



A BIENNIAL REPORT OF THE ENVIRONMENTAL QUALITY BOARD

MINNESOTA PLANNING



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Minnesota Planning develops long-range plans for the state, stimulates public participation in Minnesota's future and coordinates public policy among state agencies, the Minnesota Legislature and other units of government.

The Environmental Quality Board, staffed by Minnesota Planning, draws together five citizens and the heads of 10 state agencies that play a vital role in Minnesota's environment and development. The board develops policy, creates long-range plans and reviews proposed projects that would significantly influence Minnesota's environment.

Acknowledgements

This document was prepared by the EQB Water Resources Committee and Minnesota Planning with assistance from various other federal, state, regional and local governments. The report is based on priorities adopted by the Environmental Quality Board at its June 2002 meeting. Bruce Olsen, Pat McCann, Sheila Grow and Dan Wilson, Department of Health; Roman Kanivetsky, Minnesota Geological Survey; Doug Thomas, Board of Water and Soil Resources; Paul Burns and Dan Stoddard, Department of Agriculture; Gretchen Sabel, Douglas Hanson, John Holck, Gaylen Reetz, Tom Clark and Mike Trojan, Pollution Control Agency; Sarah Tufford, Judy Boudreau, Laurel Reeves and Jan Falteisek, Department of Natural Resources; Jeff Freeman, Department of Trade and Economic Development; and Brad Schaeppi, Mike Tietz, Heidi Habeck and Karen Roach, Minnesota Planning, each made important contributions to the report.

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February 2003

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INTRODUCTION

Minnesota Statutes, Sections 103A.43 and 103B.151, direct the Environmental Quality Board to coordinate state water programs and develop biennial reports on water policy and priorities, including recommendations for funding the identified needs. *Minnesota Water Priorities 2003-05* presents the EQB's suggested priorities for the 2004-05 biennium.

The Environmental Quality Board Water Resources Committee developed a set of water priorities for the biennium based on work done by seven local-state basin teams and EQB member agencies. An extensive public comment period was provided for people representing interests across the state. The committee changed the priorities to reflect those comments and put forth five for EQB consideration. These were approved by the board in June 2002 and forwarded to the Governor and Commissioner of Finance to inform preparation of the biennial budget.

While many elements must be considered in determining the biennial budget, the priorities are considered a key factor in securing Minnesota's environmental and economic future. The recommendations build upon the existing framework of water programs and in some cases fill gaps inadvertently created by budget cuts of the last decade. Should additional cuts in the state's water programs be necessary, the priorities can aid in making those tough choices.

PROTECTING KEY PROGRAM ELEMENTS

Minnesota's water programs have experienced cutbacks in recent years; further reductions are likely. While budget problems are difficult for every agency, cuts to certain core functions of water protection and management could be detrimental to this highly valued resource. The Environmental Quality Board believes that the following core functions should be protected:

The ability to monitor and understand Minnesota's water resources. This requires an adequate network of water monitoring stations to define ambient quality, record the effects of pollutants, understand pollutant sources, and measure the effectiveness of practices to address problems. It also requires understanding of water availability and the geologic and land use characteristics that profoundly influence and affect water.

Water-related data management and information sharing tools and expertise. These are essential ingredients to capturing the information, linking water quality, availability and land use, and informing decision-makers at every level of government.

Integrity of basic water regulatory programs. The regulatory programs for water quality and availability provide a safety net to ensure basic protection of the resource from those who might not recognize the effects of their actions. They include rule development and standard setting, environmental review, permitting, compliance monitoring, enforcement, outreach and evaluation. These activities provide the backbone of Minnesota's water protection and management system, and must be kept effective.

Principles for a sound water program

People want and expect Minnesota's waters to be clean and plentiful. This requires a solid understanding of the resource, the threats and potential solutions.

Achieving this requires a state water effort that:

- Is transparent and easily understood
- Integrates and coordinates federal, state and local interests
- Makes the link to land use
- Collects sufficient data and interprets it for ready use by decision-makers and citizens
- Involves and empowers local governments and citizens
- Addresses current problems and prevents the emergence of new ones
- Acts in a unified, economical manner

THE PRIORITIES

Minnesota's leaders face a daunting challenge in protecting the environment as they deal with serious budget shortfalls. The following priorities signal where the state has fallen short in past water protection efforts and where a new focus is needed, despite difficult economic times.

The Environmental Quality Board recommends five basic priorities for the coming biennium. They are:

- Improve the monitoring and assessment of Minnesota waters
- Help agriculture protect, restore and enhance water resources
- Manage water for growth
- Take new steps to protect Minnesota lakes
- Secure stable financing

We can't manage what we don't measure. Over a decade after passage of the Ground Water Protection Act we still cannot tell much about trends in nitrate contamination of ground water. And that is just one example. This priority calls for water monitoring initiatives essential for basic support of the water program, including: condition monitoring of ground water to characterize the quality and availability of this source of much of the state's drinking water; geologic atlases and regional hydrogeologic assessments in areas of the state at risk or under pressure; surface water monitoring to inform state efforts to control or manage point and nonpoint sources of contamination; and basic information management technology and information systems to integrate, assess and share data collected by a wide range of agencies, local governments and individuals. – *Environmental Quality Board*

IMPROVE THE MONITORING AND ASSESSMENT OF MINNESOTA'S WATERS

Minnesota has developed the most productive farm land in the world. Communities and businesses thrive and the state leads the Midwest in population growth and the country in quality of life. But there are costs for these accomplishments. Water quality has deteriorated and supplies now may begin to limit growth. The changing state of Minnesota's waters must be tracked and understood before thoughtful steps can be taken to protect and manage the resource.

Growing risks to people and ecosystems

The Minnesota Pollution Control Agency identified 1,780 impaired lakes and streams in 2002, an increase of 500 since 1998. This list is based upon sampling only 12 percent of the state's lakes and 5 percent of its streams. The PCA recommends that a minimum of 30 percent of each be routinely monitored to ensure these resources are protected.

Ground water presents a similar picture. A PCA study of over 200 wells in sensitive urban areas across the state found herbicides in more than 60 percent. Their breakdown products – which can be more toxic – were found in 95 percent of the wells. Pesticide-contaminated rainfall contributes to the problem, but experts are not sure how much because monitoring efforts were cut back. The PCA no longer tests for herbicides in urban areas due to budget cuts.

The concern is not just with pesticides. Volatile organic compounds, usually from industrial or household products, occur in a high percentage of water samples from industrial and older residential areas. The extent of contamination statewide is unknown. Equally troubling is the presence of pharmaceuticals, growth hormones, endocrine disrupters, antibiotics and other household chemicals in the state's waters.

Certain chemicals in water put people and ecosystems at risk. Every fish has some amount of mercury. Some also have polychlorinated biphenyls, dioxins and polybrominated diphenyl ethers. The number of Minnesota waters with fish consumption

advice goes up every year. And experts are concerned with ecosystem health, as well as public health, with the troubling incidence of frog malformations still unexplained, and gender morbidity prevalent in the Mississippi River's sauger.

Minnesota's water resources are feeling the pressures of growth. The wealth of ground water found under the Twin Cities virtually disappears as one heads northwest along the state's growth corridor. Yet growth plans seldom take into account effects on lake, stream and ground water quality and often fail to consider the availability of drinking water. And while progress has been made in understanding water availability, the state has not systematically identified sustainable resource use goals nor delivered this information to growing communities.

Managing data that state and local units have and data they will be collecting is vital to managing water. Many groups, including state, federal and local agencies, citizen groups and nonprofits collect water data. Coordinating the design, collection, management and use of this data is essential. Basin teams of local and state officials have identified this need throughout the state.

Diminishing support

Because of budget constraints, support for water monitoring and assessment has diminished.

Last year the Department of Natural Resources cut back the program that develops county geologic atlases, which provide a foundation for sound local water and land use decisions. The action required the Minnesota Geological Survey to cut its work on atlases and hydrogeologic assessments by 50 percent. This comes at a time when there is greater demand than ever for atlas products to support land use planning, water planning, wellhead protection and other local government activities. In addition, the Pollution Control Agency eliminated its program for monitoring the condition of ground water and cut back its technical assistance program for care of individual sewage treatment systems. The Department of Agriculture also was forced to make cuts in its pesticide monitoring program.

