

**Legislative Water Commission- 2019 Legislative Recommendations:
Protecting and Preserving Minnesota's Lakes
August, 2018
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DRAFT, for Discussion only, JRS**

Minnesota is a water-rich state with a great deal of water stored in aquifers, lakes and streams. We are not running out of water. However, our activities are negatively affecting our lakes and lake ecosystems. Our lakes provide environmental, economic, and public health benefits and our lakes are among our most treasured of our natural resources. Healthy lakes enhance our quality of life. They support complex and important food-web interactions and provide habitat for fish and wildlife. Lakes contribute to a healthy economy. They are important for tourism and provide recreational opportunities for our state's residents. Our lakes are short-lived features on our landscape and all our lakes are aging. The natural aging of many of our lakes is being accelerated because of our actions on the land and in the water. We need to protect and restore our lakes. Because of the vast numbers of lakes in the state and because of the many threats that they face, we may need to make decisions about which lakes we protect and preserve.

There are things that can be done to protect, preserve and improve the condition of our lakes. On a statewide basis, we can improve our lakes by implementing best-management practices (BMPs) where our lakes are most affected by urban development, agriculture or forestry. Across the state, we should enhance the "one watershed/one plan" process to evaluate, locate, promote, incentivize and regulate activities that will improve our streams, lakes, wetlands, and groundwater. The DNR, with others, has initiated a "sentinel lakes program" in portions of the state. This program identifies lakes for study and monitoring that serve as indicators of general lake health in the different ecoregions of the state. This program should be maintained and enhanced by implementing a sentinel lake program in many of the 80 major watersheds in the state (this would not be appropriate for all watersheds because some have few lakes). This program would provide needed information regarding the status of our lakes and would enable an existing, locally-led, statewide programs to focus BMP's in areas that can best benefit our lakes, streams, wetlands and groundwater, all tailored for specific watersheds and ecoregions.

For lakes affected by water-level changes induced by groundwater pumping, the DNR has a program to assess and address a process for groundwater allocation change (groundwater management area program). This program is well documented and provides an effective management option. The program should be continued at an accelerated pace.

That being said, a more proactive and aggressive approach is needed to protect, preserve and improve our most precious and important lakes. The sentinel-lakes program approach could be applied to identify groups and classes of lakes, across the state's ecoregions that are most important to the state's residents. After identification and prioritization, these lakes could be placed in a protected status. Much like that state's protected water's program, protected lakes could be established through a process of inventory, designation, and incentives, all subject to possible regulation. Lakes could be identified and made subjected to a series of public review periods, revisions and a final hearing. The result would be groups of lakes that need to be protected through special resource programs. More importantly, state programs such as the Clean Water Fund, the Outdoor Heritage Fund and the Legislative and Citizen's Commission on

Minnesota Resources could be encouraged to consider prioritizing funding programs to provide conservation easements in the watersheds where these lakes exist.

