



3.0 ISSUES IDENTIFICATION/ASSESSMENT OF PROBLEMS

This section identifies, describes, and assesses issues facing the VLAWMO. These issues were identified through the resource inventories described in Section 2.0, past studies, workshops, and consultation held with local and State agencies and organizations. Issues listed are fairly comprehensive because of the multiple mechanisms used to solicit input. The assessment of issues and problems includes a brief description of the issue/problem prioritization.

The intent of this section is to describe and define issues so that the Board can make informed choices regarding future efforts of the VLAWMO. Numerous organizations are responsible for management of water within the watershed, not just the VLAWMO. Therefore, this section ends with an assessment of the adequacy of existing controls and the identification of management gaps relative to each issue. Responsibilities in terms of goals and objectives, priorities, and implementation strategies selected by the VLAWMO for addressing the issues are presented in Sections 4.0 and 6.0.

Significant issues are listed below. VLAWMO completed a report card at which time a self-assessment was conducted and new issues were considered. Input from VLAWMO Annual Reports, the Technical Commission, the Board of Directors and prior to that the Board of Commissioners were used to complete the 2007 Report Card as seen in Appendix A. Undoubtedly, there are additional issues that have not yet surfaced. As new issues surface, they will be considered at monthly watershed meetings.

3.1 ISSUES AND PROBLEM IDENTIFICATION

The following potential or known issues were identified through the planning process:

- Local communities obtain their potable water supply from groundwater
- Groundwater quality is threatened or impaired
- Surface water withdrawn from the watershed supplies a portion of the potable water for the 400,000 users of the St. Paul regional water system
- Much of the urban development occurred before the use of Best Management Practices (BMP) for mitigating water quality impacts of development were common place
- Additional development is expected
- Data for making informed decisions is needed



- Public awareness about water resources in the watershed and appropriate stewardship is limited
- Sensitive resources are present, including wetlands
- There are numerous shallow lakes in which water quality is either threatened or impaired
- Exotic species, such as Eurasian water milfoil, Curlyleaf Pondweed, and Common Carp, infest some lakes
- There are localized flooding problems

The priorities of each issue/problem were identified by subwatershed in Table 3-1.

**TABLE 3-1
PRIORITIZATION OF ISSUES BY SUBWATERSHED**

Groundwater Supply 1	Groundwater Threatened 2	Surface Water Supply 3	Urban Development Pre BMPs	Additional Development	Sensitive Resources & Wetlands	Threatened/Impaired Lakes	Exotic Species	Data Is Needed 4	Public Awareness/Stewardship 5	Localized Flooding 6
M	H	L	M: Mostly parkland, but park development prior to BMPs.	L: Parkland, limited urban development potential.	H: W. Vadnais Lake classified by VLAWMO as a High Priority Wetland.	?: Limited data	L: Eurasian Water Milfoil confirmed, but boating is not a use.	M	H	L
M	H	H	H: Vadnais Heights about 80 to 90% developed, future focus on redevelopment.	M: Only 10 to 20% undeveloped.	H: E. Vadnais and Sucker Lakes rated as high priority wetlands by VLAWMO, and some rare natural features present.	H: E. Vadnais close to meeting Total Phosphorus goal, Sucker meeting MPCA swimming standard.	M: Eurasian Water Milfoil confirmed, but boating is not a use. Curlyleaf pondweed present, but rare. Carp low.	M	H	L
M	H	H	M: Much of the subwatershed is developed, but development has been more recent and includes some BMPs.	H: Approximately 300 acres for development remaining. Likely to be at higher densities than previous development in the area.	H: Pleasant and Charley Lakes rated as high priority wetlands by VLAWMO and some rare natural features present.	H: Monitoring shows Pleasant Lake average total phosphorus concentrations in some years exceeds MPCA threshold for impairment of swimming.	M: Some past efforts for carp harvesting by the residents of Pleasant Lake. Curlyleaf pondweed present but rare in Pleasant and Sucker Lakes.	M	H	L
M	H	H	M: Much of the subwatershed is developed, but development has been more recent and includes some BMPs.	H: Close to 800 acres potentially remaining for development. Likely to be at higher densities than previously, except rural residential areas in Lino Lakes.	H: Wilkinson and Amelia Lakes rated as high priority wetlands by VLAWMO and some rare natural features present.	H: Analysis of data show slight declining trends in water quality for Wilkinson and Tamarack Lakes.	H: Common carp have historically been a problem in Wilkinson and Gilfillan Lakes. Curlyleaf pondweed noted as common in 1961 DNR report for Gilfillan Lake.	M	H	L
M	H	H	M: Subwatershed and shoreline mostly developed.	M: Only 10 to 20% undeveloped.	M: Birch Lake and most wetlands rated as moderate to light management by VLAWMO.	H: Birch Lake meeting MPCA standards for swimming.	M: Eurasian Water Milfoil confirmed present in 2005 in Birch Lake, but localized problem.	M	H	L
M	H	H	H: Subwatershed is largely developed, future focus on redevelopment.	L: Only a few acres of developable land remaining.	M: Goose Lake rated as light management by VLAWMO. Limited number of wetland in the subwatershed.	H: Goose Lake is a highly productive lake, with high nutrient levels, poor water clarity, and no aquatic vegetation.	M: No exotic species confirmed, but Goose Lake is shallow and if infested with carp could have even greater water quality problems.	M	H	L
M	H	H	H: Subwatershed is largely developed, future focus on redevelopment.	L: Only a few acres of developable land remaining.	L: Very few wetlands present.	L: No lakes present.	L: Limited number of water bodies, and no confirmations of exotic species.	M	H	L



Groundwater Supply 1	Groundwater Threatened 2	Surface Water Supply 3	Urban Development Pre BMPs	Additional Development	Sensitive Resources & Wetlands	Threatened/Impaired Lakes	Exotic Species	Data Is Needed 4	Public Awareness/Stewardship 5	Localized Flooding 6
M	H	H	M: Some existing development, but there is a lot of undevelopable wetland area.	H: Approximately several hundred acres of developable land remaining. Much of this is the City of Gem Lake portions of the subwatershed, should be developed at lower densities.	H: The Lambert Creek Wetlands are rated as high priority by VLAWMO, some rare natural features present.	M: No lakes present, but area drains to E. Vadnais Lake, and has been shown to be an historic source of phosphorus.	M: Presence of exotic species unknown, but the shallow wetland may be highly susceptible to impacts of carp and curleyleaf pondweed if infested.	M	H	H
M	H	H	M: Mostly developed, much of the remaining open area is undevelopable wetland. Potential for redevelopment/improvements to Lower Lambert Creek (streambank stabilization).	M: Only 10 to 20% undeveloped, outside wetland areas.	H: The Lambert Creek Wetlands are rated as high priority by VLAWMO, some rare natural features present.	M: No lakes present, but area drains to E. Vadnais Lake, and has been shown to be an historic source of phosphorus.	M: Presence of exotic species unknown, but the shallow wetland may be highly susceptible to impacts of carp and curleyleaf pondweed if infested.	M	H	H
M	H	L	L: Existing development generally at lower densities.	H: Roughly 50 percent of subwatershed developable at lower densities (i.e., 1 unit/3-acres).	H: Gem Lake rated as a high priority wetland by VLAWMO.	H: Monitoring shows a slight declining trend in the water quality of Gem Lake.	L: Exotic species unknown. Lack of outlet limits potential for infestations.	M	H	M: Landlocked basin, may be sensitive to lake level increases with increase runoff volumes from anticipated development.