Suggestions for better understanding ground water

A number of steps should be taken to understand and protect ground water:

Establish a statewide ground water condition-monitoring program to sample for pesticides, pesticide degradates, nitrates, pharmaceuticals, growth hormones and other chemicals in urban and agricultural areas.

Expand the existing Department of Agriculture monitoring network to include sampling statewide.

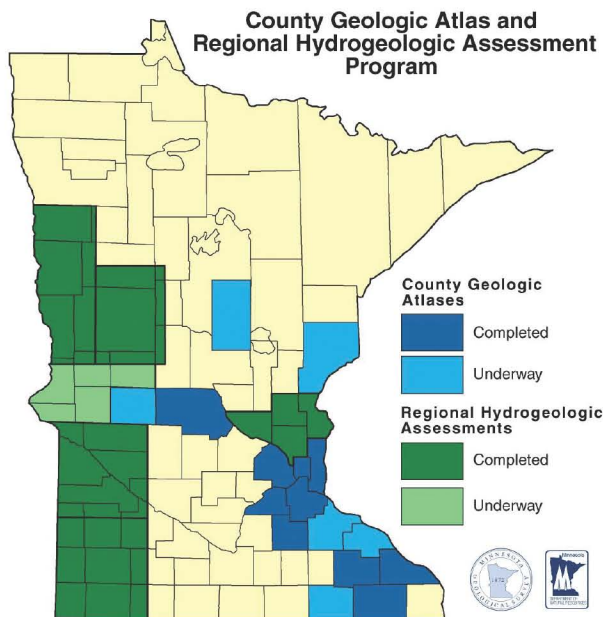
Develop a mechanism for incorporating data and information from regulated sites into statewide condition and effectiveness monitoring.

Provide the PCA and MDA regulatory flexibility for improving condition and effectiveness monitoring at regulated sites.

Continue to increase communication, education and outreach between state agencies and local ground water managers.

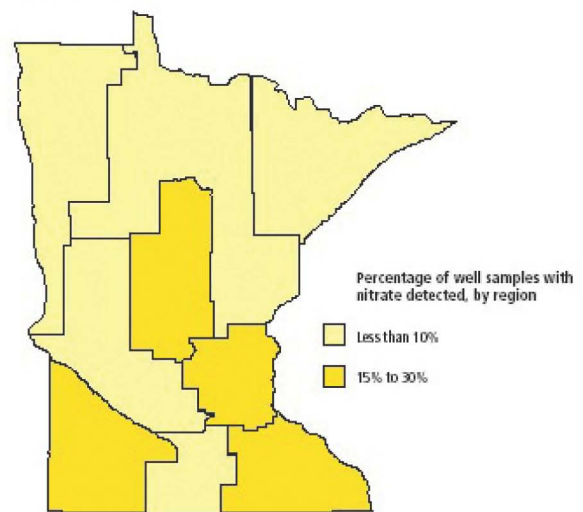
Develop a statewide plan for ground water use and protection. This should address the collection, storage, interpretation and dissemination of ground water data to define needs in different areas of the state.

Geologic mapping and the County Well Index database are essential elements in improving monitoring and assessment of Minnesota waters. They are used to determine sensitive areas where agricultural best management practices are needed, to identify ground water influence on lakes, and to manage water for growth. Geologic mapping enables the state to physically assess aquifer distribution, size, sensitivity and the amount of water that can be sustainably withdrawn.



Information about geology and hydrogeology helps local government make land use decisions that protect water supplies.

NITRATE CONTAMINATION POSES A GREATER PROBLEM IN CENTRAL AND SOUTHERN AREAS



Notes: "Detected" means nitrate levels exceeding one part per million. Wells were sampled over a five-year period, 1992 through 1996.

Nitrate contamination is both a direct health concern and an indication that other types of pollution may be in the ground water.

Source: Pollution Control Agency

Row crop agriculture takes place on about 40 percent of Minnesota's land surface. This percentage is much higher in the Minnesota and Lower Mississippi River Basins. Animal confinement facilities are also prevalent in these areas. This priority will build on the federal 2002 Farm Security and Rural Improvement Act to enhance the sustainability of Minnesota's agricultural industry. It will target conservation efforts to critical areas, including highly erosive lands, impaired waters that have established total maximum daily load targets for pollutant reduction, source water protection areas, and areas sensitive to ground water contamination. Targeting may require and allow shifts in the allocation of state resources, both to ensure effective use of federal funds and to give attention to other state priorities. Another need is to build on the sensitive area delineations developed by the Department of Natural Resources in response to the Ground Water Protection Act of 1989. The goal is to identify suitable activities and land uses for Minnesota's most vulnerable areas consistent with state ground water and drinking water protection policy.

— *Environmental Quality Board*

HELP AGRICULTURE PROTECT, RESTORE AND ENHANCE WATER RESOURCES

Many areas of the state rely on agriculture to drive their local economies. The state's private working lands – its farms, forests and open space – comprise 78 percent of Minnesota's land base, or roughly 42 million acres. These lands supply people with an abundance of food and forest products as well as – given proper management – clean water, clean air, healthy soil and an array of fish and wildlife and other public environmental benefits.

Minnesota has approximately 23 million acres of cultivated cropland of which 10 million acres have or have the potential for water and wind erosion above tolerable levels. About 9.2 percent of the state's cropland is threatened by water erosion above tolerable soil loss limits, while 42 percent is threatened by wind erosion. In Minnesota, tolerable soil loss limits for cropland generally fall between 3 to 5 tons of soil loss per acre per year.

Soil loss and crop yields

Minnesota's crop yields will drop if erosion continues, according to Gyles Randall, University of Minnesota soil scientist at the Southern Research and Outreach Center at Waseca:

"This is the fourth year in a row of severe erosion. The agricultural community, especially corn and soybean farmers, should be very concerned when severe losses of highly productive soils and impassable gullies continue to develop ... The best tillage system we've observed for keeping erosion in check is soybeans no-tilled into standing corn stalks, especially when combined with strategically placed, sufficiently wide grass waterways ... Most farmers do some major tillage after corn. And with the corn-soybean rotation so prevalent, there's very little protection against erosion. Tremendous gullies develop, and a complacent attitude of "it happens" seems to exist. No-till following corn works very well. We have the machinery to do it, we can get good stands and excellent weed control and yields and it's inexpensive."

See www.extension.umn.edu/newsletters/sustainableagriculture/FD1988.html.

Soil conservation efforts

The Board of Water and Soil Resources teams with federal, state and local agencies to provide technical and financial assistance to land owners and operators. The aid is designed to help land owners and operators apply complex conservation treatments to control erosion and improve the quality of Minnesota's soil resources, protect and improve water quality, enhance fish and wildlife habitat, and manage woodlands and pasturelands. Without this assistance, many land owners would not have the knowledge or financial resources to apply the conservation measures needed, and the environmental benefits that Minnesotans expect from these lands would be lost.

Cost-share and other financial assistance programs help offset the economic costs of providing these benefits. The Department of Agriculture, for example, has provided millions of dollars in low interest loans through the Agricultural Best Management Practices program to help farmers protect Minnesota waters. The loans enable farmers to improve manure management, reduce soil erosion and upgrade rural septic systems. However, technical assistance – the scientific and practical guidance on how to set standards and properly design, engineer, install and maintain conservation practices – is and will continue to be a key to getting conservation applied on the landscape. As funding for the Farm Security and Rural Improvement Act increases over the next five years, technical assistance may become a limiting factor. The BWSR and local soil and water conservation districts will need to be part of solving this assistance gap if the state is to realize the full environmental benefits of the new law.

