Draft for partners/agency review and comment

VLAWMO
Vadnais Lake Area
Water Management Organization

Vadnais Lake Area Water Management Organization

Comprehensive Watershed Management Plan 2017-2026

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ASSOCIATES
Responsive partner. Exceptional outcomes.

Draft for partners/agency review and comment

VADNAIS LAKE AREA WATER MANAGEMENT ORGANIZATION
COMPREHENSIVE WATERSHED MANAGEMENT PLAN
OCTOBER 2016

Approved by the Minnesota Board of Water and Soil Resources (September 28, 2016)

Adopted by the VLAWMO Board of Directors (October 26, 2016)

VLAWMO Board of Directors
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Director Dan Jones, Vice-Chair (City of White Bear Lake)
Director Bob Uzpen, Secretary/Treasurer (City of Gem Lake)
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TERMS AND ACRONYMS

Term	Acronym	Definition/Description	For more information
Aquatic Invasive Species	AIS	Non-native plants, animals or pathogens that live primarily in water, thrive in new environments and can cause economic, environmental damage, and harm human health.	www.dnr.state.mn.us
Best Management Practice	BMP	Structural or engineered control devices and systems (e.g. retention ponds, raingarden) to treat polluted stormwater, as well as operational or procedural practices.	www.epa.gov
Birch Lake Improvement District	BLID	A tax district with a public board that governs lake improvement projects.	www.birchlakeimprovementdistrict.org
Board of Directors	Board	The governing board of VLAWMO consisting of one elected official from each of the municipalities within the watershed.	www.vlawmo.org
Capital Improvement Program		An itemized program for at least a five-year period, and any amendments to it, subject to at least biennial review, setting forth the schedule, timing, and details of specific contemplated capital improvements by year, together with their estimated cost, the need for each improvement, financial sources, and the financial effect that the improvements will have on the local government unit or watershed management organization.	
Capital Improvement Project	CIP	A physical improvement that has an extended useful life.	
Citizens Lake Monitoring Program	CLMP	Volunteers who assist with the water quality monitoring program by collecting water samples and gathering other applicable water resource information.	www.vlawmo.org
Colony Forming Units	CFU	Bacterial pollution, measured as the concentration of fecal coliform or E. coli organisms.	www.pca.state.mn.us
Designated Uses		Specific uses identified for all waterbodies, both surface water and groundwater. Examples of designated uses are drinking water, aquatic life and recreation, aesthetic enjoyment, and wildlife.	www.pca.state.mn.us
Dissolved Oxygen	DO	The amount of oxygen dissolved in a body of water as an indication of the degree of health of the water and its ability to support an aquatic ecosystem.	www.pca.mn.us
Environmental Protection Agency	EPA	A federal agency with a mission to protect human health and the environment.	www.epa.gov
Environmental Quality Information System	EQuIS	A database managed by the Minnesota Pollution Control Agency to store water-related monitoring data and associated laboratory results from sampling locations across the state.	www.pca.state.mn.us
Geographic Information System	GIS	A computer based program used to develop maps and analyze data.	
Impaired Waters List or 303d List		As required by the Clean Water Act, if a water body does meet one or more water quality standards (bacteria, nutrients, turbidity, mercury, etc.) and cannot meet its designated uses (drinking water, fishing, swimming, etc.), it is added to the MN Impaired Waters 303d list and a TMDL study is completed to set pollution reduction goals needed to restore the waterbody.	www.pca.state.mn.us
Joint Powers Agreement	JPA	A formal, legal agreement between two or more public agencies that share a common power and want to jointly implement programs, build facilities, or deliver services.	www.vlawmo.org
Legislative-Citizen Commission on Minnesota Resources	LCCMR	A 17 member commission whose function is to make funding recommendations to the legislature for special environment and natural resource projects.	www.lccmr.leg.mn

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Load Allocation	LA	A calculation of the total amount of a pollutant from point and non-point sources that a waterbody can receive and still meet water quality standards. Related: Waste Load Allocation (WLA).	www.pca.state.mn.us
Local Government Unit	LGU	All divisions of government below the regional level.	
Term	Acronym	Definition/Description	For more information
Local Water Management Plan	LWMP	A plan prepared and implemented by local water management authorities to manage surface water. Minnesota Rule Chapter 8410 defines the plan content.	www.bwsr.state.mn.us
Mercury	Hg	A toxic metal that becomes airborne as a byproduct of coal-burning power plants. Mercury deposited at high enough levels into water resources can bioaccumulate in fish tissue, posing a health risk to people and animals that eat the fish.	www.pca.state.mn.us
Metropolitan Council Environmental Services	MCES	MCES provides services to the seven-county metro area regarding wastewater collection and treatment, water resources, energy and sustainability.	www.metrocouncil.org
Micrograms per liter	µg/L	A measurement unit used in water analysis. Also equal to parts per billion (ppb).	
Milligrams per liter	mg/L	A measurement unit used in water analysis. Also equal to parts per million (ppm).	
Minimum Impact Design Standards	MIDS	MIDS consist of performance standards, design standards, or other tools to enable and promote the implementation of low impact development and other stormwater management techniques.	www.pca.state.mn.us
Minnesota Board of Water and Soil Resources	BWSR	BWSR is the state soil and water conservation agency, and it administers programs that prevent sediment and nutrients from entering our lakes, rivers, and streams; enhance fish and wildlife habitat; and protect wetlands.	www.bwsr.state.mn.us
Minnesota Department of Agriculture	MDA	MDA's mission is to ensure the integrity of the food supply, the health of the environment, and the strength of the agricultural economy.	www.mda.state.mn.us
Minnesota Department of Health	MDH	MDH's mission is protecting, maintaining and improving the health of all Minnesotans.	www.health.state.mn.us
Minnesota Department of Natural Resources	DNR	DNR works with citizens to conserve and manage the state's natural resources, to provide outdoor recreation opportunities, and to provide for commercial uses of natural resources in a way that creates a sustainable quality of life.	www.dnr.state.mn.us
Minnesota Department of Transportation	MnDOT	MnDOT's mission is to plan, build, and maintain a safe, accessible, efficient, and reliable multimodal transportation system.	www.dot.state.mn.us
Minnesota Pollution Control Agency	PCA	The PCA monitors environmental quality, offers technical and financial assistance, and enforces environmental regulations.	www.pca.state.mn.us
Municipal Separate Storm Sewer System	MS4	An MS4 is a conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, gutters, ditches, storm drains, etc.) that is publicly owned. Stormwater discharges associated with MS4s are subject to regulation under the National Pollutant Discharge Elimination System (NPDES). MS4s in VLAWMO are: Cities of White Bear Lake, Vadnais Heights, Gem Lake, North Oaks, Lino Lakes, and White Bear Township, Anoka and Ramsey Counties, and MnDOT.	www.pca.state.mn.us

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National Oceanic and Atmospheric Administration	NOAA	A federal agency under the Department of Commerce charged with evaluating and predicting changes in climate, weather, oceans, and coasts; sharing that knowledge and information with others, and conserving and managing coastal and marine ecosystems and resources.	www.noaa.gov
National Pollutant Discharge Elimination System	NPDES	A permit program authorized by the Clean Water Act that controls water pollution by regulating point sources that discharge pollutants into waters of the United States.	www.epa.gov
Term	Acronym	Definition/Description	For more information
National Wetlands Inventory	NWI	The NWI is managed by the US Fish and Wildlife Service and provides information to the public on the extent and status of the Nation's wetlands. The NWI produces maps or digital databases regarding wetlands and reports on wetland trends.	www.fws.gov
Nitrate	NO_3	A compound used in fertilizer that acts as a nutrient in soil and a pollutant when found at high levels in groundwater and surface water.	
Nonpoint Sources		Pollution in runoff and seepage from land areas. Within VLAWMO, this is largely due to urban road runoff from streets, yards, and construction sites.	www.pca.state.mn.us
pH	pH	A measure of how acidic or basic a substance, such as water, is. The range of measurement goes from 0-14. Values above 7 indicate alkalinity; values below 7 indicate acidity. How acidic water is has a significant effect on chemical and biologic processes within the water.	
Phosphorus	P	A chemical element used in fertilizers and other products that acts as a nutrient in soil and a pollutant when found at high levels in groundwater, surface water, and wastewater. Related: Soluble Reactive Phosphorus (SRP) and Total Phosphorus (TP).	
Point sources		Pollution from municipal or industrial facilities, usually entering a waterbody via discharge from a pipe or channel.	www.pca.state.mn.us
Public Waters Inventory	PWI	The DNR conducted the original public waters inventory in the late 1970s, maintains and updates the inventory records, and provides maps of public waters.	www.dnr.state.mn.us
Quality Assurance/ Quality Control	QA/QC	The process or set of processes used to assure the quality of water samples and monitoring data. VLAWMO has a QA/QC in place for its water quality monitoring program.	www.vlawmo.org
Riparian		Relating to, living on, or located on the bank of a natural watercourse or lake.	
St. Paul Regional Water Service	SPRWS	SPRWS supplies water to the City of St. Paul and neighboring communities. The water is pumped from the Mississippi River and runs through a chain of lakes (Charley, Pleasant, Sucker, and East Vadnais) within VLAWMO.	www.stpaul.gov
Secchi Disk Transparency	SDT	The term used describing the results of a Secchi reading, expressed in feet or meters. It measures the clarity of the water.	www.pca.state.mn.us
Soil and Water Conservation District	SWCD	LGUs that manage and direct natural resource management programs at a local level. Districts work with landowners and other units of government to carry out a program for the conservation, use, and development of soil, water, and related resources.	www.bwsr.state.mn.us

