process, and on restoration. The report led to the process that resulted in the Legacy Amendment. Many of the recommendations have been implemented into the state's clean water program. However, the recommendations were mostly silent in addressing the state's problem with respect to groundwater.

DNR Groundwater Report: In 2005, the Legislature asked the Department of Natural Resources (DNR) to assess groundwater sustainability. The DNR suggested that a sustainability definition was needed and proposed the following: "Sustainable use of groundwater is the use of water to provide for the needs of society, now and into the future, without unacceptable social, economic or environmental consequences. That definition has since been put into statute. The DNR argued that there were many areas of the state where withdrawals of water from wells were resulting in aquifer-level declines and where streams, lakes and wetlands were being adversely affected by groundwater withdrawal. Some of the suggestions in the report have been adopted as policy by state agencies.

Clean Water Legacy Act (CLWA): The 2006 Act provided an operational framework and tools to ensure Minnesota's legacy of clean water passes intact to future generations. The Act accelerated testing of Minnesota's waters; provided resources to develop specific plans (TMDLs) to clean up Minnesota's contaminated waters; and targeted additional financial resources to existing state and local programs designed to improve water quality, leveraging federal, local and private resources. The CWLA provided funding of \$25 million for clean-water funding priorities and created the Clean Water Council. The majority of CWLA funding went to local government units and local stakeholders through existing programs to protect and restore lakes, rivers and streams. Other funds were made available to state agencies to perform critical activities related to monitoring and assessment of Minnesota's waters. The Act generally was silent with regard to groundwater.

In 2006, the Environmental and Natural Resources Trust Fund supported a unique partnership among the University of Minnesota and partners focused on the evaluation of state's natural resources. The objective of the effort was to identify key issues affecting those resources, and to make recommendations for improvement and protection of those resources. The work addressed Minnesota's constitutionally identified natural resources: air, water, land, wildlife, fish, and outdoor recreation. In doing so, the project assessed the past and present condition of each of these six natural resources. They also identified and describe drivers of change impacting them, and identified key issues that could be addressed to protect and conserve them. They addressed the key issues and developed recommendations. These recommendations were synthesized into a framework with five strategic areas. Recommendations were identified as being either policy and action recommendations or recommendations that add to our infrastructure (research needs, data gathering and monitoring needs, or educational activities). Some of these recommendations have been adopted by state agencies and some remain to be implemented (*Minnesota Statewide Conservation and Preservation Plan, 2008*).

2008: Clean Water, Land and Legacy Amendment: The Amendment provided stable funding, from sales' tax dollars for monitoring, planning, restoration and protection activities for lakes, rivers, streams, and groundwater for the next 25 years. The funds are used primarily for: assessments of drinking water protection and subsurface sewage treatment systems, acceleration of analysis and restoration of impairments from nonpoint and point contamination, and watershed research and tool development. The Amendment has resulted in fundamental changes and improvements in sustainable management of waters in the state.

Minnesota Water-Sustainability Framework: In 2008, the citizens of Minnesota passed the Clean Water, Land and Legacy Amendment to the state constitution, dedicating a portion of a small increase in the state's sales tax for the next 25 years. The Amendment created the Clean Water Fund to protect and enhance the state's water resources. This rare and unique opportunity allowed Minnesota to take action for a sustainable water future. At that time, the legislature directed the University of Minnesota to construct a framework describing what needed to be accomplished and how that could be accomplished. Aspects of water sustainability included drinking water, storm-water, agricultural and industrial use, surface and groundwater interactions, and infrastructure needs, all within the context of predicted changes in climate, demographics and land use. The resulting report (*Minnesota Water Sustainability Framework*) presets the most pressing issues that needed to be addressed to achieve sustainable water use, presented strategies, and provides recommendations. Some of the recommendation in the report have been incorporated into the work of our state agencies. Others remain to be addressed.

2009: EQB report: Managing for Water Sustainability: This report examined whether the state's water supplies are sufficient to meet the long-range requirements of communities, businesses and ecosystems. The report was prepared in response to a request from the Minnesota Pollution Control Agency. In addressing these charges, the EQB convened managers and technical experts. Participants discussed the issues and identified Minnesota's needs both today and long term, and reached a set of 14 conclusions and 15 recommendations for action or further consideration. The report concludes that information is the key ingredient of Minnesota's water allocation program. They also conclude that in one sense, the water resources of the state all have been allocated and that every use has its purpose, whether for people or the environment. Therefore, the state needs to address how much water may be available, the quality of that water, how the water is currently being used, what or who is depending on that source, and what will happen to public interests if a change is made. The report concluded that adequate data is integral to sustainable management because it allows for proper understanding of our resources and answers questions that decision makers and citizens ask. It tells us whether water of sufficient quality can be reliably tapped in a location or a region and whether the use can be sustained over the long run without harming the natural environment, other users, or the prospects of future generations. The Environmental Quality Board's conclusions and recommendations set a course for collecting and applying the information essential to Minnesota's continued progress toward sustainable management of its precious water resources.