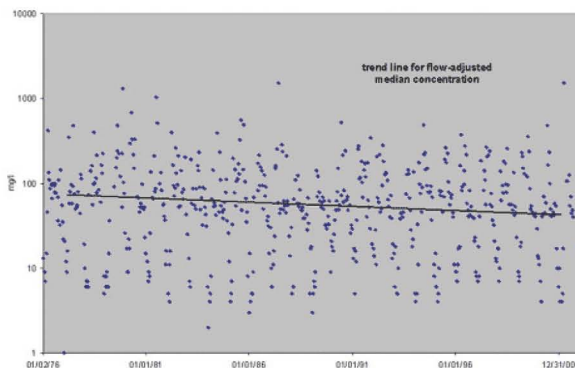
THE MINNESOTA RIVER STORY

In the fall of 1992, Gov. Arne Carlson issued a challenge to make the Minnesota River fishable and swimmable by 2002.

To gauge progress in 2002, the Minnesota Pollution Control Agency and others looked at 30 years of data for several key pollutants. From 1970-2001 significant improvements were made in total suspended solids, biochemical oxygen demand, phosphorus and ammonia.

TSS decreased by an average of 1.5 to 2 percent per year, about 30 to 40 percent over the period. In addition to reductions in discharges from wastewater treatment plants, greater use of conservation tillage practices by farmers also helped cut sediment loads. In the 1980s, about 10 percent of fields met recommended residue levels; by 2000 this figure had risen to 44 percent.

TREND OF DECREASING TSS



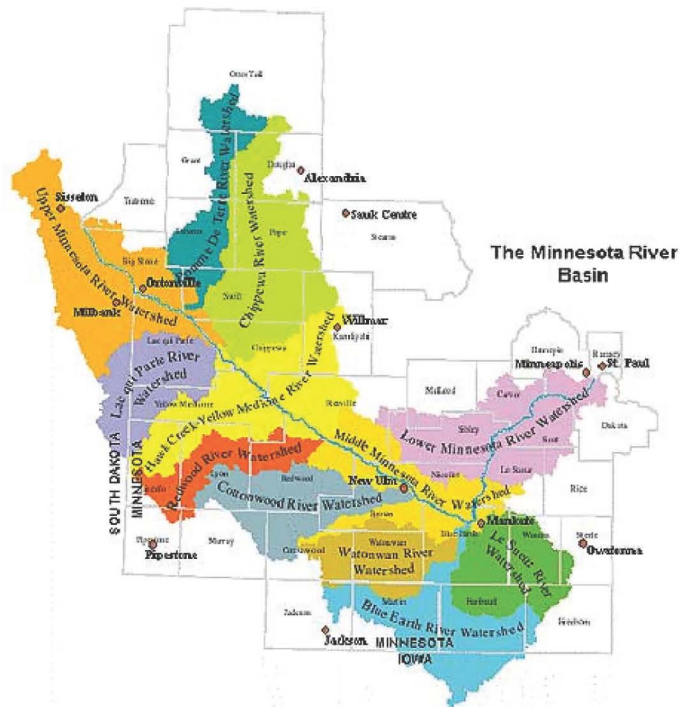
TRENDS INDICATE PROGRESS, BUT MORE NEEDS TO BE DONE

Minnesotans have reason to be optimistic about these trends. However, there is much work to be done to restore the health of the state's namesake river and its tributaries. Some other studies indicate that nitrogen is increasing and that the Minnesota River Basin delivers up to 5 percent of the nation's contribution to the dead zone in the Gulf of Mexico.

Although trends show that several key Minnesota River pollutants are decreasing, during the past 10 years virtually no change has occurred in the diversity and structure of fish communities at selected sites within the basin. *Evaluating Progress of Biological Condition in Streams of the Minnesota River Basin* compares sampling data from the early 1990s to similar samples in 2001. It reveals little or no improvement in stream biological condition as measured by fish community structure. The report states: "In the last decade, it appears that changes in land use and the implementation of best management practices have not yet resulted in an improvement of stream biological condition at select sites."

The phosphorus detergent ban, wastewater treatment plant improvements, and changes in land use practices have led to reductions in phosphorus, ammonia and BOD in the basin. But further reductions are needed before the river attains fishable/swimmable status and water quality improves further downstream on the Mississippi River and in Lake Pepin, in particular. Eighty-nine reaches in the Minnesota River basin are on the PCA's degraded waters list and each major watershed has at least one reach that doesn't meet standards.

Source: www.pca.state.mn.us/programs/indicators/iom.html



A conservation needs workload assessment completed in 2000 by the USDA Natural Resources Conservation Service and the state's 91 soil and water conservation districts estimated that nearly 700 years of staffing were required each year to address soil and water conservation needs with the programs in place at that time. This was about a hundred people more than currently serve in the state. Today, the NRCS estimates that the workload will double under the 2002 Federal Farm Security Act.

If the USDA Environmental Quality Incentive Program is fully funded in the next six years and Minnesota receives its usual proportion of the national appropriation, the state would receive approximately \$75 million during the life of the Farm Security Act.

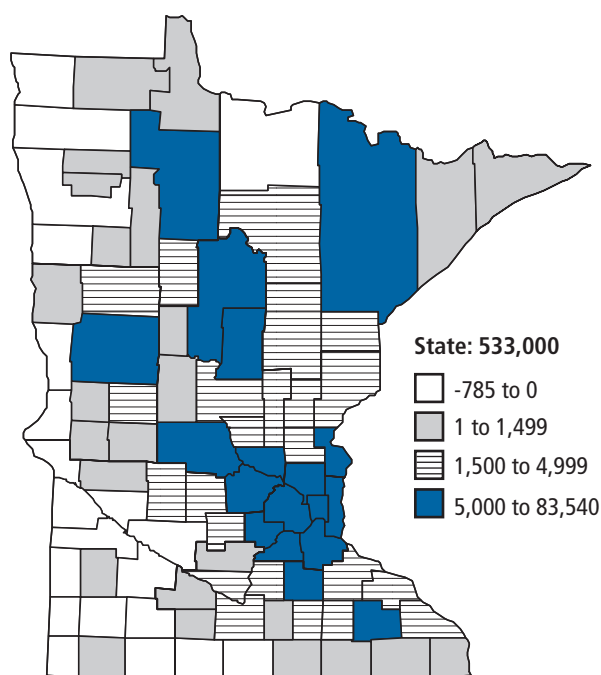
WATER QUALITY AND THE GULF OF MEXICO

Minnesota is one of 23 states implicated in contributing excess nitrogen to the Gulf of Mexico via the Mississippi River. This is the main factor for the expansion of the size and degree of oxygen depletion of the hypoxic zone of the northern Gulf of Mexico, commonly referred to as the dead zone.

POPULATION PROJECTIONS

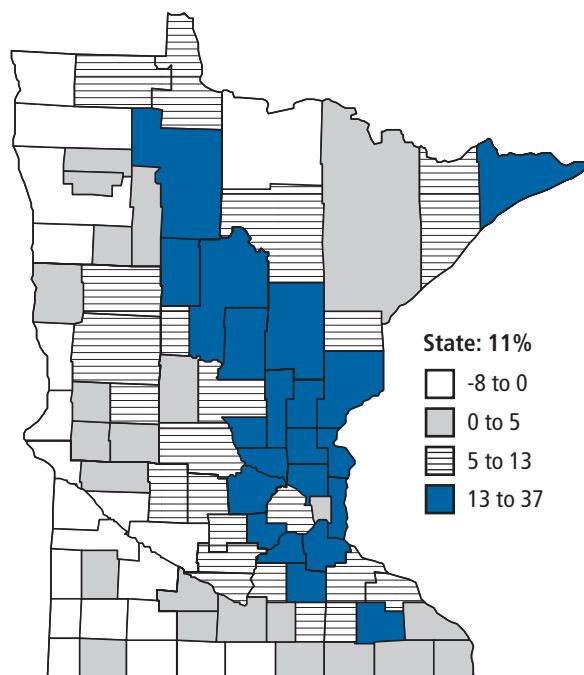
Minnesota's growing population will place new demands on water resources.