**Working Toward Statewide Sustainable Lakes- Draft Recommendations.
(Not in priority order)**

- 1) **Legislation to make it easier to establish locally-let lake management districts having authority**
- 2) **Legislation to limit liability for de-icing applicators and property owners, given adequate training**
- 3) **More rigorous legislation focused on stopping the progression of invasive species across lakes in the state.**
- 4) Legislation that is focused on **eliminating emerging contaminants** from wastewater across the state. Include un-used pharmaceutical take-back legislation
- 5) **Assess watershed best-management practices as they apply to lakes.** These should include practices that address invasive species, nutrients and sediment. Provide additional agency support to **understand stressors** and best management practices to preserve and to enhance lakes across the state.
- 6) Increase funding and regulation authority for the **Groundwater Management Area Program** within the DNR
- 7) **Prioritize funding opportunities, within established programs, to increase environmental and conservation land easement in watersheds that contain lakes needing protection**
- 8) **Provide funding for a sentinel lakes program** focused on establishing lakes that need special protection status
- 9) **Establish a status of lakes consensus document:** Establish a prioritization process for the state's lakes that considers criteria for lakes to be maintained, improved and protected. Establish policy to promote those goals.
- 10) **Water budget information:** Incorporate robust water- budget information into water planning for lakes. Improve our understanding of the classes of lakes, water balances and water sustainability by including vigorous assessments of lakes into the one watershed/one plan program. Use existing information about groundwater recharge, streamflow, and water use to identify priorities for sustaining lake ecosystems, based on objective criteria. Use this analysis to assess priority areas for future lake-management programs.
- 11) **Policy/legislation/incentives aimed at protecting shorelines of lakes:** Based on a tiered approach that considers lake status. This could consider housing density, wastewater management and set-back requirements to protect lake quality and habitat.
- 12) **Deep Lakes:** Provide additional agency support to understand stressors and best management practices to **preserve and protect deep lakes.** Assess and identify lakes that can be preserved as deep lake habitat.
- 13) **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**
- 14) Provide additional agency support to understand stressors and best management practices to **preserve and to enhance shallow lakes.** Assess and identify lakes that can be preserved.
- 15) Provide program support for studies to **assess the impact of groundwater on lakes.** Conduct a statewide reconnaissance assessment of isotope chemistry to understand how lakes interact with groundwater, the landscape and groundwater withdrawals, focused on how best-management practices can be most effective.
- 16) **Develop a program to assess leaking septic systems and support legislation to provide support to fix inadequate septic systems.**
- 17) **Economic Analyses:** Assess the costs and benefits of ensuring, protecting and enhancing the quality of lakes across the state. Quantify the economic value of lake-ecosystem services provided by lakes and wetlands.
- 18) **Groundwater Recharge:** Identify and protect recharge areas for lakes that need to be protected and persevered.
- 19) **Data, information and analysis:** Maintain and enhance information and monitoring programs for lakes. Establish interagency working group on lakes, shallow and deep. Continue and accelerate studies focused on wetlands and on shallow and deep lakes. Increase emphasis on collecting information to understand groundwater and surface-water interactions in lakes. Prepare a strategy for generating and managing information needed to integrate lake- assessment results into regulatory programs on a statewide basis. Support systematic lake assessments by re-assessing data programs in order to collect the data that are needed.
- 20) **Understand the importance of landscape setting.** Develop a program that identifies lakes, based on their landscape setting, in order to protect and preserve our most important lakes.
- 21) **Inter-jurisdictional water planning:** Support and provide processes to manage large lakes that cross jurisdictional
- 22) **Support efforts to increase our understanding of the importance of hydrology and the quality of aquatic biology in our lakes.** Increase programs to understand the interrelationships between groundwater, surface water and aquatic ecology as well as the associated eco-services.
- 23) **Importance of our state as the land of 10,000 high-quality lakes:** Dedicate a portion of Clean Water funds for lake-sustainability efforts. Establish a Clean lake sustainability Committee within the Clean Water Council.

Background

Lakes are Part of our Identity:

We live in the land of 10,000 lakes. Our lakes provide environmental, economic, and public health benefits. Our lakes are among our most treasured of our natural resources. Healthy lakes enhance our quality of life. They support complex and important food-web interactions and provide habitat for fish and wildlife. Lakes contribute to a healthy economy. They are an important draw for tourism and provide recreational opportunities for our state's residents. It has been estimated that more than 25 million visitors travel to our state each year and that they generate in excess of \$7 billion in revenue. About 73 percent were vacationers, with outdoor activities rated high on their lists of preferred activities. Keeping our lakes clean directly relates to Minnesotans' ability to compete with regional lake centers such as northern Wisconsin, Ontario and Michigan for these income sources, which in turn contribute to local schools, roads, health programs, social services and law enforcement services and infrastructures. We need to protect and restore our lakes. However, because of the number of lakes in Minnesota, and because of the many threats that they face, we may need to make decisions about which lakes we protect and preserve.