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Soluble Reactive Phosphorus	SRP	Soluble Reactive Phosphorus (SRP) is the form of P directly taken up by plant cells. Related: Phosphorus (P) and Total Phosphorus (TP)	
Storm Water Pollution Prevention Plan	SWPPP	Holders of NPDES permits must prepare a SWPPP in order to obtain permit coverage for stormwater discharges.	www.pca.state.mn.us
Subwatershed		A smaller geographical unit of a watershed.	
Sustainable Lake Management Plan	SLMP	A report covering the subwatershed area of a particular waterbody which provides information about the overall health of the lake and trends within the ecosystem, along with lake management plans.	www.vlawmo.org
Term	Acronym	Definition/Description	For more information
Technical Advisory Committee	TAC	A group consisting of stakeholders and partnering agencies which provides guidance and input for VLAWMO.	
Technical Commission	TEC	A commission composed of persons appointed by each municipality within VLAWMO assigned with technical business decisions or to give recommendations to the Board.	www.vlawmo.org
Technical Evaluation Panel	TEP	A group consisting of a representative from the SWCD, BWSR, DNR, and WCA LGU to review actions affecting wetlands.	www.bwsr.state.mn.us
Total Maximum Daily Load	TMDL	A calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, as well as an allocation of that load among the various sources of that pollutant. A TMDL Study identifies all sources of the pollutant and determine the load reductions needed to meet state standards. The TMDL Implementation Plan identifies strategies to achieve the necessary reductions.	www.pca.state.mn.us
Waste Load Allocation	WLA	Pollutants that originate from a point source are given allowable levels of contaminants to be discharged. The WLA is assigned to MS4s as part of the TMDL study.	www.pca.state.mn.us
Watershed Restoration and Protection Strategy	WRAPS	A document summarizing scientific studies of a major watershed; identification of impairments and waterbodies in need of protection; identification of biotic stressors and sources of pollution; TMDLs for the impairments, and an implementation table containing strategies and actions designed to achieve and maintain water quality standards and goals.	www.pca.state.mn.us
Total Phosphorus	TP	A chemical element used in fertilizers and other products that acts as a nutrient in soil and a pollutant when found at high levels in groundwater, surface water, and wastewater. TP levels are monitored as an indicator of water quality. Related: Phosphorus (P), Soluble Reactive Phosphorus (SRP)	
Total Suspended Solids	TSS	Measurement of suspended materials (soil particles, algae, plankton, microbes, etc.) which limit sunlight, inhibit oxygen uptake by fish and alter habitat.	www.pca.state.mn.us
Vadnais Lake Area Water Management Organization	VLAWMO	The abbreviated name of the organization that will carry out this Water Plan.	www.vlawmo.org
Water Management Organization	WMO	An organization mandated by the State to create and implement a watershed management plan as detailed by Minnesota Rules Chapter 8410.	www.bwsr.state.mn.us
Watershed		An area of land draining into a river, river system, or waterbody which can cover tens to hundreds of square miles and cross several jurisdictions.	

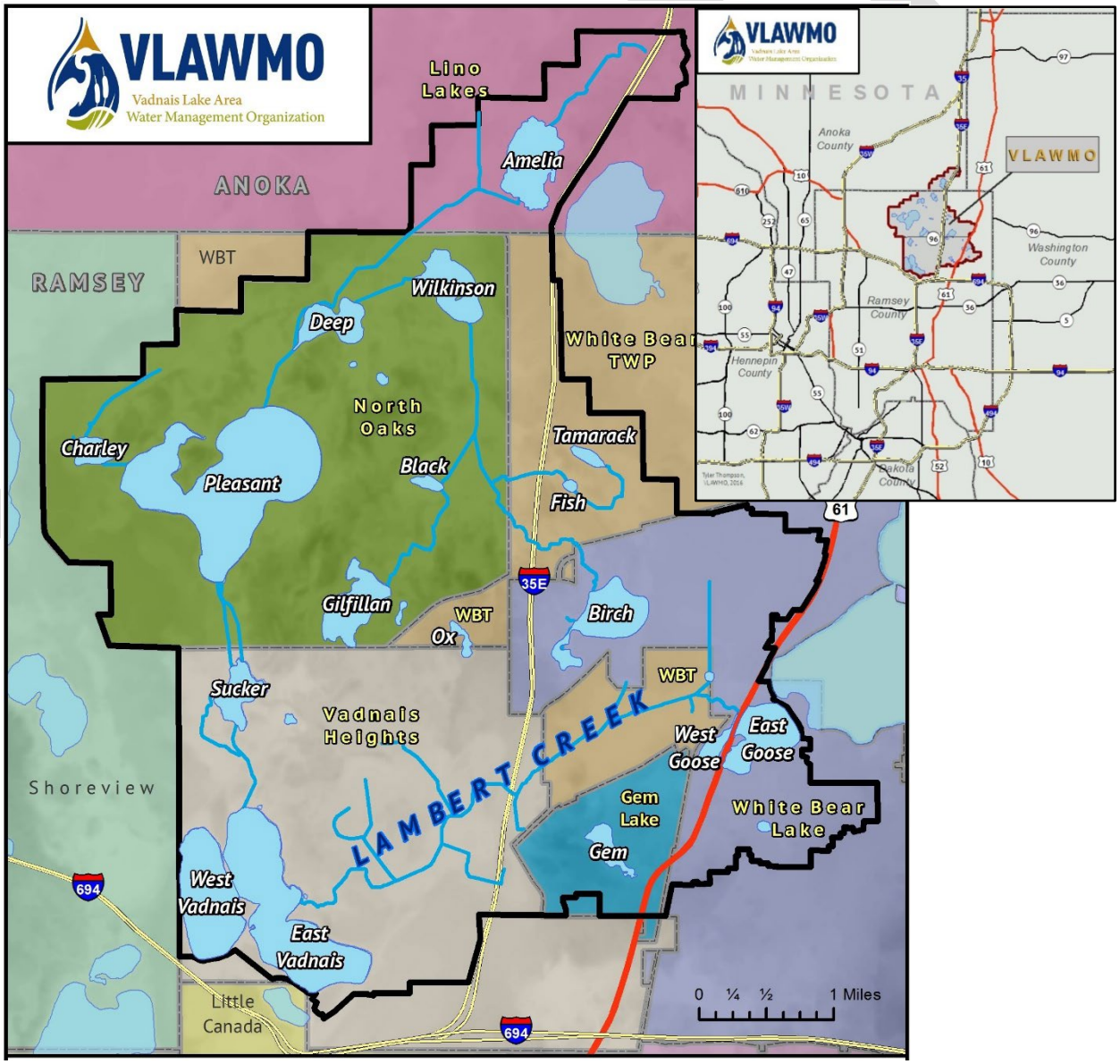
TERMS AND ACRONYMS

Watershed Action Volunteers	WAV	A group of citizens who participate in a variety of watershed projects from monitoring to working with local PreK-12 youth programs. VLAWMO's name for their Citizen Advisory Committee.	www.vlawmo.org
Wellhead Protection Areas		A surface or subsurface land area regulated to prevent contamination of a well or well-field supplying a public water system.	www.health.state.mn.us
Wetland Conservation Act	WCA	A State law that requires anyone proposing to drain, fill, or excavate 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. VLAWMO acts as the LGU for WCA within the watershed except in MnDOT right of ways.	www.bwsr.state.mn.us

EXECUTIVE SUMMARY

The Comprehensive Watershed Management Plan (Plan) describes how the Vadnais Lake Area Water Management Organization (VLAWMO) will manage activities in the watershed from the years 2017 through 2026. The Plan describes the natural resources and core activities of the watershed, the issues and goals that VLAWMO will focus on for the next ten years, and the implementation strategies and subwatershed activities which will be utilized to meet those goals. This Executive Summary provides an overview of the Plan.

VLAWMO was organized in 1983 using a Joint Powers Agreement (JPA) developed under authority conferred by Minnesota Statues, Sections 471.59 and 103B.201. The 24.2 square mile watershed is located in the northeast metro area within Ramsey and Anoka counties. The watershed encompasses the City of North Oaks, along with portions of the Cities of White Bear Lake, Gem Lake, Vadnais Heights, Lino Lakes, and White Bear Township, and includes 17 lakes, 1 creek, and over 1000 wetlands.



EXECUTIVE SUMMARY

PURPOSE

The purpose of water management organizations is described in Minnesota Statues 103B.201, Metropolitan Surface Water Planning, which codified the Metropolitan Surface Water Management Act of 1982:

1. *protect, preserve, and use natural surface and groundwater storage and retention systems;*
2. *minimize public capital expenditures needed to correct flooding and water quality problems;*
3. *identify and plan for means to effectively protect and improve surface and groundwater quality;*
4. *establish more uniform local policies and official controls for surface and groundwater management;*
5. *prevent erosion of soil into surface water systems;*
6. *promote groundwater recharge;*
7. *protect and enhance fish and wildlife habitat and water recreational facilities; and*
8. *secure the other benefits associated with the proper management of surface and groundwater.*

Water management organizations are required to develop a Plan at least every 10 years under State Statute 103B.231 and Minnesota Rules 8410. In general, these plans must contain information which describes the natural resources within the watershed, establish measurable goals that address priority issues, devise and implement strategies to reach the goals, and a procedure to evaluate progress. VLAWMO's fourth generation Plan will cover the years 2017 through 2026.

VLAWMO's mission is "to protect and enhance the water and natural resources within the watershed through water quality monitoring, education and outreach projects, wetland protection, and water quality enhancement projects and programs." With this updated Water Plan, VLAWMO aims to demonstrate the connection and relationship of its mission statement with the priority issues, goals, and strategies developed through the planning process.

EXECUTIVE SUMMARY

PRIORITY ISSUES

To develop the list of priority issues, VLAWMO conducted a vigorous stakeholder process which included numerous stakeholder meetings, public engagement efforts via different avenues (community fairs, open houses, and surveys), and the development of a Plan webpage. VLAWMO also convened a TAC comprised of municipal, regional, and state agencies and the St. Paul Regional Water Service (SPRWS) to provide guidance and input throughout the planning process. Once the priority issues were established, a paired weighting analysis activity was conducted with the VLAWMO Board of Directors and Technical Commission to rank the six identified issues.