Projected population change 2000 to 2010



Source: Minnesota State Demographic Center

Projected population growth rate 2000 to 2010



Source: Minnesota State Demographic Center

Minnesota is growing, but this growth often occurs without thorough consideration of the implications for the environment, particularly water. This priority will ensure that water information and expertise are available to help with growth management decisions. This includes guidelines and targets for water and sewer project funding, financing of water quality and availability monitoring and data management, and other support needed to define concerns and possible limits to growth. A key element is development of aquifer management plans (determining sustainable yields and resource protection needs) for those aquifers at risk from urban growth. Another key element is providing this information to local governments and helping them build and carry out solid comprehensive plans that incorporate the issues from water plans. The priority includes a new federally mandated storm water program that will impact development and protect surface waters from urban storm water runoff. And, it calls for policies and actions to enhance the connections cities make with urban rivers. Finally, support for preparation of a state investment strategy is also included. The strategy will help focus and integrate state investments and will make the state more responsive in meeting local growth management needs. – *Environmental Quality Board*

MANAGE WATER FOR GROWTH

Minnesotans tend to take water for granted. This seems especially true about water supplies. With a few exceptions, most communities believe that the availability of water will never limit their growth.

Limited supplies of water

The rich ground water resources under Minneapolis, three aquifers deep, give way to a single, limited aquifer in the St. Cloud region. There may be plenty of water, but just not where it is convenient, inexpensive or, in some cases, clean.

The map shows the area along Interstate 94 between the Twin Cities and St. Cloud where population growth is projected to expand greatly over the next several decades. Ground water resources are not evenly distributed in this area and the State of Minnesota needs to work with local governments to ensure that water demand does not exceed water availability. As the population expands in this area, so will the demands for competing uses of limited ground water supplies.

To help guide growth, the state should identify the areas where ground water can meet projected demands and protect both ground water and its interconnected surface waters from overuse.

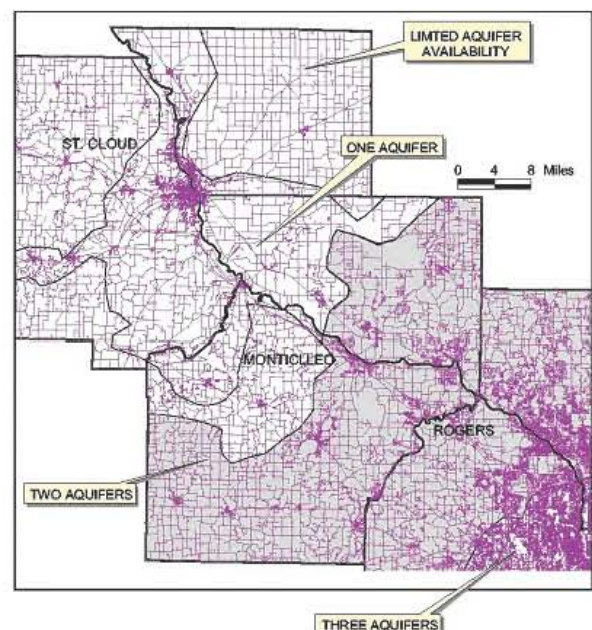
Approximately one-third of the seven-county metropolitan region does not have access to the high-yielding Prairie du Chien-Jordan aquifer. Metropolitan water supply limitations stem from this and other factors, including competition for water between ground water uses and sensitive surface features, like springs and calcarious fens, that may lose water when ground water is withdrawn.

The Information People Need

Making a commitment to delivering sound information to aid those facing complicated growth management decisions is imperative. The state needs to make information about water supplies available to local governments before they make such decisions. In addition, the state should carefully evaluate its own decisions to invest in infrastructure where water resources may not support new demands.

AQUIFERS LIMITED IN MINNESOTA'S GROWTH CORRIDOR

Traveling northwest along the growth corridor takes one from lands rich in ground water to lands with limited supplies.



What do people need to effectively manage water for growth? What information is relevant and what needs to be done to acquire and deliver it to communities? The needs for ground water are to:

- Establish sustainable resource use goals for aquifers so that pumping does not exceed natural recharge rates, or deplete stream flows, wetlands or other surface features.
- Define local geological conditions that affect ground water availability and the natural quality of water.
- Determine the distribution of naturally occurring contaminants such as arsenic, iron and manganese. These affect the amount of treatment needed to meet specific uses for ground water.
- Determine where existing land uses have contaminated ground waters and will limit their use as a source of drinking water.
- Develop a regional database of contaminated sites to help communities and individuals avoid constructing drinking water wells in polluted areas.
- Identify areas where ground water does not meet drinking water standards and prevent the construction of additional private drinking water wells in those aquifers.
- Educate community planners and developers about the limited availability of ground water resources to meet increased needs for public water supplies.
- Identify guidelines for land use change to avoid adverse effects on the quantity and quality of ground water used by local residents.

The growth-related needs for surface water include:

- Determine the portions of rivers and streams where water quality cannot meet federal drinking water regulations.
- Determine areas where surface water and ground water are directly connected and where overuse of one affects the availability of the other.
- Determine the feasibility of using the Mississippi River as a source of drinking water to meet the needs of a regional water supply system.
- Designate impaired surface waters to be cleaned up.

The task of establishing sustainable resource use goals requires estimates of an aquifer's recharge rates and an understanding of its connection to surface waters. This is not an easy job and is rarely attempted in Minnesota. The Minnesota Geological Survey recently completed a pioneering study of Twin Cities aquifer recharge rates based on the principle that ground water and surface water are a single resource. The map presents information that can help people understand a number of important features:

- Areas most sensitive to contamination and in need of concentrated monitoring (blue)
- Areas whose ground water recharges more quickly, which may be more favorable for water supply development (blue)
- Surface water budget (an accounting of inflows and outflows, which is possible because listed recharge values equal stream discharge values)
- Loading of contaminants like nitrates or pesticides
- Sustainable water use

Helping communities grow

Local water planning has complemented land use planning and zoning for over 45 years beginning with the advent of planning by watershed districts in 1955. Since then, the State of Minnesota has routinely looked to local government to help protect and manage water resources. Examples include shoreland and floodplain zoning, metropolitan water management, county comprehensive water planning and wetland conservation.

Today, more than ever, people recognize the importance of water in supporting healthy communities and ecosystems. They also realize how development in a community can affect water quality and availability.

Local governments should take special care to establish and maintain strong connections between comprehensive planning, land use management and comprehensive local water planning. The decisions local governments make about where and how growth occurs, whether agricultural, residential or industrial, can have a profound effect on, and be profoundly affected by, water.

The state, in turn, has a responsibility to provide local governments the best information possible about water availability, quality and vulnerability. Efforts in the southwestern part of the metropolitan area illustrate how this can work.

Wastewater and land use

Land use decisions can have a profound influence on wastewater management. Suggestions to keep costs low while protecting environmental quality include:

- Priority should be given to maintaining and improving existing wastewater treatment systems.
- This should be balanced with the need to support new systems in areas determined to be serious threats to the environment or public health.
- Projects should utilize loans or other mechanisms before any grant funding is considered.

Grants should be targeted to cost-effective projects that address existing problems for communities with a clear financial need.

State agencies should provide coordinated, upfront planning and technical assistance for unsewered areas before specific wastewater treatment alternatives are selected and considered for funding.

The state should not fund projects in unsewered areas unless appropriate plans and the related land use controls are in place and the projects are consistent with local comprehensive plans.

Future development should pay its fair share of the costs through appropriate sewer access charges and assessments.

EARTH AND WATER

The earth that makes up Minnesota determines where and how water enters the ground, and how it travels and accumulates in the subsurface. Through mapping and analysis, agencies like the Minnesota Geological Survey create a framework that helps people understand the interactions of ground water systems and human activities. Geologic maps are the key to connecting ground water quality to the land and land use practices that affect it.

A GUIDE TO RENEWABLE GROUND WATER RESOURCES TWIN CITIES METROPOLITAN AREA

Understanding the connections between surface and ground water is important in both tapping and protecting water supplies.