H= High priority

M=Medium Priority

L= Low Priority

1. All rated high because private and/or community supply systems spread throughout entire watershed
2. All rated high because of potential for contamination
3. All rated high except Gem Lake subwatershed because connectedness.
4. All rated medium because data is needed to make informed decisions, but VLAWMO Managers place higher priority on resource outcomes
5. All rated high because VLAWMO Managers consider this an important implementation action
6. All rated low (except Gem Lake, and portions of Lambert Creek subwatershed) because it is generally not considered a big problem in the watershed, and is generally handled by the Local Units of Government



3.2 ASSESSMENT OF PROBLEMS

3.2.1 ISSUE: POTABLE WATER SUPPLY FROM GROUNDWATER

As shown in Table 2-26, White Bear Township, the City of St. Paul, and the City of Vadnais Heights, all have municipal supply wells located in the watershed. In addition, residents of Gem Lake and Lino Lakes, located in the watershed and portions of North Oaks, are supplied by private wells.

3.2.2 ISSUE: GROUNDWATER QUALITY: THREATENED AND IMPAIRED

There are also a number of additional potential pollutant sources that may or may not threaten supplies, as described in Table 2-27 and Figure 2-12 in Section 2.4. There is a superfund site that has contaminated groundwater in portions of North Oaks. Water supply in these areas is currently obtained from White Bear Township. Infiltration of contaminated urban runoff may also threaten groundwater. As shown in Section 2.0, much of the watershed has areas with high groundwater susceptibility.

3.2.3 ISSUE: POTABLE WATER SUPPLY FROM SURFACE WATER

The BWCSP withdraws water from East Vadnais Lake. Surface runoff and the VLAWMO provide a portion of the supply estimated at about 30 percent of the annual withdrawal. The balance of the supply is obtained through pumping from the Mississippi River to Charley Lake, which flows to Pleasant and Sucker lakes and then to East Vadnais Lake. Portions of the watershed that do not contribute include the Gem Lake Subwatershed, which does not discharge, and the subwatershed to West Vadnais Lake, which is not hydrologically connected to East Vadnais Lake.

3.2.4 ISSUE: URBAN DEVELOPMENT BMP OCCURRED BEFORE IMPLEMENTATIONS

The use of BMPs to mitigate the water quantity and quality impact of urban development did not become common until the late 1980s and early 1990s. Much of the development in the watershed occurred before this time. This means that much of the existing urban development does not have storm water quantity and quality practices in place, prior to the discharge of storm water to surface waterbodies. Retrofitting existing storm sewer systems, although costly, has the potential to improve water quality and reduce surface flooding. Retrofitting can be added with road maintenance, improvement projects, and when areas are redeveloped.



3.2.5 ISSUE: ADDITIONAL DEVELOPMENT IS EXPECTED

As shown in Table 2-25, approximate methods show that about 11 percent of the watershed is potentially still developable through 2020. Discussions with the VLAWMO commissioners and with various city staff found that many consider this estimate to be low. The exception is the City of White Bear Lake (Burch, 2006), which estimates that there are approximately 20 acres or less of developable land left in the VLAWMO portions of the city.

One reason that the estimate may be low is that there may be a number of individual platted undeveloped lots that are included in the MCES's coverage for developed areas. The analysis completed only looked at the acreage of areas noted as "undeveloped" in the MCES's GIS coverage. Storm water management opportunities may be limited on these existing platted lots as there may be some legal rights granted through previous approvals.

Another important conclusion about remaining development is that it varies by subwatershed. Inspection of Table 2-25 shows that the Gem Lake and Tamarack/Wilkinson subwatersheds has the greatest percentage of development remaining through 2020. In the Gem Lake subwatershed, and also in the Lambert Creek subwatershed, much of this development is within the municipal boundaries of the City of Gem Lake. In general, development with the City of Gem Lake is expected to be on larger lots of about 3 acres. However, a number of recent development proposals have been submitted at densities higher than allowed by the City, while other projects have petitioned for de-annexation, with subsequent annexation into Vadnais Heights, where higher densities would presumably be allowed.

In the Tamarack/Wilkinson subwatersheds, most of the remaining undeveloped area is in the cities of North Oaks and Lino Lakes. The area in Lino Lakes is outside the Metropolitan Urban Service Area (MUSA) and is shown as rural residential in future 2020 land use, however, for the 2030 Regional Development Framework of Lino Lakes it is shown as developable area. Also, much of the area around Amelia Lake was recently put into a conservation area. In North Oaks, development is managed by the North Oaks Corporation. This remaining development will be urban residential, at densities of around four lots per acre (North Oaks Corporation, 2006).

Additional development is an issue because it increases recreational needs and demand, increases potable water use, and changes local surface drainage patterns and pollutant loads.

Impervious surface covers soils that would otherwise infiltrate water, and natural drainage ways are replaced with storm sewers, paved channels, ditches, and other artificial drainage devices.



Impervious surfaces and artificial drainage, increase the volume and accelerates the rate of surface runoff reaching receiving waters. The effects of higher runoff volumes and rates on water resources are higher flows, flooding, erosion, and adverse impacts on aquatic habitats.

In addition to changing the hydrology in an area, development also increases the potential for pollution of water resources. Because the human population is concentrated, more materials are manufactured, consumed, and disposed of in developed areas. Not only is the number of possible pollutants increased, but also the opportunities for them to be released into the environment. Large quantities of wastewater and solid waste are generated in developed areas that must be treated and/or disposed. Construction sites disturb land and can result in substantial erosion. Erosion rates can be 20,000 to 40,000 times higher at construction sites than vegetated areas. After construction, impervious surfaces are likely places for the deposition of contaminants from vehicles, industry, lawn care, pets, sediment, organic litter (e.g., grass clippings), and trash. These contaminants are more likely to reach water resources because there is more surface runoff to transport pollutants and there are fewer natural filtration systems (like vegetation and wetlands) to remove pollutants.

3.2.6 ISSUE: DATA NEEDS/LIMITATION

The hydrology and issues facing the watershed are complicated and interrelated. Good information of recent origin is necessary for making informed decisions. Although, there is much information on the watershed (Section 2.2), and a number of recent studies, additional information is needed to reduce uncertainty and to track effective management efforts to support adaptive management. Specific data collection needs include:

Lake Levels: Lake level information is limited. The BWCSPP monitors levels on Charley, Pleasant, Sucker, and East Vadnais lakes, while the Ramsey County Department of Public Works has a monitor who records levels for Birch Lake.