GOALS

The goals established for the Plan are associated with each of the priority issues and were developed through an evaluation of watershed data and studies, as well as input from staff and stakeholders. Gaps in essential information were assessed, and staff capacity and partnerships were considered to make certain the goals were measurable and that they were manageable yet aggressive. Goals will be measured yearly through an assessment of the implementation strategies as part of the annual reporting process.

MAJOR ACTIONS

The Plan's priority issues and the supporting measurable goals provide direction for the work of VLAWMO. Numerous strategies have been developed to reach each goal. These strategies will be implemented through the five core activities: Administration, Monitoring and Studies, Education and Outreach, Capital Projects and Programs, and Regulatory Programs. Throughout the planning process all of the major activities of the Plan, including the core activities, strategies, and goals, have continuously been evaluated and adjusted to better address the priority issues of the watershed. Specific core activities have been expanded for implementation in a variety of the subwatersheds. These subwatershed activities provide focus on the priority issues and are done along with core actions.

VLAWMO CORE ACTIVITIES

VLAWMO frequently teams up with partners to reach its goals. Partnerships are common with municipal storm sewer system (MS4) agencies. MS4s include the six communities within VLAWMO as well as Anoka County, Ramsey County and the Minnesota Department of Transportation (MnDOT). Other partners may include the SPRWS, other state agencies, and local groups such as the Birch Lake Improvement District (BLID) and the North Oaks Homeowners Association (NOHOA), among others. Because of these vital partnerships, VLAWMO's function in some strategies may be more of a supporting role while others will require a major role and responsibility.

EXECUTIVE SUMMARY

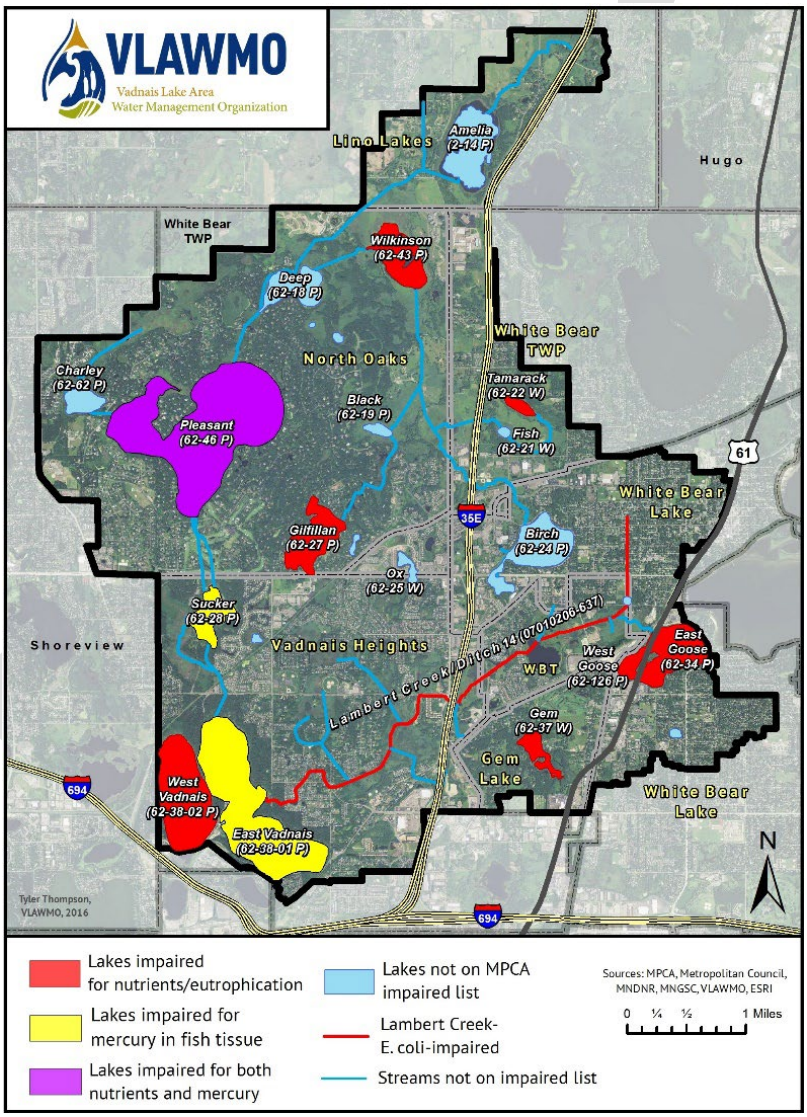
PLAN FRAMEWORK

All of the priority issues and goals developed for the Plan are included in this Executive Summary, along with an abbreviated list of strategies. Strategies are discussed in full within the Plan as well as details regarding VLAWMO's core activities and planned subwatershed activities.

Priority Issue 1: Threatened and impaired surface water and natural resources.

Threatened or impaired surface waters refer to those waterbodies which have been included on the Minnesota Pollution Control Agency (MPCA)'s Section 303d Impaired Waters List. A Total Maximum Daily Load (TMDL) study and implementation plan has been completed which provides guidance towards actions that can be taken by VLAWMO and its partners to restore these water bodies. VLAWMO plans to focus efforts in the first few years of the Plan on selected lakes to ascertain the best projects that could be implemented to aid in better water quality. These actions are described in more detail within the goals and strategies in the Plan.

IMPAIRED WATERS OF VLAWMO



Goal 1-1: Work to delist all waters within VLAWMO currently on the 303d Impaired Waters list.

Strategy 1-1-1: Show measurable in-lake and stream reductions in targeted impaired waters (Goose Lake, Wilkinson Lake, Gem Lake, Gilfillan Lake, and Lambert Creek) within the first 5 years of Plan implementation.

Strategy 1-1-2: For lakes in which studies indicate internal loading as a primary source of nutrients, complete an internal load management feasibility study to identify projects with the best potential for nutrient reduction.

Strategy 1-1-3: Use an annual evaluation process to organize funding, along with technical and staff resources in line with the implementation schedule. Identify gaps in funding, technical and staff resources and set a plan to fill those gaps.

Strategy 1-1-4: Support watershed load reductions prescribed in Total Maximum Daily Load (TMDL) studies by providing stormwater management program assistance for MS4s to meet their regulatory requirements under the National Pollutant Discharge Elimination System (NPDES) and their Storm Water Pollution Prevention Program (SWPPP), as well as the goals identified in their Local Water Management Plans (LWMP). Communicate with MS4s on a regular basis to identify opportunities and gaps where VLAWMO can provide support through education programs, cost share, and technical support.

Strategy 1-1-5: Seek to achieve watershed load reductions prescribed in TMDL studies by implementing BMPs in lakes, streams, and surrounding areas. Support BMPs with restoration when feasible.

Goal 1-2: Demonstrate stable or improving water quality trends in all of VLAWMO lakes and streams by 2026.

Strategy 1-2-1: Conduct an annual monitoring program that tracks trends in the waters VLAWMO manages. Report data annually to the Minnesota Pollution Control Agency's (MPCA) database and create an annual monitoring report which will be available on VLAWMO website. Share monitoring results with MS4s to identify opportunities for achieving waste load allocations (WLAs) assigned through the TMDL. Annually evaluate monitoring program and make adjustments to the program as necessary.

Strategy 1-2-2: Develop and implement Sustainable Lake Management Plans (SLMPs) for each major lake within VLAWMO by 2026. Update SLMPs every 10 years.

Strategy 1-2-3: In addition to water quality monitoring, VLAWMO will track and document progress by reporting the number of publicly funded best management projects (BMPs) implemented, along with documenting the volume of runoff reduced, the amount of total phosphorus and total suspended solids reduced, and the acres converted from standard turf grass or impervious surface to native landscaping. The information will be provided in the Annual Report and made available to the MS4s.

Goal 1-3: Minimize loss of major wetland function and value within the watershed boundary.

Strategy 1-3-1: Continue to administer the Wetland Conservation Act (WCA) rules as the local government unit (LGU) for the watershed. MnDot is the LGU within their right of way.

Strategy 1-3-2: Establish a wetland monitoring program to determine the condition of major wetland complexes. Monitor sensitive species in wetlands as indicators of water and habitat quality. Monitor the watersheds major wetland complexes on a five-year rotational schedule. Conduct a map review to prioritize and schedule monitoring by January 1, 2018.

Strategy 1-3-3: Locate potential wetland restoration sites, assess with WCA technical evaluation panel, and develop a plan for sustainable restoration of degraded wetland functions. Pursue partnerships to assist with funding, monitoring, maintenance or other activities. Restoration of mitigation sites may be considered and undertaken.

Strategy 1-3-4: Continue to follow VLAWMO wetland standards as established in the VLAWMO water management policy.

Priority Issue 2: Threatened or impaired groundwater quality or quantity.

Goal 2-1: Support projects and programs which provide shallow groundwater recharge and deep groundwater conservation.

Strategy 2-1-1: To promote shallow groundwater recharge, VLAWMO will maintain cost share and technical support programs to promote infiltration projects exceeding minimum infiltration rates identified in VLAWMO's water management policy.

Strategy 2-1-2: To conserve deep groundwater, VLAWMO will continue to implement cost share and technical assistance programs to reduce the need for irrigation by promoting conversion from turf grass or impervious surface to native prairie, and stormwater capture or reuse projects.

Strategy 2-1-3: Groundwater sensitivity will be considered for all cost share projects.

Goal 2-2: Support public water suppliers within VLAWMO in developing and implementing water use and protection goals.

Strategy 2-2-1: Coordinate with partner organizations to establish conservation and water use goals and strategies which may include metering, sprinkling bans, tiered fees, etc.