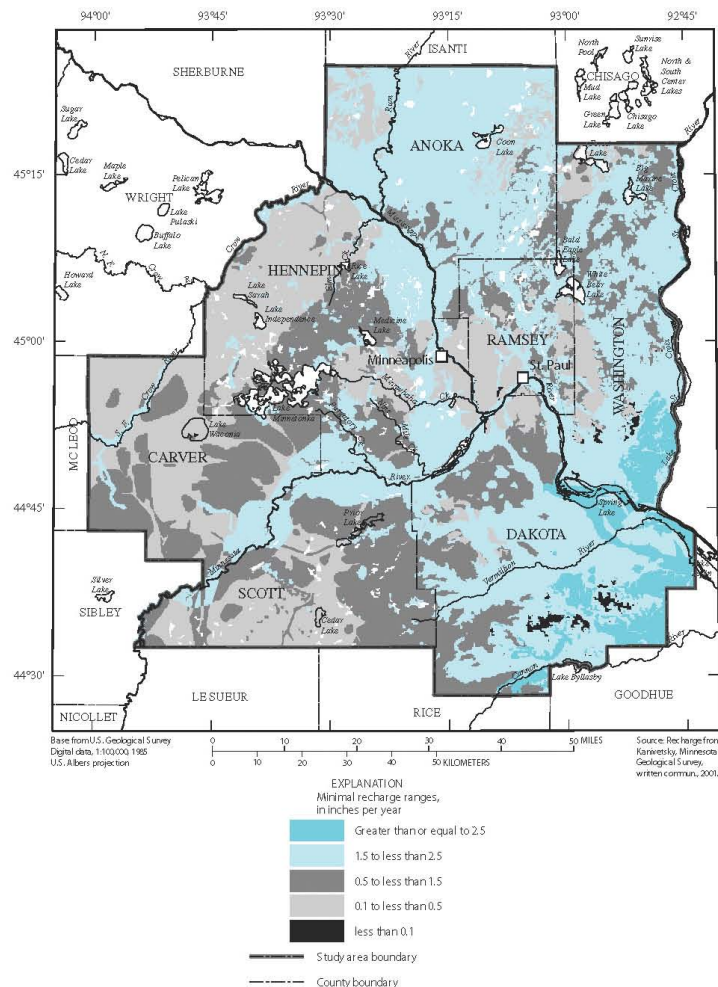


Figure 6. Minimal ground-water recharge based on statistical analyses of watershed characteristics in the Twin Cities metropolitan study area, Minnesota.

Source: Map from Roman Kanivetsky and the Minnesota Geological Survey.

A problem with storm water

Storm water affects Minnesota's lakes, streams and wetlands in two ways. First, rain and snow melt wash pollutants off streets, parking lots, industrial storage areas and lawns, and carry them to nearby waters via ditches, gutters or storm sewers. Second, soil excavation and grading loosens large amounts of soil that can flow or blow into storm drains when handled improperly.

The federal Clean Water Act mandates that states and municipalities implement storm water protection programs. Phase I, implemented in the mid-1990s, applied only to the cities of Minneapolis and St. Paul, certain industrial sites and to construction sites that disturbed greater than five acres. In 2003, Phase II requires an estimated 150 to 250 additional municipalities and other owners of storm water infrastructure and approximately 4,000 additional construction sites (those that disturb between one and five acres of land) to implement programs and practices to control polluted runoff. With Phase II, permit actions alone will increase from about 900 per year to between 4,000 and 5,000 per year.

The Pollution Control Agency is expected to ask the Legislature for authority to collect fees from the newly regulated parties and to require municipalities to fund mandated storm water pollution prevention programs and regulate storm water discharges from land developments.

Spending state dollars wisely

State infrastructure spending is often fragmented and misses opportunities to meet community needs. An investment strategy could help focus and integrate state spending decisions and make the state more responsive to communities.

A strategy could ensure that Minnesota investments:

- Stay true to those things Minnesotans value
- Conserve and protect resources
- Address needs and problems before they become crises
- Make state-level priorities understandable and consistent
- Optimize investment efficiency
- Address statewide issues and concerns that cross boundaries and interests

Minnesota by Design: Options for a State Development Strategy discusses these concepts in greater detail.

State investments can change local decisions. State wastewater infrastructure aid to communities may provide a good case in point. Sometimes the aid may have the unintended consequence of growth that costs taxpayers or ecosystems down the road. It may reward communities that fail to address problems on their own.

MANAGING WATER SUPPLIES IN SOUTHWEST TWIN CITIES METRO

In early 1997, several cities in the southwest portion of the metropolitan area, south of the Minnesota River, realized they were heading for trouble in obtaining water to support growth. The Department of Natural Resources became concerned when lowered ground water levels affected the Savage Fen, a calcareous wetland containing rare plant species. Boiling Springs, another unique surface water feature, and Eagle Creek, a nearby trout stream, also were at risk.

The continued viability of these special natural features relies upon upwelling of calcareous ground water from the Prairie du Chien Aquifer. That aquifer, in turn, is partially supplied by water from the Jordan Aquifer. The complex connection of these two bedrock units and the impact of pumping them for water supply became the primary focus of the Southwest Metro Ground Water Work Group. The group includes the cities of Burnsville, Lakeville, Prior Lake, Savage and Shakopee; the Shakopee Mdewakanton Sioux Community; the DNR, Metropolitan Council, Department of Health, Pollution Control Agency and U.S. Geological Survey; Dakota and Scott counties; the Minnesota Geological Survey and others.

The Southwest group set goals to:

- Develop consensus on a strategy to accommodate projected growth and ensure ground water availability in the area while protecting sensitive environmental features.
- Collect the best data possible with which to make water use decisions.
- Create a long-term water supply management strategy that recognizes the importance of local control and state water law, and builds on the cooperation that exists between communities, the state and others.

Today, the PCA Regional Ground Water Model and core monitoring data are used by regulators and communities to guide water supply planning. A memorandum of understanding and a management plan for cooperative water supply planning also have been developed.

Lakes are perhaps Minnesota's most prized natural resource, and additional state, local and citizen-based efforts to safeguard them are warranted. This priority integrates state water quality protection efforts and provides new, integrated support to local governments and lake interests consistent with local comprehensive plans. There is strong public support for improving lake water quality protection efforts and strengthening the involvement of local governments and citizen groups. – *Environmental Quality Board*

TAKE NEW STEPS TO PROTECT MINNESOTA'S LAKES

Minnesotans take great pride in their lakes. Thirty-six percent of the state's residents – 1.3 million people – bought a fishing license last year and over half say they participate in wildlife watching. Lakes are a major part of both activities. Lakes play a lead role in Minnesota's lore, too, as Lake Wobegon suggests. Yet, for all the talk about how important its lakes are, the state's lake management efforts could be strengthened. The Minnesota Lakes Association puts it this way:

GROWING WITH A RIVER RESOURCE

Communities like Minneapolis, St. Paul, Hastings and Winona are taking steps to celebrate and build their vision of the future around a healthy urban river. Still, two-thirds of those responding to an informal survey of river interests believe that cities do not take full advantage of the rivers that flow through them.

One goal of the Urban Rivers Act of 2001 is to build or rebuild the connections between downtowns, adjacent neighborhoods and their waterfronts. Another is to protect and enhance the natural environment that provides the basis for much of a river's value to a community. Understanding how to integrate these needs is the ultimate challenge of sustainable urban river management.

The state needs to adopt more sustainable approaches to the management of urban riverfronts. Although current law and practice make good efforts to preserve natural resources, there is much less effort to encourage sustainable economic and community development.

Source: *Connecting with Minnesota's Urban Rivers: Helping Cities Make Sustainable Choices for the Future*. Minnesota Planning, 2002.

Minnesota Milestones

-----▶ Measures that matter

WATER QUALITY IN LAKES

More and more Minnesota lakes have been found unsuitable for swimming in recent years.

Percentage of monitored lakes fit for swimming

	Lakes suitable for swimming
1994	79%
1996	68%
1998	65%
2000	64%

In 2000, the most recent year for which data is available, the figures are based on monitoring 53 percent of the state's lake acres, or about 12 percent of its lakes, for swimmability. See www.mnplan.state.mn.us/mm/indicator.html?Id=64.