Many of the lakes are shallow and a diverse aquatic plant community is important for the water quality of these lakes. However, only Birch Lake has had a comprehensive survey.

3.2.7 ISSUE: PUBLIC AWARENESS

Public awareness of watershed and water quality issues has generally increased over the past 20 to 30 years. However, many residents and local officials, with responsibility for land use decisions, remain unaware that they live in the Vadnais Lakes area watershed, and that what they do on the landscape affects water quality and flows to area lakes and wetlands. This leads to practices that can contribute to water quality and aquatic resources problems. For example, a 2005 study by



VLAWMO and the Ramsey Soil and Water Conservation District called “Improving The Waters of Lower Lambert Creek” found numerous incidences where residents use questionable yard waste disposal practices.

3.2.8 ISSUE: SENSITIVE RESOURCES

As described in Section 2.0, there are numerous wetlands in the watershed, many of which have are classified as high priority by the VLAWMO. There are also a number of rare and natural features in the watershed (Figure 2-8). These wetlands and natural features provide important wildlife, aquatic life, education, and habitat functions. Wetlands can also provide water quality, flood storage, and recreation functions and values. Given the number of wetlands and the glacial topography of the Vadnais Lakes Area Watershed, the wetlands are particularly important for water quality and flood storage. In most of the watersheds, wetlands represent the edge where the aquatic environment has the most contact with the terrestrial environment.

3.2.9 ISSUE: LAKE WATER QUALITY: THREATENED OR IMPAIRED

There are numerous lakes in the watershed, some of which are threatened or impaired. The MPCA 2006 list of impaired waters only lists a few lakes for impairment of aquatic consumption due to mercury (i.e. fish consumption). There are also a number of lakes that have improved according to some of the studies completed by the BWCSP (i.e. Pleasant, Sucker, and East Vadnais lakes). However, East Vadnais Lake does not meet the BWCSP goal of 25 mg/L total phosphorus in all years and comparison of the VLAWMO CLMP and the BWCSP data for other lakes with the MPCA thresholds for swimming (nutrient) impairment suggests that some VLAWMO lakes would likely be considered impaired if the MPCA used the local data. These lakes include: Pleasant Lake, which in some years is above the threshold for phosphorus as measured at the outlet of the lake, and Goose, Gilfillan, Wilkinson, Tamarack, and Gem lakes. These lakes are for the most part shallow, and Wilkinson Lake and Tamarack Lake, in particular, are wetlands instead of lakes, making comparison with the MPCA thresholds uncertain. However, it is clear that a number of the lakes are nutrient rich and eutrophic to hypereutrophic. Also, trend-line analysis of data for these lakes (Appendix C), while not a rigorous trend analysis, does show possible negative trends in water quality for Goose, Gem, Tamarack, and Wilkinson lakes.

3.2.10 ISSUE: EXOTIC SPECIES INFESTATION

As discussed in Section 2.0, Eurasian water milfoil, Curlyleaf Pondweed, and Common Carp have been found in some watershed lakes. Eurasian water milfoil and Curlyleaf Pondweed can be recreational boating nuisance issues. However, with respect to Eurasian water milfoil infested lakes,



only Birch Lake has private boating as a use. Boating access and use are restricted in East and West Vadnais lakes.

Data on Curlyleaf Pondweed is limited, and where it exists at a nuisance level is unknown. MnDNR surveys show it as common or rare in Deep, Gilfillan, Vadnais East and West, Pleasant, and Sucker lakes. Most of these surveys were completed in the late 1990's, usually during the summer months. DNR data might not show the true extent of the Curlyleaf Pondweed problem, as they are in the end cycle of their life. Curlyleaf Pondweed can be a water quality concern at high densities because of its life cycle characteristics. It begins growing in the fall, starts growing again in early spring, and dies in early July. The fall and early spring growth can give it a competitive advantage over native plants. When it dies in early July it can also increase phosphorous loading through plant decomposition, and changes to sediment phosphorous release mechanisms (James, et. al., 2001). This mid-growing season release of phosphorous can trigger algae blooms, particularly if the Curlyleaf Pondweed growth was at densities that kept native plants from growing.

According to MnDNR surveys, Common Carp were at a low number for the lake class for East and West Vadnais, Sucker, and Pleasant lakes. Wilkinson Lake and Gilfillan Lake have had problems with Common Carp in the past and have had reclamation efforts. A new outlet with a fish barrier has recently been installed on Wilkinson Lake. As discussed in Section 2.0, local residents have also promoted Common Carp management efforts in the past for Pleasant Lake. Common Carp is an issue for the shallow lakes in the watershed because of their feeding behavior. They stir up bottom sediments and can uproot aquatic vegetation. This can contribute to water quality problems.

3.2.11 ISSUE: LOCALIZED FLOODING

There are localized flooding issues throughout the watershed due to storm water infrastructure issues. There are also identified flooding concerns along the lower and middle portions of Lambert Creek. Much of this area is considered floodplain, but there are flooding concerns by residents. High water levels have inundated private property in some of these areas.

3.3 ISSUE PRIORITIZATION

The Board considered the various issues identified, and an ordinal ranking exercise was used to evaluate the relative priority of each issue/problem. This was done by comparing the issue to each other and for each pair, asking the question which of the two is a higher priority, or if you had a limited amount of money, where would you spend it? Table 3-2 presents the results of the ranking. In general, the higher the total score at the bottom of the table, the higher the priority. However,



discussion of the ranking showed that there were some deviations to the manager's priorities from that shown in the table.

Discussion of these rankings by the participants showed:

- That the first issue was perceived as an issue of the quantity of groundwater and was probably ranked where it was because of the perception that this is a water rich area.
- Participants agreed that the groundwater threat and surface water supply (i.e., the issues dealing with the quality of potable water for human consumption) were the highest priority issues. However, it was also generally perceived that the groundwater quality contamination issue in North Oaks from the superfund site is being adequately addressed by the MPCA and Minnesota Department of Health (MDH). Thus, the balance of the concern of the issue is with respect to the potential for future groundwater contamination.
- Participants did not agree that public awareness and stewardship was a low priority. The group believed this was a high priority for the VLAWMO, but also recognized public awareness and stewardship through education programs is a tool for achieving and addressing some of the more outcome oriented issues/problems. The higher ranked issues/problems tended to be resource based outcomes.
- The participants agreed that localized flooding was a lower priority compared to the other issues. This is probably due to the past use of development design standards to minimize flooding and public works projects over time to address these types of issues.

Water priorities and partnership meetings were held in three communities with the community organization that most often dealt with natural resources. The communities visited included North Oaks, White Bear Lake, and Vadnais Heights. Individual community members in the other communities, White Bear Township, Gem Lake, and Lino Lakes, were also contacted to solicit input.