Strategy 2-2-2: Encourage water suppliers within VLAWMO to develop and implement a consistent testing method for private drinking water wells.

Goal 2-3: Enhance education and communication on the use of groundwater and increase the focus on water conservation. Improve the understanding and management of water use for both citizens and MS4s.

Strategy 2-3-1: Coordinate with partner organizations to develop a posting schedule and publish groundwater education materials through social media, community events, and other venues, multiple times per year.

Strategy 2-3-2: Promote available cost share programs which support water conservation through social media, community events, and other venues, multiple times per year.

Strategy 2-3-3: Support North and East Metro Groundwater Management Areas to implement identified protection strategies. Develop task list as necessary and assign roles.

Priority Issue 3: Need for education and involvement from citizens and stakeholders.

Goal 3-1: Support MS4 partners in the implementation of their MS4 permits through VLAWMO's Education and Outreach Program.

Strategy 3-1-1: Improve stormwater guidance and information. Develop and implement NPDES and MS4 information and documents to assist municipal compliance. Assist MS4s with regulatory questions and information. Collaborate with local governments in achieving a consistent and streamlined municipal education program for various target audiences to meet MS4 requirements. Develop and facilitate MS4 staff trainings for best practices and compliance as required, including knowledge and implementation of best management practices (BMPs).

Strategy 3-1-2: Regularly communicate with MS4 stakeholders to assess their needs and opportunities for collaboration on water resource management.

Goal 3-2: Implement the 2016 Education and Outreach Plan.

Strategy 3-2-1: Build on existing and pursue new partnerships with governmental entities and diverse stakeholders to maximize effectiveness and eliminate gaps in water resource communication. This will be addressed through regular communications with our MS4s, partnering with coordinated metro-wide efforts, and timely communication with other stakeholders.

Strategy 3-2-2: Use effective marketing techniques, including social media, brand recognition, and regular, timely communications. The annual report, electronic newsletters, website, print, and other communications will use a cohesive brand.

Strategy 3-2-3: Be a resource to residents, business owners, and developers by providing an easy to use website, responsive staff and useful print material.

Goal 3-3: Implement education and outreach programs and activities that engage adult and school age residents in the watershed.

Strategy 3-3-1: Continue to implement citizen-based science programs and volunteer opportunities such as the Citizen Lake Monitoring Program (CLMP), Watershed Action Volunteers (WAV - VLAWMO's Citizen Advisory Committee), Community Blue grant program, and/or others as opportunities are identified. Programs will focus primarily on water resource benefits and public understanding of those resources.

Strategy 3-3-2: Develop at least one ongoing program targeting school age children through either schools, scouts, local nature centers or other organized groups. Target reaching 10% of the school age population per year through programs.

Priority Issue 4: Need for adequate data, analysis, financing, and staff capacity in order to meet goals and accomplish strategies.

Goal 4-1: VLAWMO will have adequate resources to address our priority issues.

Strategy 4-1-1: Continue to operate a robust data collection program to support the assessment of progress towards goals by taking a broad-based approach to assessing water quality and water quantity conditions and trends in the lakes and streams of the watershed over time. Prioritize baseline monitoring. VLAWMO will publish an annual water quality monitoring report by January 31st of each year.

Strategy 4-1-2: Sustainable Lake Management Plans (SLMPs) will be written and updated per the schedule in Table 2 of the Plan to assess lake and drainage area conditions and include information regarding land use and vegetative cover, as well as water quality, and other ecological assessment data.

Strategy 4-1-3: VLAWMO may, from time to time, retain consultants to provide data and analysis. Staff and Board will evaluate when it is most efficient to use existing staff vs. consultants.

Strategy 4-1-4: Minimize overlap with other agencies and evaluate the potential for collaboration of services. Partnership with lake associations, schools, businesses, and individuals will also be sought to implement practices, programs, and various education efforts. Collaboration with MS4s and other groups will also be documented annually.

Strategy 4-1-5: Evaluate job descriptions and needed qualifications and training for staff every 5 years or at employee turnover to ensure consistency with VLAWMO's needs. A market assessment will be reviewed on a regular basis to assure VLAWMO's capacity to acquire and retain well-qualified staff. Potential modifications would be brought to the Board for consideration.

Strategy 4-1-6: The financial capacity identified in the budget will be reviewed yearly through the annual report and budgeting process with fiscal needs identified for short term and long term projects and programs.

Priority Issue 5: Aquatic invasive species (AIS) management.

Goal 5-1: In cases where AIS management overlaps with water quality improvement efforts, especially in shallow lakes (for example rough fish and curly leaf pondweed management), VLAWMO

will look for opportunities to improve water quality as they align with the priorities of the VLAWMO Capital Improvements and Programs Plan.

Strategy 5-1-1: Implement rough fish management (such as harvesting or fish migration barriers) and curly leaf pondweed treatment, where applicable.

Goal 5-2: Support other LGUs and partners in AIS management.

Strategy 5-2-1: Where appropriate, VLAWMO may act as a partner and fiscal agent to lake associations or other interest groups to manage AIS.

Strategy 5-2-2: Where appropriate, VLAWMO may partner with other agencies or lake associations to provide education on AIS. These partnerships will be described and approved by the Board and each opportunity will be evaluated to ensure consistency with VLAWMO's priorities, goals, strategies and statutory responsibilities.

Priority Issue 6: Localized flooding.

Goal 6-1: Minimize flood damage to private and public property within VLAWMO.

Strategy 6-1-1: Communicate regularly with MS4s to assess what is needed to address new flooding concerns and support floodplain management in accordance with city, state, and federal regulations.

Strategy 6-1-2: In the event of localized flooding that crosses municipal boundaries but is within the watershed, VLAWMO may collect hydrologic and hydraulic (H&H) data to support MS4 modeling efforts which address flooding and water quality issues. Limit modeling support to only those instances where VLAWMO can use its unique abilities and authorities to address its priority issues.

Strategy 6-1-3: Support floodplain management in accordance with municipal, state, and federal regulations.

Strategy 6-1-4: Facilitate the management of intercommunity stormwater flows if necessary. No MS4s report issues related to flooding currently, however if flooding issues arise that cross municipal boundaries, VLAWMO may mediate and coordinate the necessary modeling and implementation solutions. This can include convening meetings, providing technical support, or implementation support.

Strategy 6-1-5: Use cost share programs and technical support to encourage local partners with land use authority to promote infiltration and minimize flooding risks.

Responsibilities of Local Governments

All municipalities within VLAWMO are required to complete and adopt a Local Water Management Plan (LWMP) that conforms to Minnesota Statutes 103B.235 and Minnesota Rules 8410.0160 by December 31, 2018. The LWMPs must become part of the local comprehensive plan for the municipality. The LWMPs must be consistent with VLAWMO's Plan and address the priority issues identified in the Plan as it pertains to their community. Each municipality must consider the VLAWMO water management policy in the development of their LWMPs. Prior to the adoption of an LWMP, a municipality must prepare their local water plan, distribute it for comment, and have it approved by VLAWMO.

VLAWMO does not operate a regulatory program for development review. Each of the municipalities, along with Anoka County, Ramsey County and the Minnesota Department of Transportation (MNDOT) has an MS4 permit and is responsible for stormwater management associated with those permits.

EXECUTIVE SUMMARY

The MS4s will be responsible for ensuring that development, redevelopment, and construction meets National Pollutant Discharge Elimination System (NPDES) requirements. Each municipality is required to operate a permitting program and have local controls consistent with the VLAWMO water management policy.

Additionally, for the waterbodies that have a completed TMDL study and implementation plan, the MS4s have Total Phosphorus (TP) waste load allocations (WLAs) for which they are responsible. Further discussion regarding the TMDL and WLAs is located in Appendix B of the Plan.

ASSIGNED TP WLAS FOR WATERBODIES WITH COMPLETED TMDL STUDY

			MS4s								
Lake	WLA (lbs/yr)	M-Foods Dairy	Anoka County	City of Gem Lake	City of Lino Lakes	MN DOT	City of North Oaks	Ramsey County	City of Vadnais Heights	City of White Bear Lake	White Bear Township
Gem	47.0	-	-	23.9	-	5.2	-	9.0	-	8.9	-
Goose – East	78.7	-	-	2.2	-	7.9	-	3.9	-	64.7	-
Goose – West	40.0	24.7	-	2.8	-	3.6	-	1.6	-	7.3	-
Gilfillan	17.0	-	-	-	-	-	14.7	0.5	0.1	-	1.7
Wilkinson	179.4	-	0.1	-	1.2	47.2	26.4	1.8	-	35.1	67.6

VLAWMO looks forward to continuing its strong partnerships with the MS4s as we work together to accomplish the goals of this Plan.