Our Lakes Face Many Threats

Our lakes are fragile. Most were created as the result of glacial process that occurred about 8,000 years ago. As a result, all of our lakes are ephemeral and they are undergoing a natural aging process. Many of our lakes are undergoing accelerated environmental changes because of human activities in our cities and in our agricultural areas. This leads to significant declines in aesthetic, recreational, economic and aquatic ecosystem functions. Our lakes are exposed to natural and anthropogenic influences from the atmosphere, inflowing streams, groundwater, urban and agricultural runoff and other human activities accelerate rates of change. If the causes of the changes are known, intervention (lake-management) can lessen, control, or even reverse, detrimental changes. Because there are so many threats to our lakes, and because Minnesota has so many lakes, we may need to prioritize management activities in lakes that we feel are most important to protect and improve.

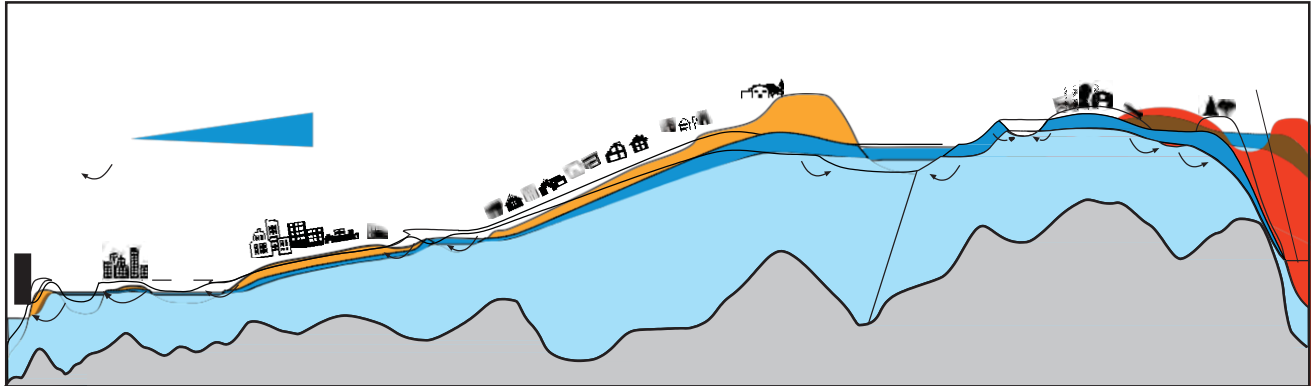
We have a Variety of Lake Types

Lakes are a part of our overall water resources. They occur where surface-water runoff or groundwater accumulates in low areas. Lakes are not just water where water is trapped. They represent areas where water enters faster than it can escape, either by outflow to rivers, seepage, or pumping. Lakes vary greatly and understanding impairments and stressors as well as the setting of our lakes, can help us frame management, protection and regulatory approaches.

Lakes are classified in several ways. Lakes often are classified according to their hydrologic setting relative to streams and groundwater. Lakes that are well connected to streams are sensitive to the quality and condition of water in those streams. Closed-basin (those without outlets at normal lake levels) are more sensitive to fluctuations in water levels than are flow-through lakes. Closed-basin lakes rely on a balance between two main sources of water, direct precipitation and groundwater inflow to the lake, and two components of water loss, evapotranspiration and lake water outflow to aquifers to maintain their levels. Lakes with inflowing and outflowing streams are generally less sensitive to water-level changes

Lakes without inflowing streams or outlets tend to be dominated by groundwater and respond to changing groundwater levels and to the quality of inflowing groundwater. The water levels in most groundwater-dominated lakes are relatively stable. Jones and others (2015) found several landscape factors that influence lake-level fluctuations. These factors include groundwater pumping, the hydrologic setting of the lakes, geology and soils, lake-outlet structures, as well as the general topographic setting of the lakes. Lakes at

higher elevations on the landscape tend to be more sensitive to groundwater withdrawals, and to water-table fluctuations, than are lakes at lower elevations in the landscape.