2012: Groundwater Management Areas (GWMAs): The Minnesota legislature created groundwater management areas as a tool for the DNR to address difficult groundwater-related resource challenges. The DNR is developing pilot groundwater management areas plans. They are located in the North and East Metro, the Straight River area, and the Bonanza Valley. The purpose of the pilot planning projects is to learn how to effectively create and establish GWMAs in areas facing groundwater management challenges. Minnesota State Law provides for groundwater management areas: "The commissioner may designate groundwater management areas and limit total annual water appropriations and uses within a designated area to ensure sustainable use of groundwater that protects ecosystems, water quality, and the ability of future generations to meet their own needs". The GWMA process is a great step forward in managing our groundwater on a sustainable basis. However, the process is not robust enough and does not cover a sufficient portion of the state or the state's needs.

Freshwater Society, 2017- Several reports: The Freshwater Society has published several reports on groundwater sustainability in an effort to inform the state's residents about the demands on our groundwater and the limitations those resources face. Collectively, these reports present recommendations that can be encapsulated within three broad categorical suggestions: reduce, re-use, recharge and manage

Governor Dayton's Town Hall Meetings on Water: In 2017, Governor Dayton and state agency leaders traveled throughout the state to hear from Minnesotans about their ideas to protect and improve water quality in Minnesota communities. At the meetings, the Governor, as well as members of the administration talked with Minnesotans about the "25 by 25" Water Quality Goal and other ideas to ensure all Minnesotans have access to clean, reliable, affordable water. More than 2,000 people attended at least one of the ten meetings across the state. Overall, 3,500 ideas were submitted for improving water quality in Minnesota. The top recommendations and strategies for improving water quality included: Improving education; reducing water runoff; improving and empowering local water planning; reducing pollutants to protect drinking water; addressing failing wastewater, and; identifying long-term and sustainable funding.

There plans and reports that lay the groundwork for a strategy for the desired future state of our water resources and for statewide water policy. Some of the recommendations in these reports are underway or are being accomplished. Others are included in the following recommendations from the Legislative Water Commission. The recommendations employ an interdisciplinary approach with multiple perspectives and expertise.

The draft recommendations follow. They are not listed in priority order:

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- **Control Emerging Contaminants in Waters of the State:** Emerging contaminant affect aquatic biota and potentially human health in ways we do not understand. Continue to fund studies to understand this problem. Promote legislation that mandates a simple process for the return and disposal of un-used pharmaceuticals.
- **Increase Data, Information and Analysis--Maintain and enhance water information and monitoring programs. Increase emphasis on collecting information to understand water use, water budgets, groundwater, surface water, and aquatic biology and their interactions.** Prepare a strategy for generating and managing information needed to integrate water sustainability assessment results into regulatory programs on a statewide basis. Support systematic water sustainability programs by re-assessing data programs in order to collect data that are needed.
- **Increase our Knowledge About our Water Supply and Water Use--**Population growth, development in the agricultural and energy sectors, climate variability, pollution, and competition for water all influence our future availability of water (National Science and Technology Council 2007). As a state, we need to improve tools to answer the following question: **“How much water can the people of Minnesota use on a sustainable basis?”** The National Science and Technology Council has identified three challenges to ensuring adequate water supplies: measurement and accounting for water availability and use; development of methods that allow for expansion of freshwater supplies while using existing supplies more efficiently and; development and improvement of predictive management tools. A program focused on water sustainability needs to be based on sound hydrologic and water-use information as well as an understanding of the role of ecosystems. There also are needs for short and long-term predictive methods. These include models and other forecasting tools supported by sound data. Development of a national water census (<http://water.usgs.gov/wsi>) is one of USGS’s seven major strategic directions (USGS 2007). The USGS goal is to provide technical information and tools to evaluate water availability and inform decision making. These resources should be linked to state programs to better integrate water availability, water budgets, water use, and climate-variability information within the state’s water-appropriation and permitting process.
- **Recharge and Re-use of excess water: Begin to value wastewater and storm water as a resource and not as a liability.** Assess the state to prioritize areas with the most critical and significant wastewater system repair needs. Identify and promote mechanisms to address areas with leaky septic systems. Identify, prioritize, allow and promote areas where groundwater recharge of wastewater and storm water is feasible. Allow for managed recharge. Protect areas where enhance recharge makes hydrologic sense. Assess and allow water reuse where appropriate.
- **Water quality degradation is a prominent issue in our state.** The state has made good progress in characterizing drivers, stressors, and issues that affect water quality. We now have a good picture of how changes to chemical, physical, and biological components have led to present water-quality conditions in our rivers, lakes, and groundwater. Many areas of Minnesota are relatively undisturbed and have a high

degree of attainment of designated beneficial uses. Other areas show measurable effects on water quality associated with particular land uses and human activities. These changes affect the quality and safety of drinking water; the presence of toxins; the quality of recreational waters; the support of healthy aquatic communities; and many other ecological benefits from flood control to spiritual fulfillment. **We need to better identify these areas and tailor our management practices individually with respect to water-quality protection, preservation and improvement.**