ASSIGNED BACTERIAL WLAS FOR LAMBERT CREEK

	MS4 Wasteload Allocation (Billions of org) (Daily)						
Critical Condition	City of Gem Lake	MN DOT	Ramsey County	City of Vadnais Heights	City of White Bear Lake	White Bear Township	Total Waste Load
High Flow	0.68	1.17	0.56	8.78	3.74	0.45	15.38
Wet	0.21	0.36	0.17	2.73	1.16	0.15	4.78
Mid-Range	0.10	0.17	0.08	1.28	0.55	0.07	2.25
Dry	0.04	0.06	0.03	0.45	0.19	0.02	0.79
Low Flow	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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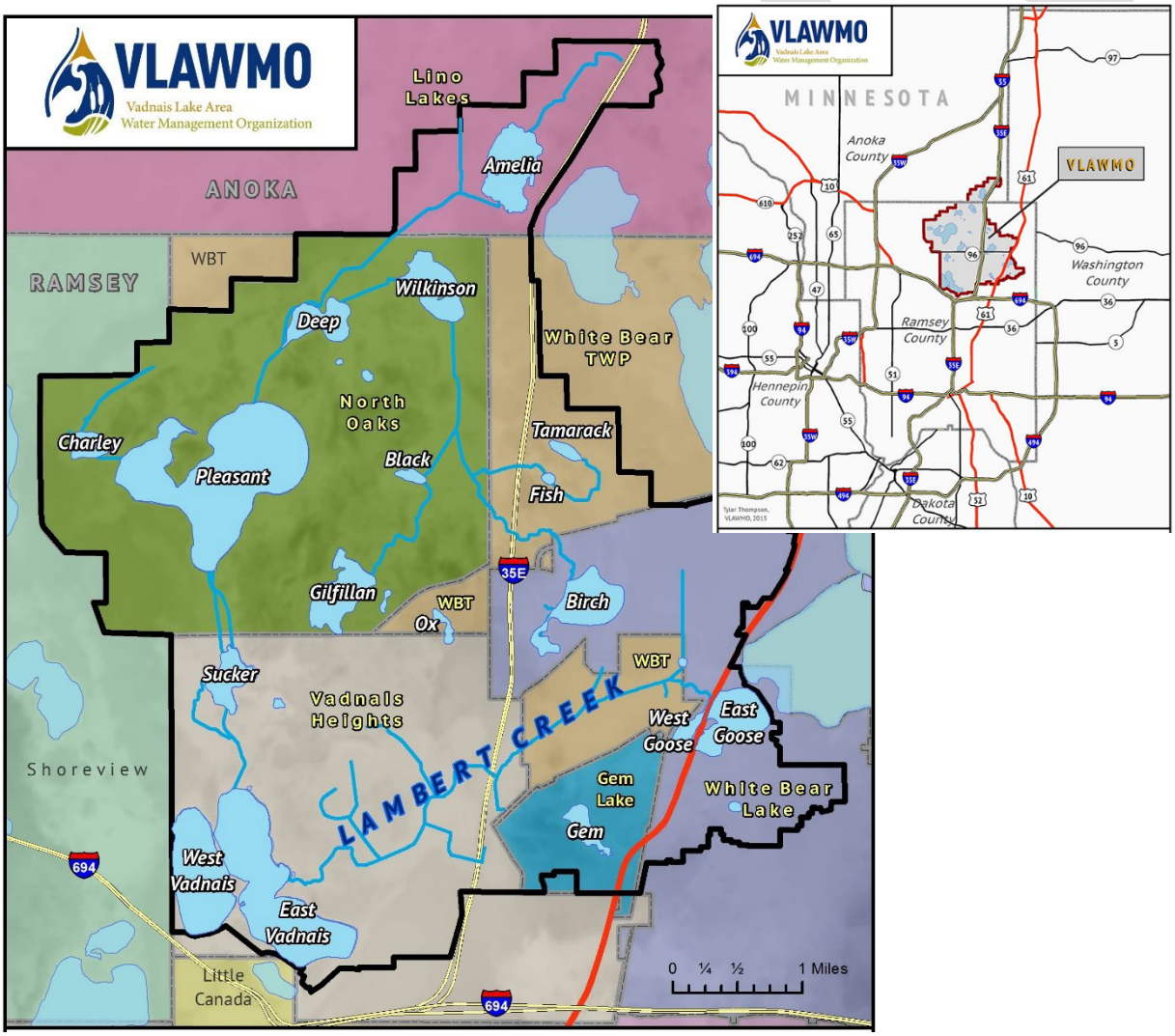
1 INTRODUCTION

This Comprehensive Watershed Management Plan (Plan) is rooted in scientific evidence brought about through over 30 years of water quality monitoring and investigative studies. The Plan will guide the efforts of the Vadnais Lake Area Water Management Organization (VLAWMO) in its mission to protect and enhance our water and natural resources for today and tomorrow. The Plan is intended for use by VLAWMO, its agency and local government partners, and its citizens to provide a framework for the management of the water and natural resources in this watershed from 2017 to 2026.

1.1 General Information

LOCATION

VLAWMO is a 24.2 square mile watershed located in the northeast metro area in Ramsey and Anoka counties. The watershed encompasses the City of North Oaks, and portions of the Cities of White Bear Lake, Gem Lake, Vadnais Heights, Lino Lakes, and White Bear Township, and includes 17 lakes, 1 creek, and over 1000 wetlands. The area is mostly developed and has a population of just over 29,000, according to 2013 data.

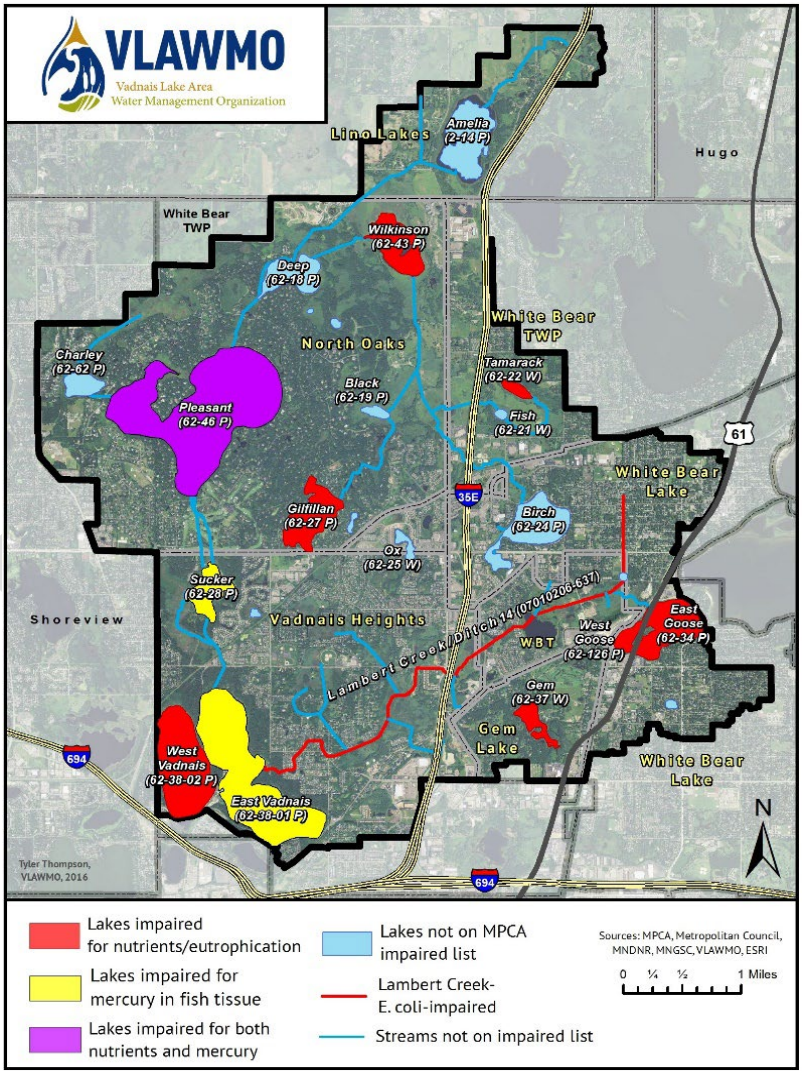


MS4 PARTNERS

Each of the six communities within VLAWMO, Anoka County, Ramsey County, and the Minnesota Department of Transportation (MnDOT) have sought coverage under the Minnesota Pollution Control Agency's (MPCA) National Pollution Discharge Elimination System (NPDES) Phase II General Permit as Municipal Separate Storm Sewer Systems (MS4). Regulatory requirements for MS4s have increased with each 5 year permit renewal cycle. The 2014 permit update required MS4s to implement a minimum level of development review, among other things. Additionally, MS4s are required to meet the standards within the VLAWMO water management policy. An update to the policy will be available before the adoption of this Plan to reflect currently held standards in most other watersheds and will be available on the VLAWMO website.

Another area which involves coordination between MS4s and VLAWMO is the management of waterbodies on the Section 303d Impaired Waters List. The MPCA manages activities associated with Section 303d of the federal Clean Water Act. Water quality standards have been set by the State which define how much of a pollutants (such as bacteria, nutrients, and mercury) can be in the water and still meet its designated uses. The standards vary by the designated uses (drinking water, fishing, recreation, etc.), ecological classification, and by lake depth. As part of its monitoring program, VLAWMO submits water quality data annually to the MPCA which is used to determine if waterbodies meet water quality standards. For waterbodies not meeting standards, they are placed on the MPCA's Section 303d Impaired Waters List. As of 2014, VLAWMO has 7 lakes that are impaired for high levels of nutrients, 2 lakes impaired for high levels of mercury in fish tissue, 1 lake impaired for both high nutrients and mercury, and Lambert Creek is impaired for high bacteria levels. As a result, VLAWMO, along with identified partners (mainly MS4s), are tasked with the responsibility of restoration of those waterbodies. More