Conceptual diagram of land cover, geology, and water-level changes in the northeast Twin Cities Metropolitan Area. The setting of lakes on the landscape affects how lakes interact with groundwater.

Although lake settings and conditions lie along continuums, they also are often also classified based on their relative depths as “deep” or “shallow”. Groundwater and surface-water exchanges in shallow and deep lakes can vary. However, water in shallow lakes tends to be well-mixed because of wind action. Deep lakes tend to stratify, both thermally and chemically, and overturn seasonally. Consequently, the ecology of deep versus shallow lakes vary, and management activities required to protect them also vary. Hydraulic residence time also is important to the ecological condition of lakes. Deep and large lakes, Lake Superior being the most extreme example, have long water residence times of up to hundreds of years. Water in shallow lakes exchanges much more quickly. These factors also are important to efforts to improve lake quality. Because lake conditions fall along a continuum, we need to understand these conditions as we attempt to manage and protect our lakes.

Indicators of Lake Health

Indicators of lake condition often are considered to include chemical, physical, recreational, and biological factors. Lake chemical characteristics, which include nutrients and dissolved oxygen, create environments essential for aquatic organisms. Chemical conditions of lakes affect the health of primary producers (algae), zooplankton, macroinvertebrates, and fish. Chlorophyll-*an* often is used as an indicator of trophic state (productivity). In order to address recreational and human health-related considerations, indicators such as concentrations of the algal toxin microsystem, cyanobacteria and chlorophyll-*a* concentrations are important for algal toxin concentrations. Mercury in lakes and in sediment is important because it bioaccumulates in the food chain. Herbicides and other agricultural chemicals also are important because they have potential to affect aquatic life. Important physical indicators of lake condition include the condition of the lakeshore and shallow water, measures of human disturbance, and drawdown (the natural or intentional lowering of lake water levels). Healthy physical habitat conditions affect biological communities in many ways, such as providing food and shelter for aquatic wildlife and moderating the magnitude, timing, and pathways of water, sediment, and nutrient inputs into lakes. Following are some of the important influences on lake health and condition. We need to understand how these factors influence our lakes in order to protect, preserve or restore our most important lakes:

- Weather and Climate: Temperature, wind, precipitation, solar radiation all affect Lake Hydrology and chemistry and indirectly affect the composition of the biological communities. Precipitation is the main factor affecting runoff and the delivery of nutrients and sediments.

- Atmospheric inputs: Contaminants in precipitation, such as acid rain, mercury and particles can be major sources of certain contaminants to a lake, particularly large lakes. Each lake also receives indirect atmospheric inputs by way of the runoff from its watershed.
- Geology, soils and groundwater: Soils and geology determine the extent, nature, and quality of groundwater inflows and outflows to lakes. The importance of these factors varies among lakes.
- Physiography and Landscape Setting: The area, surface topography, upstream lakes and wetlands, altitude, and land slope of the lake's watershed affect surface-water runoff and the amount and nature of chemicals and sediments entering the lake.
- Interactions by people greatly affect runoff and the export of nutrients and sediment. The type, location, extent, and history of land cover/land use (such as agriculture, rural, and urban developed areas) can affect the quantity of surface-water and groundwater inflows and outflows, as well as the amounts and types of sediment, nutrients and chemicals (natural or synthetic) that are transported into the lake from the watershed.
- Lake morphology: Size, shape, and depth characteristics of lakes are critical in determining currents and mixing of the lake, as well as its thermal and chemical stratification characteristics.
- Physical Habitat Condition Indicators: The condition of lakeshore habitats provides important information relevant to lake biological health. These include indicators such as: riparian (lakeshore) vegetation cover, littoral (shallow water) habitat, lake drawdown (lowering of lake levels), habitat disturbance (extent and intensity of human activity), and habitat complexity (a combined index of condition at the land-water interface).
- Shallow water habitat indicators include the presence of living and non-living features such as overhanging vegetation, aquatic plants, large woody snags, brush, boulders, and rock ledges. Lakes with greater and more varied shallow water habitat are typically able to more effectively support aquatic life because they have many complex ecological niches.
- Lake draw-down can occur in both natural lakes and reservoirs. It can be the result of natural processes, such as drought, or as the result of direct manipulation of water levels for lake management purposes. Changing or significantly lowered lake water levels can adversely affect physical habitat conditions in and around the lake and therefore can also have an impact on biological communities.
- Lakeshore disturbance reflects direct human alteration of the lakeshore itself. The effects of lakeshore development on the quality of lakes include excess sedimentation, loss of native plants, and alteration of native plant communities, loss of vegetation structure and complexity, and modifications to substrate types. These impacts a negatively affect fish, wildlife, and other aquatic communities.
- Lake Habitat indicators combines lakeshore and shallow water indicators to estimate the amount and variety of all cover types at the water's edge.