Unfortunately, there is no single government agency in Minnesota responsible for coordinating or overseeing management of the more than 10,000 lakes scattered throughout the state. Instead, these precious natural resources are managed by four different state agencies—the Department of Natural Resources, the Board of Water and Soil Resources, the Pollution Control Agency and the Department of Health—which often results in inconsistent regulation and enforcement. Consequently, responsibility for lake management and protection frequently falls to local lake associations, many of which lack the information, tools or resources necessary to formulate and implement effective lake management plans. (See <http://mnlakes.org>.)

Minnesota's lakes are in danger of being loved to death. Many of the state's larger lakes have several tiers of development. Smaller, more vulnerable, lakes are also routinely subject to the pressures of shoreland development. And, whether because of

overdevelopment, overuse, spread of exotic species or pollution, the quality of Minnesota's lakes and the recreational experiences they offer are threatened.

So far, the Pollution Control Agency puts the number of impaired Minnesota lakes at 911. Some 87 percent are due to high levels of mercury contamination -- not an easy "fix." The agency judges that it will clean up only one of these in the next eight years.

On the positive side, methylmercury concentrations in Minnesota fish appear to have declined about 12 percent over the last 10 years. Minnesota's ban on mercury in batteries and paint, and the development of statewide contamination strategies, voluntary reduction agreements and statewide reduction goals all appear to have helped. While statewide gains are notable, 70 to 90 percent of mercury comes from air pollution sources located outside the state. Further reductions in Minnesota waters will require continued fish and water monitoring and emissions cuts from coal-fired power plants both in and outside Minnesota.

WASTEWATER TREATMENT

Under the federal Clean Water Act and Minnesota law, the Pollution Control Agency is responsible for monitoring and regulating water pollution from point sources -- those domestic and industrial facilities that discharge wastewater to surface water or land at distinct points. Since the mid-1980s, the PCA has sought resources to address the growing number of facilities without current permits. A 2002 audit by the Legislative Auditor indicated a number of deficiencies in the point source program. The PCA developed and implemented a plan to address permit backlog, inspection and enforcement issues in response to the audit. (A summary can be found at www.pca.state.mn.us/publications/reports/water-pointsourceplan.pdf.)

The PCA plan still will not meet federal goals for major facility permit backlogs (no more than 10 percent) or for minor facilities (no more than 25 percent currently, and no more than 10 percent in 2004) with the current staffing level. Further, the audit identified barriers to timely permit issuance, such as permit-by-permit debates on phosphorus discharge limits and controls.

The PCA will report to the Legislature in early 2003 with its recommendations.

The remaining 13 percent of impaired lakes are due to a variety of contamination problems, ranging from nutrient rich runoff to PCBs to dioxins. The PCA believes that the state should be able to clean up about 40 percent of these in the next eight years.

The PCA regularly collects and analyzes information on more than 800 lakes that have a high ecological and economic value in the state. As more information is gathered, more concerns surface.

Lakes that do not support designated uses are candidates for diagnostic studies under the Citizens Lake Monitoring Program, Lake Assessment Program or Clean Water Partnership Program. Local sponsors must express interest in lake restoration.

Mercury and the environment

Mercury poses a health threat when transformed in the natural environment into methylmercury. Methylmercury bioaccumulates in fish, including Minnesota's popular sportfish -- bass, walleye and northern pike. Mercury contaminated fish are unsafe for human consumption and those who eat a lot of fish for cultural, social or economic reasons face higher health risks. Health risks related to mercury are not limited to humans. Fish-eating wildlife such as loons have negative developmental effects due to methylmercury.

Mercury in northeastern Minnesota lakes comes from natural sources such as volcanos and the weathering of rocks, production of chlorine or thermometers, and from burning fossil fuels and smelting metals. Because so much is beyond easy control, Minnesotans must take special precautions to curb mercury use and releases. See

www.pca.state.mn.us/hot/legislature/reports/2002/mercury-02.pdf.

Lake associations

Minnesota is fortunate to have a strong network of lake associations. Many people, including resource managers, believe that the most effective lake management will come from these associations, that is, from the "bottom up." They prefer the locally based method of organization for lake management because lake problems and their solutions are so site-specific.

The state has a great opportunity to work cooperatively with lake associations and their county coalitions. Stakeholders need tools to conduct routine monitoring of lake conditions; to collect, analyze and store data gathered through monitoring; to assist in identifying water quality goals; and to assist in identifying and implementing actions to achieve water quality goals.

Citizens help take stock of the resource

The Citizen Lake Monitoring Program relies on volunteer efforts of citizens statewide who collect water quality data on lakes. Data from the CLMP is entered into the U.S. Environmental Protection Agency's water quality database along with water quality data collected by the PCA. The data helps scientists detect trends in water quality. For many lakes, CLMP data is the only water quality information available.

During the 2001 monitoring season, volunteers monitored 857 lakes, taking 14,765 individual Secchi disk readings, helping determine a lake's overall health and alerting the PCA to problem lakes and contaminants. New pilots will include chemical tests, further increasing the state's monitoring capabilities.

Unifying state assistance

In 2001, the state established a pilot Local Solutions Alliance to unify state efforts to help communities wrestling with growth problems. The alliance brings technical experts and assistance from a range of state and federal agencies together with communities. It proves that more can be done with less when people work together. The state could offer the same kind of integrated service to interested lake associations and local

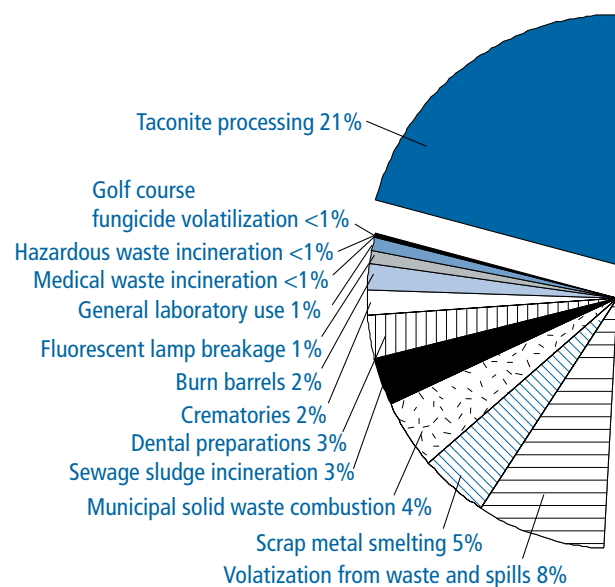
governments. Four agencies may have lake management duties, but there is no reason they cannot work as one.

Phosphorus and lake quality

Up to 90 percent of lakes are impaired by excess nutrients, especially phosphorus, in some agricultural areas of Minnesota. Phosphorus is the primary pollutant associated with the eutrophication of surface waters, a condition in which excess nutrients cause proliferation of algae and aquatic vegetation. Both point sources, municipal and industrial wastewater discharges, and nonpoint sources, urban and agricultural runoff, contribute excess phosphorus loads to Minnesota's waters. Excess phosphorus causes nuisance algal blooms and reduced transparency, making waters unsuitable for swimming, fishing or other activities. It also affects downstream reaches, making it a pollutant of regional, statewide and national concern. The PCA has developed a comprehensive phosphorus strategy with seven action steps to reduce and control phosphorus. New resources necessary to implement the strategy include data collection and assessment, new basin management specifically for phosphorus, and continued regulatory review of the effectiveness of wastewater and manure application rules. See <http://www.pca.state.mn.us/hot/legislature/factsheets/phosphorus-00.pdf>.