A prioritization exercise was used at the meetings to determine where the citizens felt VLAWMO should focus its energy. The results are summarized in Table 3-2 and Table 3-3.



**TABLE 3-2
ORDINAL RANKING**

	Groundwater Supply	Groundwater Threatened	Surface Water Supply	Urban Development Pre BMPs	Additional Development	Sensitive Resources & Wetlands	Threatened/Impaired Lakes	Exotic Species	Data Limited/Needed	Public Awareness/Stewardship	Localized flooding
Groundwater Supply		6	2	6	6	0	6	2	0	2	0
Groundwater Threatened	0		3	0	0	0	0	0	0	0	0
Surface Water Supply	4	3		0	0	0	0	0	0	0	0
Urban Development Pre-BMPs	0	6	6		1	6	6	0	0	0	0
Additional Development	0	6	6	5		0	0	0	0	0	0
Sensitive Resources & Wetlands	6	6	6	0	6		3	0	0	0	0
Threatened/Impaired Lakes	0	6	6	0	6	3		0	0	0	0
Exotic Species	4	6	6	6	6	6	6		1	3	0
Data Limited/Needed	6	6	6	6	6	6	6	5		6	2
Public Awareness/Stewardship	4	6	6	6	6	6	6	3	0		0
Localized flooding	6	6	6	6	6	6	6	6	4	6	
Total	30	57	53	35	43	33	39	16	5	17	2



**TABLE 3-3
CITIZEN PRIORITIES**

Goal	Weighting (Total Votes)
Protection of Wetlands and Habitat	38
Protect or Improve Water Quality	31
Erosion Control – Regulation	11
Groundwater Protection	8
Wise Use of Public Funding	8
Public Participation and Public Relations	7
Control Flooding	5
Management of Public Ditch System	2

The input from the citizens overwhelmingly indicates they felt the VLAWMO’s role is the protection of wetlands and water quality in general. This planning process is hoped to be the start of a continuing dialogue with the residents of the watershed.



3.4 ADEQUACY OF EXISTING CONTROLS

Table 3-4 provides a summary of existing controls, potential management gaps, and ideas for each issue, as discussed by the Board and the technical advising group. Management gaps identified were considered in the development of goals, policies, and management strategies for the VLAWMO in Section 4.0 of this Plan. The applicability of shoreland and flood plain ordinances is summarized in Table 3-5. Table 3-5 identifies communities within the watershed that have adopted shoreland and floodplain ordinances in accordance with the MnDNR's regulations. A few communities determined that additional ordinances are not required. Details on specific existing controls and programs for wellhead protection and local storm water programs are presented in Table 3-6 and Table 3-7. Table 3-6 provides a comparison of local ordinances affecting storm water quality with the MPCA's National Pollutant Discharge Elimination System (NPDES) general permit for construction.

There are also some emerging controls that will affect water management efforts by municipalities in the VLAWMO. These include:

- Municipal Separate Storm Sewer System Permitting (MS4) under the NPDES.
- MCES requirement for LWPs and for such plans to be a part of the next round of Comprehensive Land Use Plans in 2008. Requirements for LWPs by the MCES are included as Appendix D. Most of these requirements are consistent with, or part of, NPDES, MS4, and NPDES Construction Site General Permit requirements for storm water. Additional notable requirements include:
 - Storm water infiltration on hydrologic soil types A and B.
 - Soil amendment and soil ripping after mass grading to mitigate compaction.
 - Peak runoff rate control for the 24-hour, 1-or-2, 10- and 100-year precipitation events.
 - Policies and planning relative to impaired waters, and TMDL studies.

All of the municipalities (cities and townships) in VLAWMO are mandatory MS4s. The City of North Oaks does not own any storm water or road infrastructure. Everything within North Oaks is owned and operated by the North Oaks Association. Conversations with the MPCA indicate that they consider the North Oaks Association to be the permittee in this case.

Under the Storm Water Program, MS4s are required to develop and implement a Storm Water Pollution Prevention Program (SWPPP). The SWPPP must cover six minimum control measures:

1. Public education and outreach



2. Public participation/involvement
3. Illicit discharge, detection, and elimination
4. Construction site runoff control
5. Post-construction site runoff control
6. Pollutant prevention/good housekeeping

The MS4 must identify the BMPs and measurable goals associated with each control measure. An annual report on the implementation of the SWPPP must be submitted each year.

In Minnesota, the MPCA has issued an NPDES General Permit for MS4s with an effective date of June 1, 2006, and an expiration date of May 31, 2011.

3.5 SUMMARY

This section describes how the VLAWMO identified and prioritized 11 issues/problems facing water resources in the watershed. Existing and emerging controls, as well as management gaps and ideas relative to each issue/problem were identified.

Goals, policies, and management strategies presented in Section 4.0 considered the identified issues/problems, their priority, and management gaps.

**TABLE 3-4
EXISTING CONTROLS AND POTENTIAL MANAGEMENT GAPS BY ISSUE**

Issue	Existing Controls	Potential Gaps and Additional Management Ideas
Local communities obtain their potable water supply from groundwater	<p>MnDNR – Water applications permitting addresses supply, interference, conservation planning, and emergency planning.</p> <p>MDH – Permits well construction</p> <p>New Metropolitan Council requirements for half inch of infiltration for storm water permits recharge</p>	<p>While MDNR does permit appropriations, and anticipates interference issues with other wells, sometimes problems do occur, and corrective actions are needed to resolve the issue. Also, in general, while the Twin Cities area is considered water-rich, groundwater levels are declining. This could become more of an issue in the future.</p> <p>Potential gaps that VLAWMO could fill include:</p> <ol style="list-style-type: none"> 1. Serving as a place to resolve well interference issues since Board is comprised of representatives of member