- **Keeping Water on the Land:** Slowing runoff to streams will reduce erosion as well as reducing the impacts of nutrients, sediment and other contaminants. Focus on retaining water on the land, in all parts of the state, to improve groundwater and surface water quality. Best-management practices are key to improving the quality of our waters. **Identify conservation practices most likely to reduce the impacts of our uses of the land when tailored to specific landscapes and land uses across the state.** This should be a next-step in BMP implementation. Leverage state and federal funding programs to maximize land-owner involvement and enrollment in conservation practices using existing programs and incentives.
- **Address our Aging Wastewater and Drinking Water Infrastructure:** Conduct cost-effectiveness reviews of best-management practices at drinking water and wastewater facilities: The societal benefits of cleaner water, resulting from improvements in wastewater and drinking water facilities practices are difficult to measure because they are qualitative. Therefore, we need to move toward with infrastructure-improvement decisions based on cost-effectiveness reviews that examine feasible alternatives to meet required needs relative to the cost. Recommend that wastewater and drinking water facilities undergo an “alternatives review” process that includes improvements to best-management practices. Move forward with pilots of watershed-scale trading programs that involves stakeholders: Identify efficiencies for regional drinking water and wastewater administration, operation and maintenance. Define the level of infiltration and inflow considered excessive--above which corrective action should be funded. Address and fund improvements to our aging infrastructure. The U.S. Environmental Protection Agency (EPA) estimates that in the next 20 years more than \$6 billion will be needed to improve drinking water systems throughout Minnesota. The Minnesota Pollution Control Agency (MPCA) estimates that in the next 20 years more than \$4.5 billion will be needed to improve public wastewater systems, and more than \$1.2 billion to upgrade and maintain individual wastewater systems.
- **Plan for an uncertain future: Prepare policy and manage water in the face of uncertain future conditions** that considers emerging contaminants, emerging technology, changing demographics, technology and land use, climate change, economic uncertainty, and aging infrastructure. Formulate a plan to better understand the importance that water and water use plays in providing ecological services. Include a process address the impacts of long-term variations in precipitation and temperature on water supply and on ecological services. Adopt a state-wide climate change adaptation policy. Develop policy to guide adaptation for changes that likely will occur to landscapes, biota, hydrology and infrastructure. New technology and industry growth may exert demands on water resources and technology may provide avenues to improve water quality and water sustainability. Our understanding of existing and potential technologies often is insufficient to evaluate all impacts. New technology needs to be carefully considered relative to feasibility and potential unintended consequences. Consider funding projects, within established funding programs such as the LCCMR that involve technological uncertainty. In to order initiate a future-state process--strengthen communication and ties between the Legislative Water Commission and the Environment and Natural Resources Committees in the House and Senate.

- **Protect Our Lakes: Consider a comprehensive program and policy for lake sustainability**--Consider policy/legislation/incentives aimed at protecting lakes, based on a tired approach that considers lake status. Consider rigorous legislation focused on stopping the progression of invasive species across lakes. Provide additional agency support to understand stressors and best-management practices to preserve and to enhance deep lakes. Provide program support to assess lakes across the state, focused on the potential effects of climate change and management practices that can mitigate those impacts. Provide analyses, funding and incentives, and support legislation to address and to fix inadequate septic systems. Support legislation to limit liability for de-icing applicators and property owners. Promote legislation focused on eliminating emerging contaminants from wastewater across the state. **Prioritize funding opportunities, within established programs, to increase environmental and conservation land easements in watersheds that contain lakes needing protection.** Provide funding for a sentinel lakes program. Incorporate robust water- budget information into water planning for lakes. Consider legislation and incentives aimed at protecting shorelines of lakes.
- **Protect our Rivers and Groundwater: Plan to continue efforts supported by the Clean Water, Land and Legacy Amendment, beyond 2034.** Continue to provide stable funding for monitoring, planning, restoration and protection activities for rivers, streams, and groundwater. Address drinking water protection, subsurface sewage treatment systems, analysis and restoration of impairments from nonpoint and point contamination, and watershed research and tool development. The Amendment has resulted in fundamental changes and improvements in sustainable management of waters in the state. We need to ensure that progress continues as we move from assessment to implementation.