Threats to lakes

Lakes are subject to a variety of threats can diminish their aesthetics, recreational value, water quality, and habitat suitability. Among the most common lake problems is eutrophication, which is the process of physical, chemical, and biological changes ("aging") associated with nutrient, organic matter, and silt enrichment of a lake. Eutrophic conditions can be exhibited with the following conditions:

- Algal blooms: Extensive and rapid growth of planktonic (floating and suspended) algae, caused by an increased input of nutrients is a common problem in lakes. Lakes normally undergo aging over centuries, but the process can be accelerated rapidly by human activities that cause increases in sedimentation and nutrient inflow to the lake. Accelerated eutrophication and excessive algal growth reduces water clarity, inhibits growth of other plants, and can lead to extensive oxygen depletion, accumulation of unsightly and decaying organic matter, unpleasant odors, and fish kills.

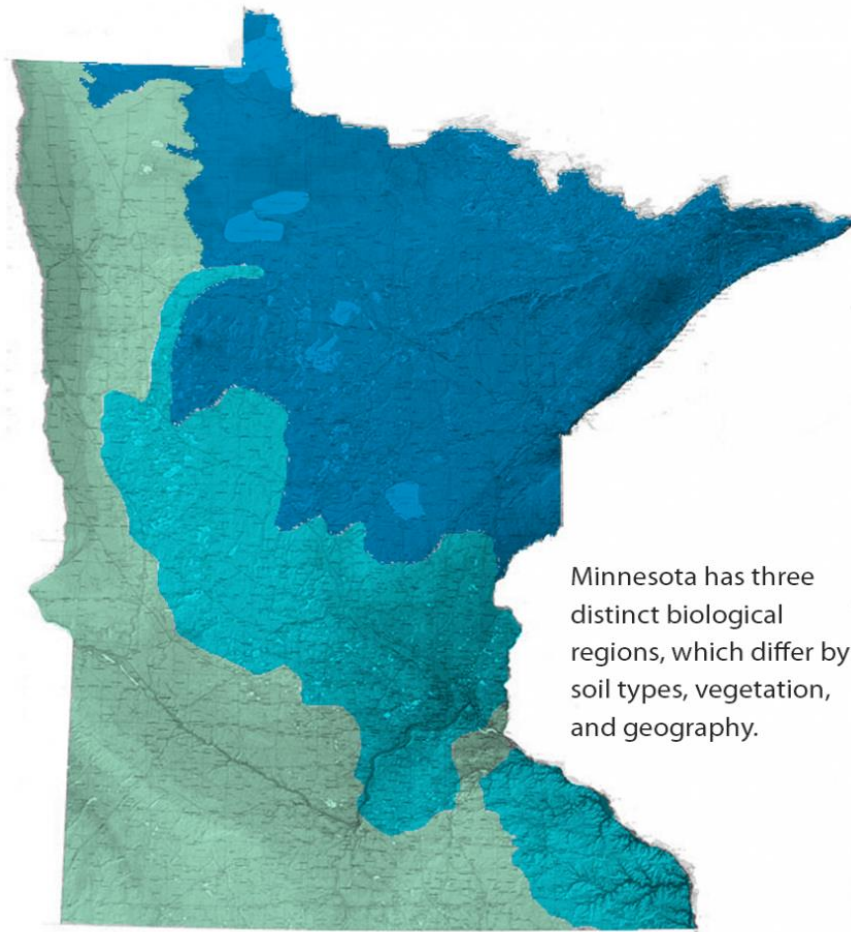
- Sedimentation/turbidity: Increases of sediment can harm water quality and the habitat for many aquatic species. Such events usually are caused by heavy rains that produce erosion and intense runoff.
- Oxygen depletion: Decreases in dissolved to less than 3 mg/L (milligrams per liter) in the water can be harmful or lethal to aquatic life. Oxygen can get used up due to organic decomposition. Prolonged low oxygen concentrations can lead to fish kills.
- Growth of aquatic plants: Normal plant growth generally is beneficial for the lake ecosystem. Plants provide refuge for fish and other organisms. However, in some lakes, the growth of aquatic plants ("weeds") can become excessive and create a serious nuisance for lake users, interfering with swimming, boating, and other recreational activities. Other causes of excessive plant growth include increased nutrients in the water, invasion of exotic species, and accumulation of organic sediment.
- Water-level change: Wide fluctuations in stage (lake level) can create major hardships for lakeside residences, marinas, and businesses. These changes most commonly are linked to weather anomalies (extended periods of abnormally high or low precipitation), but also may be associated with human activities such as withdrawals for water use.
- Species shifts: Populations of desirable animal and plant species might decline sharply or disappear, to be replaced by other less-desirable species. Species shifts can be caused by introduction of invasive species that may have little or no natural controls on their population growth.
- Exotic species have the potential to cause several problems. They can reduce the abundance of native species by out-competing them for food or space. Wildlife that depends on native species for food, cover and nesting sites may be faced with habitat of lower,