ESTIMATED STATEWIDE MERCURY RELEASES BY SOURCE, FOR YEAR 2000

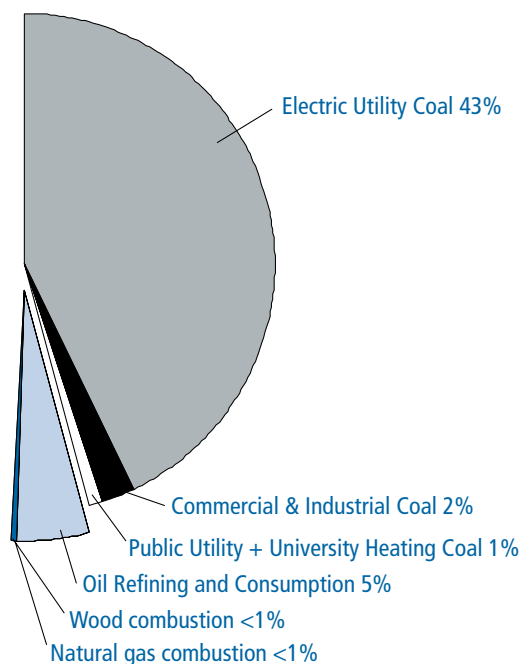
Taconite processing 21%



Product use 28%

Source: Minnesota Pollution Control Agency

Energy production 51%



DISHWASHING RECONSIDERED

A 1993 study prepared for the Minnesota Pollution Control Agency estimated that automatic dishwasher detergents contributed 8 to 9 percent of the total phosphorus contained in the water coming into the 11 Metropolitan Wastewater Treatment Plants. Nearly all dishwasher detergents sold in Minnesota contain phosphorus. The total content of phosphorus in many brand-name dishwasher soaps ranges from 1.6 to 9 percent. Yet phosphorus-free detergents are commonly available in the marketplace.

Ground water and lakes

Most people understand that lakes receive water from precipitation and runoff, but ground water also often makes a contribution. The Carnelian-Marine Watershed District asked the Minnesota Geological Survey to investigate the influence of ground water on the water quality of major lakes in the district. The study built on geologic mapping created for the Washington County Geologic Atlas to identify potential flow paths for ground water, and to connect land areas and land use to ground water recharge and discharge into lakes. By measuring ground water flow in and out of lakes, and analyzing the quality of that water, it was possible to identify the sources of nitrogen and phosphorus and effective techniques to manage them. These techniques are widely applicable to Minnesota lakes and are particularly efficient when done in conjunction with geologic mapping.

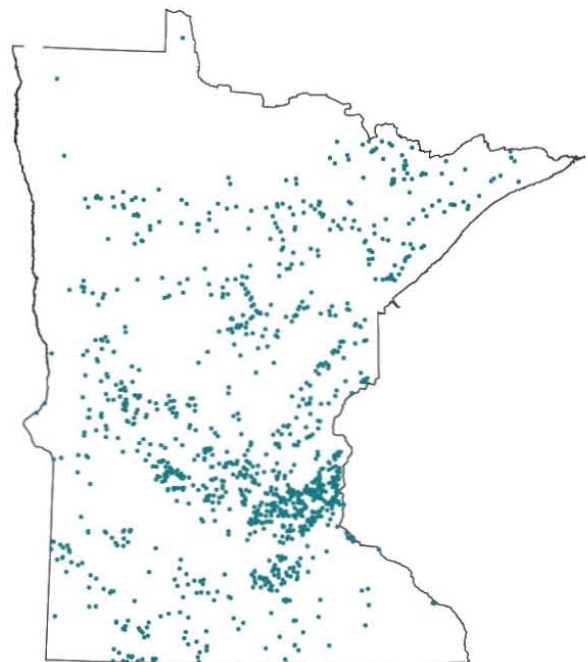
Advice on eating fish

The Minnesota Department of Health has issued advice for eating locally caught fish since the 1970s. The number of waters with fish consumption advice goes up every year. This increase is due to additional waters being monitored. Every fish has some amount of mercury. Fish from over 1,000 Minnesota waters have been tested for contaminants. Due to the presence of mercury, consumption advice is warranted for all waters tested, at least for women of childbearing years and children. Consumption advice for tested waters is listed in tables on the Minnesota Department of Health Web site (see www.health.state.mn.us/divs/eh/fish/index.html) and in DNR lake survey reports (see www.dnr.state.mn.us/lakefind/surveys.html).

Mercury is a concern in fish from all waters of the state. The concentration in fish is going up in some lakes, down in some and staying the same in others. Polychlorinated biphenyls are at levels of human health concern mainly in fish from the major rivers and Lake Superior. Levels of PCBs in the state appear to be declining. For example, a recent Environmental Protection Agency report showed that PCB levels have significantly declined in fish from the Mississippi River. As PCB levels go down fish advisories for PCBs are being replaced by advisories for mercury.

Other contaminants, such as dioxins and polybrominated diphenyl ethers, are emerging as a concern in fish. During the last decade, PBDEs have been increasing in breast milk in the U.S. Fish consumption is a major pathway of human exposure to these contaminants.

MINNESOTA LAKES IMPAIRED FOR SWIMMING – 2002



The farther south one travels in Minnesota the more likely a lake is to be impaired. Map based on sampling 12 percent of the state's lakes.

Source: Pollution Control Agency

A number of state water programs receive funding through various fees or federal grants, while others are supported solely by the general fund. This priority will examine fee-based opportunities to provide reliable, inflation-adjusted support to those functions that comprise the foundation for the state program. First, this should include support for the state's water quality and availability permit programs. Second, it should consider ways to provide a baseline of support for ambient water monitoring and assessment efforts. A key principle will be to make the system sufficiently broad-based so that fees can provide reliable support to the activities of a range of agencies. This approach is necessary to rebuild important efforts undermined by budget cuts of the last decade, and to ensure that the overall system is balanced in a way that reflects the need, not merely the success of agents at securing money. The approach is unusually important in the water arena, since water management involves a complex network of interrelated activities and programs, with each depending on others for the whole to work. — *Environmental Quality Board*

SECURE STABLE FINANCING FOR MINNESOTA'S WATERS

State and federal governments provided more support to water protection and management activities in Minnesota in 2002 than they did a decade ago. Adjusted for inflation, funding for water activities of the departments of Natural Resources, Health and Agriculture, the Board of Water and Soil Resources and the Pollution Control Agency increased from \$137 million in 1991 and 1992 to \$234 million in 2001 and 2002. This represents an increase of 71 percent over the 10-year period, or an average increase of 7 percent each year. State government spent about \$16 for each person in Minnesota in 1991, and about \$24 for each in 2002. So each Minnesotan "spends" about \$8 a year more today on water programs in these key agencies than a decade ago.

State and federal funding of local government water and sewer projects — mostly low interest loans — grew at about the same pace. The Department of Trade and Economic Development and the Public Facilities Authority spent \$195 million for local governments in 1991 and 1992, and \$337 million in 2001 and 2002, a 73 percent increase over the 10-year period, or a little over 7 percent per year. This increase came despite a decrease in federal and state funding and was due to recycled loan funds and PFA-leveraged bonds.

\$5.21 WATER SUPPLY CONNECTION FEE

To cover the costs of monitoring public water supplies, and to assist in complying with the federal Safe Water Drinking Act, the 1992 Legislature enacted a fee on all service connections to municipal water supplies and supplies operated by rural water districts. The fee was set at \$5.21 annually and has not changed since its creation. Until recently, more money was taken in by the fee than spent, but the fee now fails to raise enough money to cover costs and the surplus will be spent by 2006.

COVERING THE COST OF WASTEWATER

Currently no mechanism generates revenue to fully cover the state's cost of managing wastewater. A user fee based on the costs of wastewater treatment and levied on sewer utility bills and pumping of septic systems could raise as much as \$30 million annually for water quality protection.

Besides the rapidly growing costs of health insurance and increased cost of a more experienced work force, why did most state water agency spending increase? The answer is simple. The Legislature and Congress asked agencies to deliver important new programs to safeguard Minnesota's water resources. These included new state laws for wetland protection, septic tank regulation and feedlot management, and new federal requirements for source water protection, agricultural land conservation, water quality protection and stormwater management. Often the funding associated with these new mandates failed to cover the added costs, and other efforts had to be cut back.