FIGURE 2: VLAWMO IMPAIRED WATERS



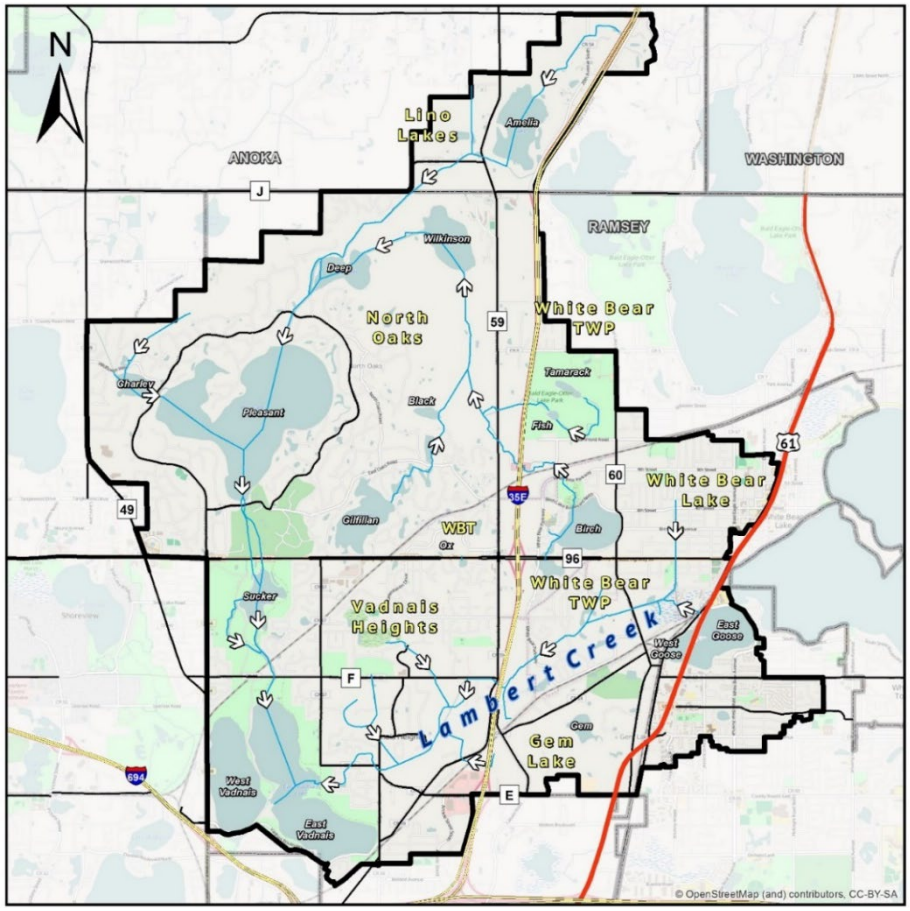
information regarding VLAWMO's impaired waters is found throughout this Plan as well as in Appendix B.

Because of the regulatory overlap in watershed restoration and protection requirements, VLAWMO prioritizes supporting the MS4s in their regulatory requirements and partnering to achieve water quality and natural resource goals and this is reflected throughout the Plan.

WATER FLOW PATTERNS

Most of the water within VLAWMO flows to East Vadnais Lake. Goose Lake discharges into Lambert Creek, which also collects water from parts of the City of White Bear Lake, White Bear Township, and the City of Vadnais Heights as it flows through the southern part of the watershed and enters East Vadnais Lake. The water from Birch, Tamarack and Fish Lakes heads north, as does the water from Gilfillan and Black Lakes. The flow from these waterbodies eventually meets up within the City of North Oaks and enters Wilkinson Lake. Water from Wilkinson Lake and Amelia Lake flows into Deep Lake and then the water heads south to East Vadnais Lake. Gem Lake is a self-contained subwatershed. West Vadnais Lake has no surface connection to East Vadnais Lake, however there may be a subsurface connection.

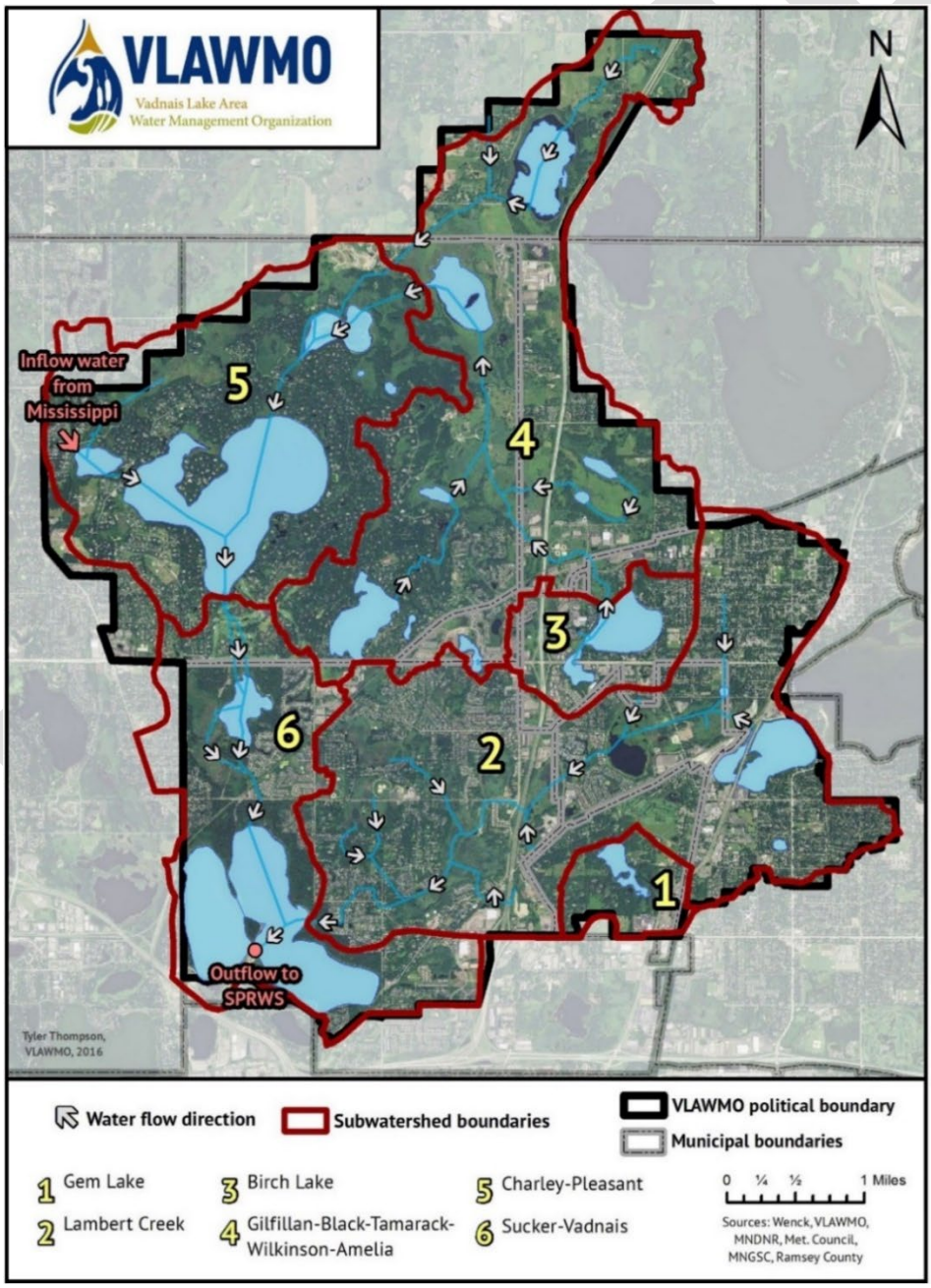
FIGURE 3: WATER FLOW PATTERN WITHIN VLAWMO



VLAWMO SUBWATERSHEDS

The water flow patterns within VLAWMO helped to determine the six subwatershed boundaries. Note that in Chapter 5, the Lambert Creek subwatershed is subdivided further to separate out the drainage area for Goose Lake. This is done because the basins of Goose Lake require significant efforts to meet water quality goals. VLAWMO uses subwatershed data to aid in the determination of the best projects and programs to implement for water quality benefit. VLAWMO's political boundary varies from the hydrological boundary which is a common occurrence for a watershed agency.

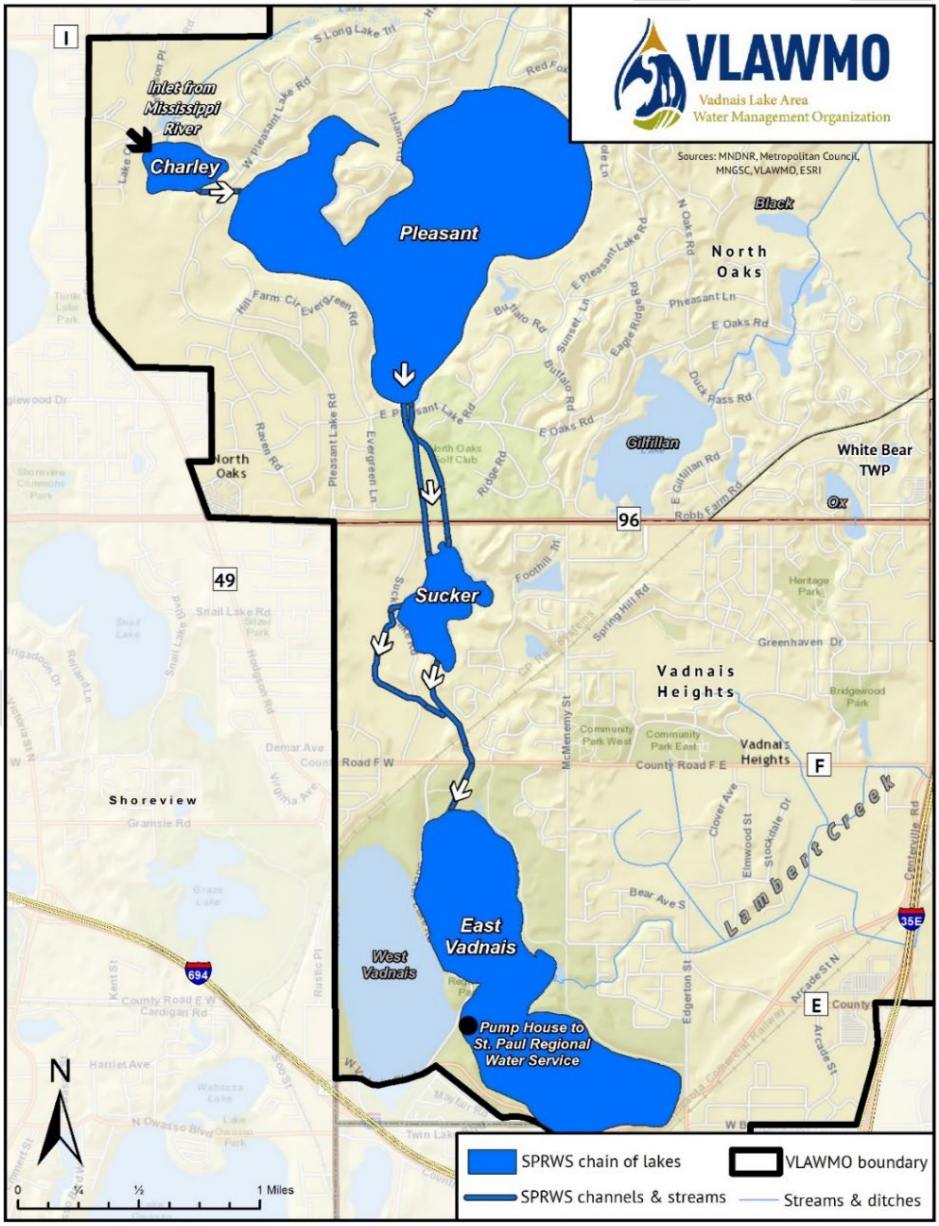
FIGURE 4: VLAWMO HYDROLOGIC BOUNDARY & SUBWATERSHEDS