What is the Status of our Lakes?

An assessment of the nation's lakes and reservoirs was conducted in 2012 (EPA- National Lake Assessment). It included an evaluation of the biological, chemical, physical, and recreational condition of lakes in the nation. During the assessment, field crews, including staff from the Minnesota Pollution Control Agency (MPCA) sampled over 1000 lakes across the country. These crews sampled benthic macroinvertebrates (insect larvae, snails, and clams), zooplankton (small animals in the water column), algal toxins, atrazine, and nutrients and near-shore habitat. These measured values are important because they are benchmarks that indicate the quality of lakes. The assessment found that nutrient pollution was common in the nation's lakes. Forty percent had excessive levels of total phosphorus and 35 percent had excessive levels of total nitrogen. Nutrient pollution was found to be the most widespread problem among lakes that were studied. Excessive nutrients contribute to algae blooms and affect public health and recreational opportunities of lakes. The algal toxin, microcystin was detected in 39 percent of tested lakes, but concentrations rarely reached toxic levels. Atrazine was detected in 30 percent of lakes. However, concentrations rarely reach the EPA level of concern for plants in freshwater. In addition, 31 percent of lakes sampled had degraded benthic macroinvertebrate communities and 21 percent had degraded zooplankton communities. The study found an association between nutrients and biological condition. While many lakes are in good condition, the study suggested that a substantial portion of lakes are in a disturbed condition for nutrients; 40 percent of lakes contain excessive total phosphorus concentrations and 35 percent of lakes have excessive nitrogen concentrations. The study indicated that 21 percent of the lakes sampled were hypereutrophic. With regard to biological measures, the study found that 31 percent and 21 percent of lakes sampled were in a most-disturbed condition based on benthic macroinvertebrate and zooplankton. The assessment provides an opportunity to frame discussions and plan strategies for the protection and restoration of lakes in Minnesota. This information helps us to understand the condition of our lakes as well as the stressors affecting them, and how stressors relate to local conditions. In order to do so, we need to understand how lakes in Minnesota respond to changes in their watersheds.