Issue	Existing Controls	Potential Gaps and Additional Management Ideas
		<p>communities.</p> <ol style="list-style-type: none"> 2. Promoting and protecting recharge 3. Promoting reuse of storm water for irrigation instead of potable water supply.
<p>Groundwater quality is threatened or impaired</p>	<p>CERCLA – Superfund cleanup/management efforts by MPCA and MDH.</p> <p>RCRA – MPCA permitting of industrial facilities to reduce hazardous waste</p> <p>NPDES – MPCA storm water permitting of:</p> <ul style="list-style-type: none"> • Industrial facilities • Construction • Municipalities <p>New Metropolitan Council – requirements for storm water</p> <p>Safe Drinking Water Act (SDWA) – Requirement for wellhead protection</p> <p>Programs to seal abandoned wells with property transfers</p> <p>Local ordinances and platting procedures that influence construction erosion control and storm water quality</p> <p>NEPA and SEPA – Requirements for environmental review</p>	<p>Discussions with the Technical Advisory Group found that many of the management efforts that protect the quality of surface water should also be protective of groundwater provided that a pretreatment of storm water is provided prior to infiltration. There are also many State and Federal programs to protect groundwater, clean up spills and contamination, and protect community supplies. The Technical Advisory Group felt the most obvious gap was with respect to private wells. There was some disagreement with respect to the need for additional efforts to seal abandoned wells. One participant felt these were addressed adequately with current requirements to seal during property transfers. Another participant felt there are many abandoned wells in existence, and a cost-share program should be considered to address those not being found during property transfers.</p> <p>Other potential gaps discussed included:</p> <ul style="list-style-type: none"> • Education – regarding private wells and groundwater protection • Assistance with wellhead protection particularly if capture zones cross municipal boundaries • Standardizing BMP practices
<p>Surface water supplies the Board of Water Commissioners, St. Paul Regional Water System</p>	<p>CERCLA, RCRA, NPDES, NEPA, SEPA, New Metropolitan Council requirements, and SDWA requirements listed above.</p> <p>Source Water Protection Planning by the BWCS</p>	<p>There is an Emergency Response Plan for BWCS facilities, but not one for the watershed.</p> <p>For new development, water quality, and erosion control, there is a gap in the State regulations for sites that disturb</p>



Issue	Existing Controls	Potential Gaps and Additional Management Ideas
	<p>MnDNR Emergency and Conservation Plan, MnDNR Demand Reduction Measures, and MnDNR Appropriation Permit Program</p> <p>Use/access limitations to Pleasant, Sucker, and East Vadnais lakes.</p> <p>System improvements for water quality – ferric chloride addition systems, aration in Pleasant and E. Vadnais Lakes, Lambert Creek improvements</p>	<p>less than 1 acre.</p> <p>There is also a gap for water quality in The State regulations for redevelopment that creates less than 1 acre of new, impervious surface, but is replacing significant amounts of existing impervious surface.</p> <p>There may be a gap for water quality in the State requirements in implementation of the NPDES General Permit for construction. The State does not have sufficient personnel to inspect, while local units of government, except for the city of Gem Lake, do not have ordinances equivalent to the NPDES General Construction Permit for storm water.</p>
<p>Much of the development occurred before the use of BMPs for mitigating. Water quality impacts of development were commonplace.</p>	<p>NPDES Construction General Permit</p> <p>Voluntary retrofit of water quality practices by local communities.</p>	<p>The NPDES permit requires temporary construction erosion control if disturbed area for proposed projects exceed 1 acre; permanent post-construction water quality practices required if new impervious surface exceeds 1 acre. There could be a gap for post-construction-water quality with projects that are less than 1 acre of new, impervious surface, but is replacing significant amounts of existing impervious surface.</p>
<p>Additional development is expected</p>	<p>CERCLA, RCRA, NPDES, NEPA, SEPA, New Metropolitan Council requirements listed above</p>	<p>As discussed above under the surface water supply issue, there:</p> <ul style="list-style-type: none"> • Is a gap in State regulations for construction erosion control on small sites (less than 1 acre disturbed) • May be gap in implementation (and enforcement) of State requirements in the NPDES General Permit <p>Except as covered by the New Metropolitan Council requirements, there are also gaps in the standards for:</p> <ul style="list-style-type: none"> • Mitigating soil compaction • Runoff volume control <p>There may also be a gap with respect to maintenance of BMPs once they are built. However, new NDPEs General Permit requirements for MS4s does</p>



Issue	Existing Controls	Potential Gaps and Additional Management Ideas
<p>Data for making informed decisions is needed</p>	<p>BWCSP – Monitoring of lakes, lake outlets, lake levels and Lambert Creek sites. Past monitoring for Lambert Creek and clean water partnership projects.</p> <p>VLAWMO – CLMP monitoring of trophic state parameters for Amelia, Birch, Wilkinson, Giffillan, Gilfillian Storm Pond, Tamarack, Goose, Deep and Gem Lakes</p> <p>MPCA – CLMP monitoring secchi transparency</p> <p>Ramsey Conservation District – Volunteer precipitation monitoring network</p> <p>Ramsay County/MDNR – Volunteer lake level monitoring</p> <p>VLAWMO – wetland inventory</p> <p>MnDNR – Fisheries survey reports for selected lakes on 5-year cycle</p>	<p>have inspections and maintenance requirements.</p> <p>Much data is collected, but vigorous assessments for trends, lake diagnostics periodic, and program effectiveness is periodic.</p> <p>Birch Lake is the only lake with Comprehensive Aquatic Plant Survey of recent origin.</p> <p>Some parameters of potential concern such as bacteria (fecal coliforms) and turbidity not monitored.</p> <p>VLAWMO CLMP – Samples not useable for MPCA-impaired waters 305(b) and 303(d) listings since laboratory utilized was not certified.</p> <p>Not all wetlands on NWI have been inventoried by VLAWMO.</p>
<p>Public awareness about water resources in the watershed and appropriate stewardship is limited</p>	<p>Information campaigns and miscellaneous efforts completed by VLAWMO and local communities as time and resources allow.</p> <p>NPDES General Permit Requirements for MS4s for Public Education and Outreach; and Public Participation and Involvement.</p> <p>Annual reports and distribution from VLAWMO and MS4.</p> <p>VLAWMO CLMP Annual Report on Water Quality</p>	<p>The MS4 programs for Public Education and Outreach and Public Participation are evolving but typically target the distribution of information. Gaps include:</p> <ul style="list-style-type: none"> • Resource specific information • Targetted efforts to change behaviors and promote stewardship by residents and businesses • Information on the benefits of aquatic plants in VLAWMO lakes • Education efforts and information specific to the management of public lands
<p>Sensitive resources are present including wetlands</p>	<p>NEPA, SEPA, Minnesota Endangered Species Statute, Minnesota Wetland Conservation Act (WCA), VLAWMO Wetland Management Plan</p> <p>NDPES and local permitting storm water level</p> <p>New Metropolitan Council requirements</p>	<p>The VLAWMO Wetland Management Plan has been completed for WCA; however, Wetland Management Plan requirements have not been adopted as standards.</p> <p>Some Technical Advisory Group members suggest additional local requirements than those in WCA</p>