DRINKING WATER SUPPLY

VLAWMO is unique in that the watershed receives water continuously from the Mississippi River which is pumped into Charley Lake and then moves along a chain of lakes on the western side of the watershed, through Pleasant Lake, Sucker Lake, and finally into East Vadnais Lake. This water is managed by the St. Paul Regional Water Service (SPRWS). East Vadnais Lake is the drinking water reservoir for approximately 400,000 customers in the St. Paul area. VLAWMO frequently works with the SPRWS on a variety of water quality monitoring and improvement projects throughout the chain of lakes as well as along Lambert Creek which empties into East Vadnais Lake.

FIGURE 5: CHAIN OF LAKES UTILIZED BY SPRWS



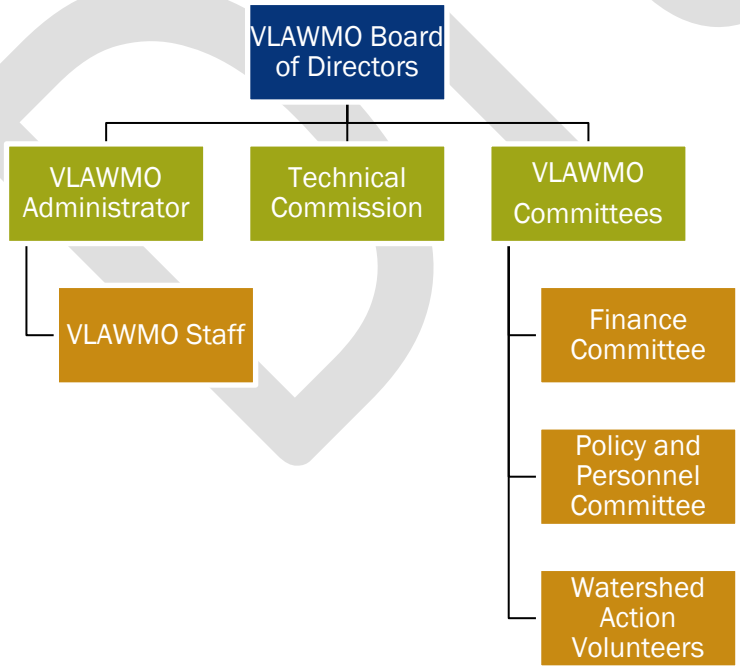
1.2 Administrative Overview

VLAWMO was organized in 1983 using a Joint Powers Agreement (JPA) developed under authority granted by Minnesota Statues Sections 471.59 and 103B.201. The JPA can be found as Appendix A of the Plan. The JPA established a 2 tier governance system consisting of a Board of Directors (Board) and a Technical Commission (TEC) The Board includes one elected official from each community and meets every two months. The Board reviews and votes on VLAWMO policies and larger scale projects and programs and oversees the VLAWMO budget. The TEC includes one representative assigned by each community and meets every month. The TEC considers monthly watershed business, votes on smaller scale projects and makes recommendations to the Board on larger projects.

The Board's purpose is set forth in Minnesota Statues 103B.201, Metropolitan Surface Water Planning, which codified the Metropolitan Surface Water Management Act of 1982:

1. protect, preserve, and use natural surface and groundwater storage and retention systems;
2. minimize public capital expenditures needed to correct flooding and water quality problems;
3. identify and plan for means to effectively protect and improve surface and groundwater quality;
4. establish more uniform local policies and official controls for surface and groundwater management;
5. prevent erosion of soil into surface water systems;
6. promote groundwater recharge;
7. protect and enhance fish and wildlife habitat and water recreational facilities; and
8. secure the other benefits associated with the proper management of surface and groundwater.

Figure 6: VLAWMO Organizational Chart



In addition to the Board and TEC, VLAWMO has a Citizen Advisory Committee called the Watershed Action Volunteers (WAV) and committees made up of Board and TEC representatives to review and recommend on finance, policy and personnel issues. The TEC, through the VLAWMO administrator and other staff members, fulfills its State-mandated purpose via its programs and projects which includes acting as the Wetland Conservation Act (WCA) Local Government Unit (LGU) except in MnDOT right of ways, water quality monitoring, education and outreach activities, and project and program implementation.

1.3 VLAWMO Mission Statement

VLAWMO's mission is to protect and enhance the water and natural resources within the watershed through water quality monitoring, education and outreach projects, wetland protection, and water quality enhancement projects and programs.

1.4 Plan History

This is VLAWMO's fourth generation Plan. The first Plan was written in 1985 when the key issues were flood control and water quality protection through watershed scale development review as well as wetland protection. The second Plan, adopted in 1997, expanded VLAWMO's activities to include an annual monitoring program. Throughout these two planning cycles, Implementation of stream and wetland restoration strategies on Lambert Creek and the assessment and protection of wetlands were VLAWMO's priorities. During that time VLAWMO and its partners designed and installed projects that mitigated flooding by restoring wetlands along Lambert Creek and conducted a comprehensive wetland assessment for some of the wetland complexes in the watershed.

With the implementation of the 2007 Plan, VLAWMO added staff, and instituted cost share programs and an enhanced education and outreach program, installed numerous capital projects and expanded its monitoring program. A funding mechanism (a storm sewer utility fee) was established in 2008 with special permission from the legislature which ensures financial stability for the watershed. VLAWMO has greatly expanded its abilities and looks forward to carrying on with its mission through this next planning cycle.

Since the adoption of the last Plan, an assessment of VLAWMO's lakes and streams resulted in the inclusion of several waterbodies onto the Minnesota Impaired Waters List. Over the next 10 years, efforts will be made to address the impairments. Additionally, groundwater aquifer concerns, fluctuating lake levels, new sources of potable water, and climate change are all issues that have risen in concern in recent years.

1.5 Planning Process

In the early stages of the planning process, VLAWMO staff and its Plan consultants reviewed previous Plans and assessed its successes, remaining issues, changes within the watershed, and challenges that may arise in the future. Additionally, the Board, TEC and staff reviewed VLAWMO's mission statement and revised it slightly to clarify "watershed's resources" to mean the "watershed's water and natural resources." Finally, a theme, "Why Water Matters", was established to inspire the 2017-2026 planning process and engage the public.

As required by Minnesota Rules 8410, a specific process must be followed to identify and assess priority issues. As directed, VLAWMO staff and consultants identified stakeholders and notices were sent to municipal, regional, and state agencies, to solicit input for the upcoming Plan. Print and electronic informational pieces were developed around "Why Water Matters" and were distributed through multiple channels including community events, the VLAWMO website, social media, e-newsletters, raingarden workshops, and other venues to gather input from the public

and to provide notice for meetings and open houses. VLAWMO also conducted surveys, facilitated discussions and provided opportunities for written comments to allow stakeholders ample input in the development of priority issues for the Plan.

VLAWMO convened a technical advisory committee (TAC) comprised of representatives from municipal, county, and state government agencies, lake associations, the SPRWS, and others. The initial meeting allowed stakeholders to expand on their thoughts and concerns for the watershed. Their input was vital to focusing the watershed's vision for the next 10 years. VLAWMO staff and consultants also facilitated several stakeholder engagement meetings and held open houses to gather more information to better understand and assess the issues. In addition to the stakeholder input, existing data, studies, and water quality trends were reviewed and considered, as well as a thorough assessment of the implementation success of the 2007 Plan and 2014-2016 Strategic Plan.

Once the priority issues were identified, they were ranked through a paired weighting analysis completed by VLAWMO staff, Board and TEC. The issues, goals, and strategies were discussed at the monthly TEC meetings and bi-monthly Board meetings. Updates were posted to the VLAWMO Water Plan webpage to be accessible by the public. Revisions were completed multiple times in order to accurately reflect the intentions of the goals and ensure they were measureable, and to produce strategies that were reasonable and achievable.

Throughout this process, staff and consultants reviewed existing core functions and activities of the watershed and provided recommendations for how to adjust and/or expand the programs for the next 10 years.

After an initial draft of the Plan was completed, the TAC met again to contribute their thoughts and provide direction before the official 60-day review period began. The 60-day review draft of the Plan was posted on the VLAWMO website and emails were sent out to the Board, TEC and other stakeholders to request their review and comments. The Plan was delivered to the TAC members in whichever format or formats they requested. Additionally, social media postings invited the public to comment as well. The 60-day review garnered seven agency responses with very helpful input and recommendations, many of which were implemented in the final draft.

A public hearing for the final draft of the Plan was held in conjunction with the June 22, 2016 Board of Directors meeting. The final draft was then sent to the Minnesota Board of Water and Soil Resources (BWSR) for a 90-day review. On September 28, 2016, the BWSR Board approved the final Watershed Plan.