In Minnesota, the MPCA has on-going programs to assess lakes as part of the Impaired Waters Program. They are finding that lake health corresponds to ecoregions and differences in soils, climate, lake depth, and size of the lake's watershed, as well as land use and alterations. In areas of the state with the most cultivated land or urbanization, lakes are less likely to meet water quality standards meant to protect aquatic life and recreational uses. Lakes in the north and north-east are generally in good health. This area is dominated by second-growth forests (41 percent of the land) and water and wetlands (more than 48 percent, which limits sediment and nutrient runoff). In this area, the lakes that the MPCA has assessed, 92 percent of the lakes meet water-quality standards and standards for recreational use. The Central region, including the Metro area, combines characteristics of both the northeastern and southern regions. Shallow lakes that are in highly urbanized or heavily farmed watersheds typically have poor water quality. Deeper lakes, or those in watersheds with less urbanization or agricultural land use, generally have better water quality. In the watersheds the MPCA has fully assessed in the region, 50 percent of the lakes meet water-quality standards of aquatic recreation. In southern and western parts of the state, much of the region has been converted to agriculture (78 percent is cropland), while wetlands have been drained and the installation of artificial drainage has increased. This has caused high nutrient and sediment levels in the region's naturally shallow lakes. In the watersheds the MPCA has fully assessed in the region, only 18 percent of lakes meet water quality standards for aquatic recreation.

Minnesota is divided into seven ecoregions, but most of our lakes are in four of them. The MPCA has developed a way to compare lakes within and between ecoregions. They studied the watershed characteristics, land use, and water quality of reference lakes in each of the ecoregions and derived an average range of water quality typical for each ecoregion. These reference lakes are not considered pristine, but are considered to have little human impact and therefore are representative of the typical lakes within the ecoregion. For example, the lakes in the Northern Lakes and Forests Ecoregion (Hubbard County and east to Lake Superior) have characteristically low phosphorus and algae concentrations due to the abundance of forests, and sandy, relatively infertile soil. Lakes in the Western Corn Belt Plains Ecoregion (southern Minnesota) tend to have higher phosphorus and algae concentrations due to the fertile black soil, agriculture and the Minnesota River Valley. The MPCA discovered through lake-user surveys that user perception of water quality varied by ecoregions. This has led to ecoregion-specific criteria for phosphorus, and in general helped to clarify expectations and goals for protecting lakes in Minnesota.



Minnesota has three distinct biological regions, which differ by soil types, vegetation, and geography.

(Adapted from the MPCA)

Implications for Lake Management

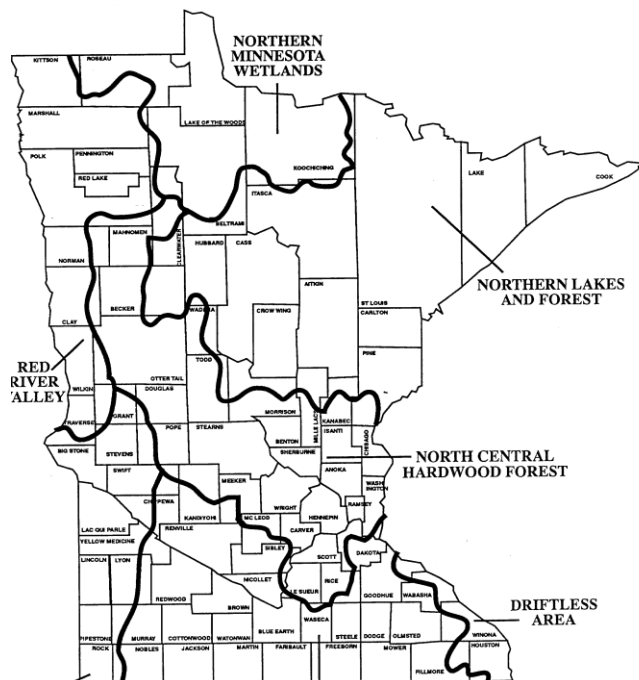
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There are things that can be done to protect, preserve and improve the condition or our lakes. On a statewide basis, we can improve our lakes by implementing best-management practices (BMPs) where our lakes are most affected by urban development, agriculture or forestry. These BMP's are discussed in the other issue papers for this legislative session. Across the state, we should enhance the "one watershed/one plan" process to evaluate, locate, promote, incentivize and regulate activities that will improve our streams, lakes, wetlands, and groundwater. The DNR, with others, already have initiated a "sentinel lakes program" in