Issue	Existing Controls	Potential Gaps and Additional Management Ideas
	<p>for water quality listed above.</p> <p>Protection of parks and existing conservation easements</p> <p>DNR Geologic Atlas for Ramsey County</p>	<p>regarding:</p> <ul style="list-style-type: none"> • The De Minimus size for permitting • Replacement of wetlands in VLAWMO <p>Encouraging or completing habitat improvements such as the use of native plants, wetland restorations, or Lambert Creek habitat improvements as part of other public improvements, or separate capital improvements.</p>
<p>There are numerous shallow lakes in which water quality is either threatened or impaired</p>	<p>MPCA/ CWA impaired waters program</p> <p>NPDES storm water, local and New Metropolitan Council requirements for water quality listed above</p> <p>State of Minnesota Mercury Reduction Plan</p> <p>Use/access limitations to Pleasant, Sucker, and East Vadnais Lakes</p> <p>Conservation easements/areas Amelia/Wilkinson Lakes</p> <p>System improvements for water quality – ferric chloride addition systems, aeration in Pleasant Lake, Lambert Creek improvements</p> <p>Past rough fish control efforts</p> <p>Voluntary storm water redevelopment retrofits wide</p>	<p>Only a couple of the VLAWMO lakes (i.e. East Vadnais) are on the MPCA. Impaired waters list for fish consumption. However, screening level data analysis in Section 2 suggest that other lakes (Goose, Gem, Gilfillan, Tamarack, Pleasant and Wilkinson) could potentially be considered impaired due to excessive nutrients. More lakes within the watershed could be identified or listed as either threatened or impaired, once data is submitted to MPCA.</p> <p>Past analysis for the VLAWMO CLMP program was not completed at a certified laboratory and not submitted to MPCA for assessment of impairment.</p> <p>Cause and effect with respect to phosphorous cycling is uncertain in some of the lakes, and Lambert Creek wetlands. Strategically designed monitoring and modeling is needed to guide management.</p>
<p>Exotic species such as Eurasian water milfoil, Curlyleaf Pondweed and Common Carp infest some lakes.</p>	<p>MnDNR – Aquatic plant management programs</p> <p>Past reclamation (rough fish) control efforts on Wilkinson, Gilfillan and Pleasant Lakes</p> <p>Aquatic plant management efforts by the Birch Lake Association</p>	<p>Information on aquatic plant communities and current level of infestation by Curlyleaf Pondweed is limited.</p> <p>Public education on exotic species and the potential for infestation.</p>
<p>There are localized flooding problems</p>	<p>Local Floodplain and Shoreland ordinances</p> <p>MnDNR permitting for protected waters and protected waters wetlands</p>	<p>Not all member communities have adopted VLAWMO detention requirements for new development. Gem Lake is landlocked, and there is currently no policy regarding management of landlocked basins, and the promotion of</p>



Issue	Existing Controls	Potential Gaps and Additional Management Ideas
	Flood insurance program and floodplain mapping VLAWMO second generation plan standards for detention	storm water volume control. The exception is the New Metropolitan Council requirements that include volume control.

**This table is not intended to be an extensive list of potential management actions. It reflects discussions by the commissioners and members of the Technical Advisory Group to identify where there are significant managements efforts already in place and some of the most obvious gaps. The gaps identified do not reflect a decision by the VLAWMO. These gaps, along with priorities, and available resources where considered in developing the goals, policies, and management strategies in Section 4.0.*

**TABLE 3-5
THE APPLICABILITY OF SHORELAND AND FLOOD PLAIN ORDINANCES**

City	Shoreland Ordinances	Floodplain Ordinances
Gem Lake	Not required	Not required
North Oaks	Yes	Not required
Lino Lakes	Yes	Yes
Vadnais Heights	Yes	Yes
White Bear Lake	Yes	Yes
White Bear Township	Yes	Yes



**TABLE 3-6
COMPARISON OF LOCAL ORDINANCES AFFECTING STORM WATER QUALITY**

Topic	MPCA General Permit to Discharge Storm Water Associated with Construction Activities ¹	Vadnais Heights	White Bear Lake	North Oaks	Gem Lake	White Bear Township	Lino Lakes
Permitting	Requires development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). Plan Covers construction activity with ≥ 5 acres of land disturbing activity, and small construction activity ≥ 1 acre of land disturbance. Application must be submitted, however, SWPPP need not be submitted except for projects disturbing 50 acres or more, or if projects propose alternative methods for storm water management other	Erosion control plans shall be required for all land disturbing activities (Goals 6.5 Vadnais Heights 1990 Surface Water Management Plan). Surface Water Management Plan incorporated into Zoning Code (Chapter 19 Water Management District of the Vadnais Municipal Code) by reference.	Erosion control for sites that disturb more than 1 acre. Storm water program for new or redevelopment that disturbs more than 1 acre, or smaller projects that are part of a common plan. (City of White Bear Lake Storm Water Pollution Prevention Program, 2003).	A developer must submit a Preliminary Site Plan ...which shall include a narrative description and plans for erosion and sediment control.	No person shall develop any land for residential, commercial, industrial, or institutional uses without first having provided storm water management measures that control or manage runoff from such developments (Zoning Ordinance Section 22).	If the appointed reviewer determines that the erosion and sediment control plan meets the requirements of this ordinance, the Town shall issue a permit that authorizes the land disturbance activity contingent upon the implementation and completion of the erosion and sediment control plan. Draft Local Water Management Plan, 2000). In order to obtain a subdivision approval	Either Rice Creek Watershed or VLAWMO shall approve all subdivision grading, drainage and wetland mitigation plans (Subdivision ordinance). The city will coordinate the NPDES Phase II responsibility with the RCWD and VLAWMO permitting programs while understanding that ultimate responsibility of such a program remains with the City (Surface Water Management Plan, 2005).

Note: The matrix presents a summary of selected portions of rules and ordinances. For complete descriptions of the requirements see the respective rules and ordinances.

¹ Source: Minnesota Pollution Control Agency, General Permit Authorization to Discharge Storm water Associated with Construction Activity Under the National Pollutant Discharge Elimination System/State Disposal System Permit Program.



Topic	MPCA General Permit to Discharge Storm Water Associated with Construction Activities ¹	Vadnais Heights	White Bear Lake	North Oaks	Gem Lake	White Bear Township	Lino Lakes
	than those specified in the General Permit.					and/or a zoning certificate, or a building permit, a developer or redeveloper of land must submit to the Township and the RCWD or VLAWMO a surface water drainage and erosion control plan which is in conformance with the Township's plan (Section 4: Draft Local Water Management Plan, 2000).	
Runoff rate control requirements	None specified except for discharges to certain special waters.	Plan evaluates 100 year storm and ten day event (snow melt) at multiple water bodies, flows given at those points.	MS4 BMP 5.A.1 The City of White Bear Lake will continue to require detention ponds to provide rate and water quality controls for new developmen. (City of White Bear Lake Storm Water Pollution Prevention Program, 2003).	Appropriate provisions should be made to accommodate increased Storm water runoff and consequent soil loss occasioned by changed soil and surface conditions during and after development...such provisions may include, but are not limited to: The installation of	The general policy on Storm water runoff rates is to reduce the impacts of development by maintaining pre-development hydrological conditions. Calculations for the 2, 10 and 100-year 24-	In general, peak flow rates shall be restricted to the 1-year, and 100-year undeveloped condition flow rates and shall not exceed the capacity of the downstream channel (Section 3: Draft Local Water Management Plan,	Peak storm water discharge rates and storage volumes from any watershed, subwatershed, detention basin, wetland or conveyor shall be consistent with the values shown in the plan (Local Water Management Plan, 1994). The 100-year