A substantial expansion of federal stormwater management requirements will bring a major challenge to the Pollution Control Agency and the state's local governments in the next several years. In addition, the Federal Farm Security Act of 2001 promises to direct millions of new dollars in conservation assistance to Minnesota farmers, if state and local officials can provide the necessary technical assistance. As noted in discussion of the agriculture priority, the additional staffing needed could be significant. Other activities have failed to keep pace with the need, including water quality and quantity monitoring, geologic atlas development, ground water modeling, aquifer management planning, information systems development and strategic water planning.

State leaders can choose from among several options in considering whether and how to meet these needs, ranging from postponing support, to reallocating funds, to asking those who contribute to the problem or who may otherwise benefit to pay their fair share.

BOATS AND WATER

Increases in boat registration fees or the redirection of unrefunded marine gas tax dollars could become part of the water recreation account, which is used to fund public access, parks and exotic species programs.

If new revenue sources are considered, the Environmental Quality Board suggests that they:

- Be simple and understandable for fee payers and the public
- Ensure revenues come from a wide variety of sources
- Retain a clear link between the revenue source and the programs or activities they fund
- Be fiscally sustainable over time and generate enough revenue to adequately address the need

The sales tax dedication

In 2002, legislators considered a bill to dedicate 3/16ths of 1 percent of the state sales tax to natural resources and create a Conservation Heritage Enhancement Fund. The amount set aside would have been about \$130 million annually. The legislation, which did not pass, also suggested various ways to distribute the funds, but did not include water quality protection among its choices.

A similar initiative, "Half a Cent for Nature," was proposed in fall 2002 by an informal consortium of state agencies. The initiative would either dedicate ½ cent of the existing tax or a new sales tax, raising about \$355 million a year for water programs (including water quality).

Valuing water

Minnesota, like most states, treats its water like a free good. Fees and other charges may cover part of the cost of providing or treating water, but they never include a charge for the resource, itself. Economists argue that this approach to pricing distorts the use people make of the resource. People tend to waste a good that costs them nothing.

The appropriation of water, use of water, discharge of wastewater and pollution of waters from nonpoint runoff or infiltration are currently free "uses" of Minnesota's water resources. The state could send a message to all Minnesotans by establishing a value-based fee on uses such as permitted water appropriations, drinking water connections and wastewater and septic system discharges.

AIR QUALITY FEES KEEP PACE WITH INFLATION

To ensure that air quality program funding keeps up with inflation, the Pollution Control Agency adjusts fees based on the Consumer Price Index. If the CPI for the current year is greater than the CPI in 1989, the air quality fees are adjusted according to the percent increase.

TOP WATER ACCOMPLISHMENTS OF THE 1990s

1. KEEPING PUBLIC WATER SUPPLIES SAFE

Minnesota ranks first in the nation in meeting drinking water standards. The state has 8,300 public water supply systems, the sixth highest in the country. They serve more than 3 million residents. Over the last dozen years, only 380 of more than 2 million samples exceeded a drinking water standard.

2. REDUCING WELL CONTAMINATION

Thanks to provisions of the Ground Water Protection Act of 1989, Minnesota is a national leader in sealing abandoned wells and preventing ground water contamination. Minnesotans have sealed 160,000 of an estimated 750,000 abandoned wells since 1990. In addition, 95 percent of today's new wells comply with state well code requirements, up from 65 percent in 1989.

3. FARMERS CLEANING UP THE MINNESOTA RIVER

The adoption of best management practices by Minnesota River Basin farmers and improvements to wastewater treatment plants helped cut pollution by as much as 30 percent. In addition, farmers signed 2,445 easements, setting aside over 100,000 acres of marginal farm land. The Minnesota River Conservation Reserve Enhancement Program, a joint state-federal land retirement program dedicated to reducing the effects of agriculture on the river's environment, ranks second in the nation in enrolled acres.

4. GEOLOGY MAKING BIG GAINS

In the last decade, Minnesota produced eight county atlases and four regional hydrogeologic assessments, covering 75 percent of the state's residents and 37 percent of its land area. These provide local governments and state agencies essential information for protecting drinking water supplies from improper land and water use.

5. SAVING THE MISSISSIPPI

The year 1996 marked completion of a 10-year, \$331 million sewer separation program for controlling combined sewer overflows into the Mississippi River. The program helped clean up the 72-mile stretch of river that flows through the metropolitan region, as well as vulnerable points downstream, such as Lake Pepin. The project involved pipe separation in more than 21,000 acres of drainage area, and construction of 200 miles of storm sewers and 12 miles of sanitary sewers. The number of overflows has been reduced from an average of once every three days to twice a year.

6. MITIGATING FLOOD DAMAGES

The number of flood-prone buildings in Minnesota has been cut by half, from nearly 20,000 in 1970 to about 10,000 in 2001. The state has removed 1,600 homes from the floodplain. Today, most buildings in Chaska, East Grand Forks, Marshall, Mankato and Rochester are protected to the 500-year flood level. The Minnesota Recovers Disaster Task Force has helped more than 200 communities since 1993.

7. PRESERVING WETLANDS

The Wetland Conservation Act of 1991 required anyone proposing to drain or fill a wetland first to try to avoid disturbing the wetland; second, to try to minimize any impact on the wetland; and, finally, to replace any lost wetland acres, functions and values. Nearly 30,000 acres of wetlands have been actively preserved since adoption of the act. The Permanent Wetlands Preserve Program, which began in 1992, acquired nearly 300 permanent easements for 11,000 acres of wetlands and surrounding upland. The Wetland Bank, which gives landowners the option of buying wetland "credits," has taken deposits of another 2,000 acres.

8. MANAGING SEPTIC TANKS

The 1994 Individual Sewage Treatment Systems Act required cities and counties to adopt ordinances regulating the design, location, installation, use and maintenance of septic tanks. Local ordinances were required statewide – for the first time – to meet or exceed state standards and criteria. As of 2001, nearly 90 percent of local governments reporting to the Pollution Control Agency have ordinances that call for approval of treatment system design. Much work remains to be done, however. Today, one third of the state's 600,000 septic tanks are thought to be failing, with 64,000 considered imminent threats to public health.

9. GETTING LOCAL

The Comprehensive Local Water Management Act of 1985 changed the way county governments view the job of protecting and managing water resources, and the way the state views counties. On average, counties put in three dollars for every one the state spends on local water planning. And, whether it is wetland or drinking water protection, feedlot management or well sealing, the state looks to local governments more than ever to help protect and manage water.

Continued on page 18

TOP WATER ACCOMPLISHMENTS OF THE 1990s**10. MANAGING FEEDLOTS**

In the past decade, Minnesota completed its first comprehensive feedlot registration program – over 29,000 owners registered their feedlots – updated a 20-year old feedlot rule, and completed an extensive study of the environmental, economic and social effects of animal agriculture. By 2002, nearly 80 percent of Minnesota's large feedlots received NPDES permits as required under federal and state law. Minnesota's revised feedlot program is considered one of the best in the nation, meeting or exceeding all the requirements of the new EPA Confined Animal Feeding Operation regulations. In addition, over the last six years, the Agricultural Best Management Practices Loan program helped finance the environmental upgrades of over 1,000 feedlots. These steps promise major improvement in the quality of Minnesota waters.

11. CLEANING UP

The Pollution Control Agency and Department of Agriculture made great progress cleaning up Minnesota's most contaminated facilities and sites through a mix of nationally recognized programs. The State Superfund program reduced the number of active superfund sites by 45 percent to less than 120. The Leaking Underground Storage Tank program closed nearly 10,000 sites with nearly \$300 million in cleanup costs covered by the Petrofund. The MDA closed nearly 2,300 agchemical incidents and sites with nearly \$12 million from the Agricultural Chemical Response and Reimbursement Account. The Legislature also established a drycleaner fund to cover the cost of cleanups at drycleaning sites and three brownfield programs: the Voluntary Investigation and Cleanup, Agricultural VIC and Voluntary Petroleum Investigation and Cleanup programs. These fee-based programs encourage the cleanup and reuse of contaminated sites by issuing assurances from liability under the Minnesota Environmental Response and Liability Act.