portions of the state. This program identifies lakes for study and monitoring that serve as indicators of general lake health in the different ecoregions of the state. This program should be maintained and enhanced by implementing a sentinel lake program in many of the 80 major watersheds (this would not be appropriate for all watersheds because some have few lakes). This program would provide needed information regarding the status of our lakes and would enable an existing, locally-led, statewide programs to focus BMP's in areas that can best benefit our lakes, streams, wetlands and groundwater, all tailored to specific watersheds and ecoregions.

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That being said, a more proactive and aggressive approach is needed to protect, preserve and improve our most precious and important lakes. The sentinel lakes program approach could be applied to identify groups and classes of lakes, across the state's eco-regions that are most important to the state's residents. After identification and prioritization, these lakes could be placed in a protected status. Much like that state's protected water's program, protected lakes could be established through a process of inventory, designation, all subject to state regulation. These lakes could be identified and made subject of a series of public review periods and revisions. The result would be maps identifying lakes that must be protected through a special resource program. More importantly, state programs such as the Outdoor Heritage Fund and the Legislative and Citizen's Commission on Minnesota Resources could be focused to provide funds and programs for conservation easements in the watersheds where these lakes exist.



Minnesota's Ecoregions

Managing our Lakes

In order to maintain beneficial uses, lakes need help. With ever increasing recreational use and growing populations residing near and along waterways, lakes suffer from cumulative impacts. We affect our lakes by our actions within lakes, along shorelines and into watersheds. Distant areas can be connected to lakes by downstream flow of waters which, in turn, carry pollutants, sediments and nutrients into lakes over time. We share problems and responsibilities to do what is possible to help our lakes. Lakes need to be systematically and purposefully managed over time if we are to sustain their long-term health and viability. The Interagency Lakes Coordinating Committee (ILCC) has prepared a guide for preparing lake-management plans which is helpful in thinking about planning for lakes in general. Lake-management planning can help protect natural resource systems, including the water quality of lakes and associated fish, vegetative and wildlife communities and are essential to improving the quality of lakes. In general, land management planning involves: partnerships among citizens, lakeshore owners, watershed residents, resource management agencies and special interest groups; identifying concerns that need to be addressed; setting realistic goals, and; identifying objectives, actions, needed funds and personnel. The ILCC identifies specific actions that need to be completed for successful lake management. The ILCC document provides detailed information about each of the components of lake management. The steps include the following:

Together, this information can be used to develop meaningful management plans for our lakes. The need to manage lakes as a limited resource requires purposeful planning and action is real and immediate. Citizen-initiated lake management can be an effective method for developing specific lake and watershed management plans.

Conclusions

Minnesota is a water-rich state with a great deal of water stored in aquifers, lakes and streams. We are not running out of water. However, in many parts of the state we are using so much water that lake levels are declining. In addition, our human activities are negatively affecting our lakes and lake ecosystems. Our lakes provide environmental, economic, and public health benefits and our lakes are among our most treasured of our natural resources. Healthy lakes enhance our quality of life. They support complex and important food-web interactions and provide habitat for fish and wildlife. Lakes contribute to a healthy economy. They are important for tourism and provide recreational opportunities for our state's resident's. Our lakes are short-lived features on our landscape and all our lakes are aging. However, the natural aging of many of our lakes is being accelerated because of our actions on the land and in the water. We need to protect and restore our lakes. However, because of the number of lakes in Minnesota, and because of the many threats that they face, we may need to make decisions about which lakes we protect and preserve.

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