Topic	MPCA General Permit to Discharge Storm Water Associated with Construction Activities ¹	Vadnais Heights	White Bear Lake	North Oaks	Gem Lake	White Bear Township	Lino Lakes
			<p>Proposers of all developments greater than 2.5 acres in size shall submit rate and runoff control measures with the permit applications... The runoff control plans must provide...calculations showing that the post-development rate of discharge will not exceed predevelopment rate (City of White Bear Lake Water Management Plan, 1997).</p>	<p>improvements...such as streets, storm sewers curb and gutter, detention basins and other features (Ordinance 75)</p> <p>The subdivider shall demonstrate that any changes in topography shall not be adverse to water flowage or water control and shall be responsible for any change in topography that causes such adverse consequences...The subdivider shall install storm sewer facilities subject to the specifications and inspection of the City Engineer if adequate provision is not made or does not naturally exist for disposal of storm waters. (Subdivision Ordinance 93)</p>	<p>hours storms required. (Zoning Ordinance Section 22)</p>	<p>2000). Sedimentation and Storm water detention basins shall be designed .with a maximum flow rate equal to existing 2-, 10-, and 100-year flow rates (Section 3: Draft Local Water Management Plan, 2000).</p>	<p>discharge rates and storage volume given in 1994 plan, appendix on VLAWMO, but referenced to VLAWMO Plan (presumably First generation plan). Modeling of Amelia subwatershed listed as future CIP item.</p> <p>The 2005 Surface Water Management Plan calls for controlling the volume and rate of runoff to conform with NPDES Phase II requirements.</p>



Topic	MPCA General Permit to Discharge Storm Water Associated with Construction Activities ¹	Vadnais Heights	White Bear Lake	North Oaks	Gem Lake	White Bear Township	Lino Lakes
<p>Erosion and Sediment Control</p>	<p>Requires SWPPP with temporary and permanent erosion prevention and sediment control practices. Has specific standards for:</p> <p>Temporary and permanent erosion prevention and sediment control.</p> <p>Temporary sediment basins for drainage basins with more than 10 acres disturbed area.</p> <p>Energy dissipaters at pipe outlets.</p> <p>Temporary erosion protection or permanent cover for exposed soils.</p> <p>Stabilizing of ditches connected to surface waters.</p> <p>Sequencing of sediment controls before land disturbance.</p>	<p>Erosion control plan consistent with Ramsey Soil and Water Conservation District <u>Erosion & Sediment Control Manual 1989</u> required.</p> <p>Plan also calls for: Preserving natural vegetation to greatest extent practical Protection of graded areas from runoff Protection of stockpiles Installation prior to obtaining grading permit (being grading) Protecting adjacent and streets property: site entrances and dust control Drain inlet and conveyance system</p>	<p>Erosion and sediment control plan shall be subject to review and approval of the applicable Watershed District and City Engineer (Subdivision regulations 104.070 Subd. 8.).</p> <p>Subdivision regulations also state:</p> <p>Measures must conform to natural limitations Installed prior to development Smallest practical area exposed at any one time. When exposed, expose for shortest period of time. Top soil saved, restored Natural vegetation protected when practical Runoff to sediment basin before discharge</p> <p>City of White Bear Lake Water Management Plan, 1997 also has language</p>	<p>The developer shall plan for necessary erosion and sediment control practices to insure effective control of soil losses within the standard prescribed ... (Erosion and Sediment Control Ordinance 75). Specifics include:</p> <p>Tailoring to site topography and soils, and maximum use of vegetation Retain natural vegetation wherever possible Maximum exposed condition of 30 days without vegetation if structural controls Temporary seeding and mulching for rough grading (90 to 360 days of exposure) Permanent seeding >1yr rough grading During final landscaping and turf establishment soil shall not be exposed</p>	<p>Approval of an SWPPP required before land disturbance for projects larger than 1 acre.</p> <p>General criteria:</p> <p>Minimize areas and duration of exposure Minimize disturbance of natural vegetation Protect receiving water bodies, wetlands, and storm sewer inlets Protect adjacent properties Minimize off-site sediment from trucks and equipment Minimize work in and adjacent to waterbodies and wetlands Maintain stable slopes Minimize disturbance to root systems and trees Minimize compaction</p>	<p>A person engaged in a land disturbing activity must submit an erosion and sediment control plan that will prevent soil erosion or sediment from damaging adjacent land, bodies of water, watercourses or wetlands to the Town for its approval (Draft Local Water Management Plan, 2000).</p> <p>The (Ramsey County Erosion and Sediment Control Handbook) shall be the reference for Erosion and Sediment Control Practice specifications used in the Town of White Bear. Draft Local Water Management Plan, 2000).</p>	<p>Policy 1 (erosion and Sediment Control): Establish erosion control practices for new and redevelopment: Objective 1: Construction Site Storm water Runoff Control to Reduce Pollutants from Construction Activities Using the Land Disturbance Criteria of the RCWD and VLAWMO and the General NPDES Phase II Permit (2005 Plan).</p>



Topic	MPCA General Permit to Discharge Storm Water Associated with Construction Activities ¹	Vadnais Heights	White Bear Lake	North Oaks	Gem Lake	White Bear Township	Lino Lakes
	<p>Protecting of storm drain inlets with BMPs. Using vehicle tracking BMPs.</p>	<p>protection Temporary sediment basins Establishment of temporary and permanent vegetation to minimize time of exposed condition Energy dissipaters Temporary vegetation</p>	<p>about silt fences, diversions, dikes, vehicle tracking, mulching, seed mixes, sod, and soil conservation practices that limit after development soil loss to not more than 0.5tons/acre/year.</p>	<p>for more than 15 days. Implement practices as soon as possible VLAWMO, review, comment and inspection allowed/provided. VLAWMO shall be responsible for monitoring whether the erosion and sediment control elements of the site plan are in conformance...and whether development is proceeding according to the approved plan.</p>	<p>Protection of stockpiles Soil tilling (6 inches) Methods to prevent sediment damage to adjacent properties and sensitive resources Stabilize steep slopes Protection of storm sewer infrastructure from sediment Disposal of collected sediment and debris Stabilization within timeframes Sedimentation basins (10 acres / 5 acres). Includes much of the NPDES General Construction Permit Language(Section 17 Zoning Ordinance).</p>		
<p>Permanent Water Quality Storm Water Controls</p>	<p>Permanent storm water management system: Treatment of ½ inch of runoff from new impervious surface if ≥ 1 acre of pervious</p>	<p>NURP pond, sedimentation basin prior to discharge, and skimmers on outlets.</p>	<p>All subdivision design shall incorporate adequate provision for storm water runoff subject to review and approval of the applicable Watershed</p>	<p>Appropriate provisions should be made to accommodate increased Storm water runoff and consequent soil loss occasioned by changed soil and surface</p>	<p>For all land disturbing activities covering 1 acre or more the applicant shall comply with all requirements of the NPDES Phase II Regulation.</p>	<p>All proposed drainage plans for developments in the White Bear Township will be required to incorporate the</p>	<p>Policy 2 (Water Quality) in cooperation with RCWD and VLAWMO establish Maximum Acceptable Nutrient Concentrations (MANC) in streams</p>



Topic	MPCA General Permit to Discharge Storm Water Associated with Construction Activities ¹	Vadnais Heights	White Bear Lake	North Oaks	Gem Lake	White Bear Township	Lino Lakes
	<p>surface is replaced with impervious surface by one of the following methods:</p> <p>Wet sedimentation basin with max discharge 5.66 cfs/pond acre. Infiltration/filtration BMPs. Regional ponds with max discharge 5.66 cfs/pond acre. A combination of the above. An alternative method with 80 percent TSS removal on an annual basis.</p> <p>Pollution prevention methods during construction for solid waste disposal, hazardous materials handling, and vehicle washing.</p>		<p>District and City Engineer. (Subdivision Regulation 1404.070)</p> <p>Post construction storm water management for new and re-development of one acre or larger will include: Detention ponds Infiltration rain gardens Infiltration grass swales Vegetative Cover seeding Outlet structure stabilization Catch basin sumps Swirl separators (City of White Bear Lake Storm Water Pollution Prevention Program, 2003).</p> <p>Storm water shall not discharge from lateral conveyors directly into any waters or wetland a other than designated detention basins without either primary</p>	<p>conditions during and after development... such provisions may include, but are not limited to: The installation of improvements...such as Streets, storm sewers curb and gutter, detention basins and other features (Ordinance 75) Developer shall maintain sediment basin, debris basins and silt traps to substantially reduce sediment from runoff water.</p>	<p>Minimum requirements of the Storm Water Management Plan (for proposed development) shall be consistent with the most recent version of the Minnesota Pollution Control Agency NPDES Construction Permit Requirements.</p> <p>Treat half inch of runoff, 1 inch if discharged to a special water</p>	<p>principles of best management practices for each site (Section 3.0: Draft Local Water Management Plan, 2000).</p> <p>The design of all sedimentation and Storm water detention basins as well as the use of wetlands, lakes and ponds as detention basins, must meet the criteria set forth in the Management Plan of the Vadnais Lakes Area Watershed Management Organization or the Rice Creek Watershed District as appropriate.</p> <p>Sedimentation and Storm water detention basins</p>	<p>contributing to recreational lakes.</p> <p>Objective 1B (Water Quality) in cooperation with RCWD, Support the Development of Management Plans with Specific Action Items for Each Recreational Lake to Meet the Desired Future Condition of Maintaining or Establishing a Minimum Lake Grade of C, and Swimming as a Lake use.</p>



Topic	MPCA General Permit to Discharge Storm Water Associated with Construction Activities ¹	Vadnais Heights	White Bear Lake	North Oaks	Gem Lake	White Bear Township	Lino Lakes
			<p>sedimentation in a natural or man-made structure, such as catch basins or grit chambers, and/or established programs of street, maintenance or house-keeping practices implemented to reduce the inflow of pollutants (City of White Bear Local Water Management Plan, 1997).</p> <p>Proposer must provide dead storage volume of no less than the calculated runoff from a 2.5-inch rainfall over the tributary area. The dead storage shall be below the outlet of the newly constructed detention basins to allow for reasonable accumulation of sediment (City of White Bear Lake Local Water Management Plan, 1997).</p>			<p>shall be designed...with design removal rates of 80 percent suspended solids and 50 percent of phosphorus. Areas within the Saint Paul Water Utility (SPWU) protected waters, removal rate of 90 percent suspended solids and 65 percent phosphorus.</p> <p>Storm water run-off from a development or construction site may be directed to a water or wetland only after pretreatment within a wet detention pond facility designed and constructed in accordance with the Town's Local Water Management Plan (Ordinance 35,</p>	



Topic	MPCA General Permit to Discharge Storm Water Associated with Construction Activities ¹	Vadnais Heights	White Bear Lake	North Oaks	Gem Lake	White Bear Township	Lino Lakes
						Wetland Overlay District Permit Procedure).	
Runoff Volume Control Requirements	None except as one of the options for minimizing temperature increases to trout streams.	None	Infiltration BMPs mentioned in SWPPP.	The subdivider shall demonstrate that any changes in topography shall not be adverse to water flowage or water control and shall be responsible for any change in topography that causes such adverse consequences. ..The subdivider shall install storm sewer facilities subject to the specifications and inspection of the City Engineer if adequate provision is not made or does not naturally exist for disposal of storm waters. (Subdivision Ordinance 93)	At a minimum first half-inch from a 24-hours storm unless the site is within 2,000 feet of special water where the first 1-inch of runoff from a 24-hour storm event shall be infiltrated (Section 22 Zoning Ordinance).	None	The 2005 Surface Water Management Plan calls for controlling the volume and rate of runoff to conform with NPDES Phase II requirements. The 2004 Parks, Natural Open Space/Greenways, and Trail System Plan by the City states that using natural infiltration methods will be an underlying principle for managing storm water on all public, and where feasible, private lands.
Security requirements	None	None but could be required in a developers agreement.	City may require a soil erosion control cash deposit to guarantee erosion control measures are taken (Subdivision regulations 104.070	City Council may require performance bond, cash escrow, or letter of credit...	The applicant shall provide security, to the City of Gem Lake, for the performance of work described and delineated on the City	Upon approval of an erosion and sediment control plan, the Town may require the developer to post a	The developer shall provide financial security to the Lino Lakes Public Improvement Financing Policy, as amended. A



Topic	MPCA General Permit to Discharge Storm Water Associated with Construction Activities ¹	Vadnais Heights	White Bear Lake	North Oaks	Gem Lake	White Bear Township	Lino Lakes
			Subd. 8.)		approved Storm Water Pollution Prevention Plan...(Section 22 Zoning Ordinance).	performance bond, cash or certified check to insure completion of the erosion and sediment control plan(Ordinance 35).	development agreement shall include a description of the required securities (Subdivision ordinance).



TABLE 3-7
VLAWMO PUBLIC GROUNDWATER SUPPLIES AND WELLHEAD PROTECTION STATUS

Community	Public Community Well(s) in VLAWMO	Wellhead Protection Planning Status
White Bear Township	Y	Part 1
Vadnais Heights	Y	Part 1
White Bear Lake	N	This community has not entered the wellhead protection program
North Oaks	Does not have their own public water supply. Portions of city supplied by White Bear Township	---
Gem Lake	Does not have their own public water supply	---
Lino Lakes	N	Completed
Board of Water Commissioners of the St. Paul	Y	Part 1 – Approved, working on Part 2