The VLAWMO Board adopted the Plan on October 26, 2016.

1.6 PLAN ORGANIZATION

The Plan is divided up into 7 main chapters and contains 3 appendices:

Executive Summary
Terms and Acronyms
1 Introduction
2 Plan Framework
3 VLAWMO Core Activities
4 Subwatershed Activities
5 Plan Implementation
6 Amendments to the Plan
7 Responsibilities of Local Governments
References
Appendix A: VLAWMO Joint Powers Agreement
Appendix B: Land and Natural Resources Inventory and Assessment
Appendix C: Storm Sewer Utility (SSU) Rule

An executive summary is incorporated into this Plan and is also available as a stand-alone document. A section for commonly used terms and acronyms, along with definitions and web links for more information is located after the executive summary.

Chapter 2 discusses the priority issues, goals, and strategies that were developed for this Plan which provide the framework for VLAWMO activities for the next ten years. This section of the Plan is structured in a manner to show the connection of strategies to specific goals which are in turn connected to individual priority issues. This creates a Plan that is organized in a cohesive manner and will aid in measuring success.

Chapter 3 describes the five core activities of VLAWMO. The major actions VLAWMO will undertake over the next ten years will be done through the core activities. The core activities are: Operations and Administration, Water Quality Monitoring and Studies, Education and Outreach Programs, Capital Projects and Programs, and the Regulatory Program. Core activities are implemented on a watershed-wide basis each year.

Chapter 4 of the Plan expands on the specific activities that VLAWMO aims to implement within each of the subwatersheds in conjunction with the usual core activities. Both core activities and subwatershed activities identified in this Plan will be prioritized on a cost-benefit basis, quantified through existing data and studies. Gaps in data and a schedule for studies to address those gaps is also included within this chapter.

Chapter 5 discusses the implementation of this Plan. It includes an explanation regarding the roles and responsibilities of VLAWMO and its partners for carrying out mandated activities. The annual review process that will be undertaken by the VLAWMO Board to assess past results and plan for the upcoming year is discussed. Additionally, this chapter contains the VLAWMO budget and includes an implementation budget and schedule for the life of this Plan. In order to fully implement the Plan, additional funding may have to be obtained through grants and/or partner contributions.

Chapter 6 reviews the Plan amendment process. Chapter 7 describes the impacts of the Plan on local government, including Local Water Management Plan (LWMP) updates and Total Maximum Daily Load (TMDL) responsibilities.

The Reference section lists the locations of all studies and documents discussed throughout the Plan. Internal links are also available and denoted in blue. In the future, if any of the links do not work, the VLAWMO website – www.vlawmo.org – has a search function which allows users to find many of the documents. Links may no longer work if websites are updated or new technology is used to house the documents. VLAWMO staff may be contacted for any issues finding needed information.

Appendix A of the Plan is the updated Joint Powers Agreement which was ratified in 2016 and will be in effect until December 31, 2026. This document ensures the continued partnership between VLAWMO and its municipalities and describes the governance of VLAWMO.

Appendix B is the land and water resources inventory and assessment. With the 2015 revision to Minnesota Rules 8410, the ability to incorporate this information by reference has been utilized for those items which have not changed since the 2007 Plan.

Appendix C is the documentation regarding VLAWMO's chief funding mechanism, the SSU. This funding mechanism is also described in Chapter 5 of the Plan.

VLAWMO is currently in the process of updating its 2007 water management policy, which includes the stormwater treatment standards and wetland buffer rules. An Education and Outreach Plan (EOP) is also in development with a draft available for review. Neither piece has been finalized and approved by the VLAWMO Board at the time of the writing of this Plan. The most up to date versions of these documents by searching in the Resources section of the VLAWMO website.

CONCLUSION

VLAWMO has identified and prioritized actions based on science and input from its partners and stakeholders. Guided by the theme of "Why Water Matters" and the VLAWMO mission statement, goals were set and strategies identified to guide the application of our unique abilities and authorities and address our priority issues. VLAWMO values close coordination with its stakeholders to maximize benefits and eliminate duplication of efforts and will work with the expertise and resources of our citizen and government partners to forge the most cost effective, efficient path to achieving our water resource goals.

The Plan accelerates the pace for the implementation of projects and programs to achieve water quality goals in priority lakes and Lambert Creek, expands the existing monitoring program to ensure that relevant data is collected to better inform the projects that are implemented, and enhances the education and outreach program to effectively communicate with our citizens and foster environmental stewardship.

The Plan includes flexibility to implement opportunistic projects and programs outside of what is specifically identified. It provides a process to quantify water quality and natural resource benefits as well as to assess less quantifiable benefits such as opportunities to cultivate stewardship. This gives VLAWMO the ability to respond to opportunities as they arise in the watershed and to evaluate these opportunities for alignment with Plan priorities and goals.

This Plan is constructed for on-going use by VLAWMO and its partners to provide guidance towards achieving water resources goals and evaluate progress, as well as provide the opportunity to adjust activities and strategies as needed over the next 10 years. The implementation schedule and annual reporting and evaluation will be used to check progress towards goals and identify needs going forward.

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2 PLAN FRAMEWORK

INTRODUCTION

This chapter will describe the priority issues, goals, and strategies developed for the Plan. The objective of this chapter is to not only explain why certain issues were deemed a priority but to also demonstrate that strategies are linked to specific goals which are in turn linked to specific issues. All of these items are meant to support the VLAWMO mission statement. The six priority issues are defined in section 2.1 and the process for setting goals and strategies is described in 2.2. Section 2.3 brings together the issues, goals, and strategies. This provides the framework and basis for the Plan.

FIGURE 7: WATER PLAN FRAMEWORK

2.1 PRIORITY ISSUES

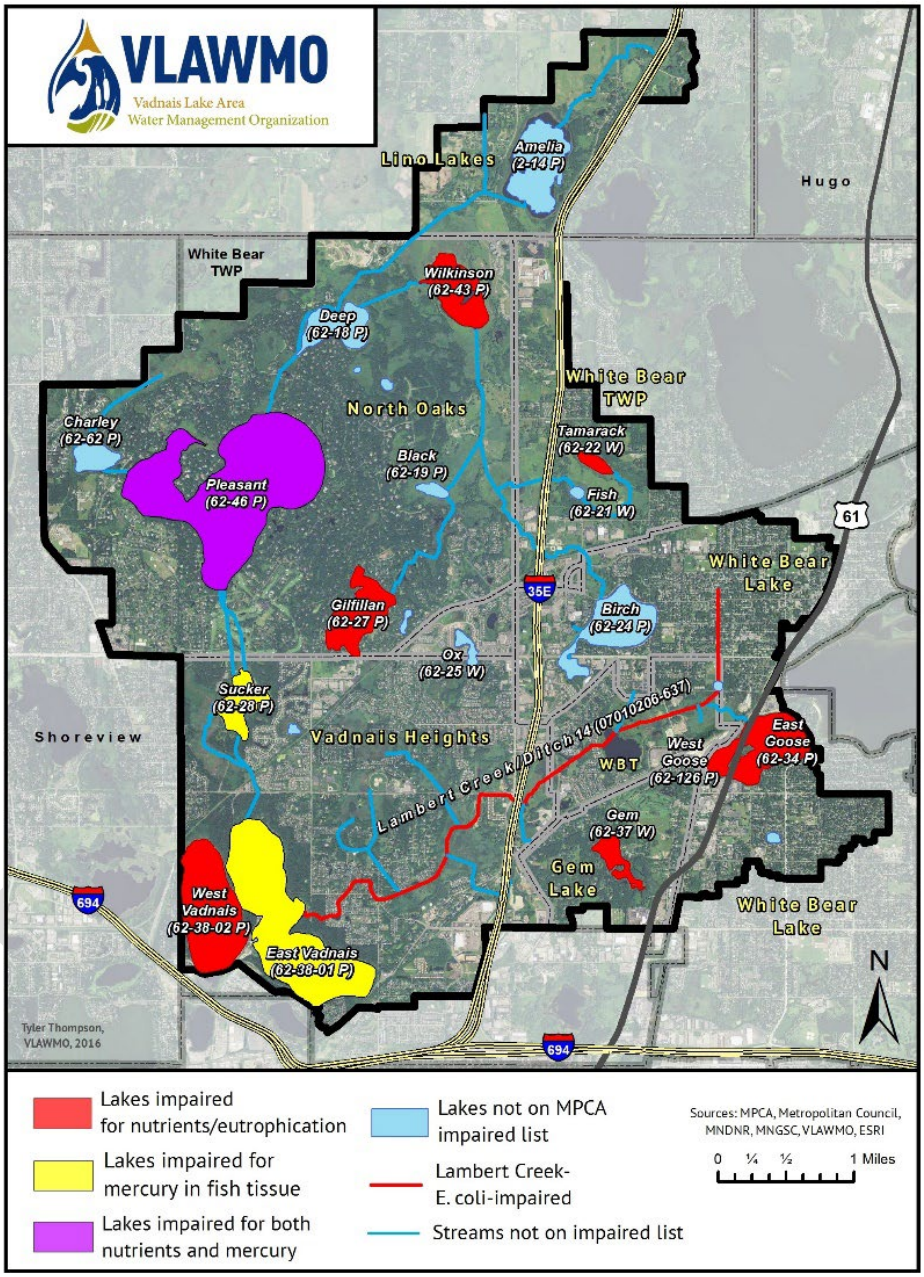
VLAWMO is required under Minnesota Rules 8410 to identify priority issues through a specific process. As discussed in the Introduction, an extensive stakeholder process took place to identify the issues, goals, and strategies that are incorporated into this Plan. The VLAWMO mission statement and the "Why Water Matters" theme were used to focus the vision for the Plan update. Information gathered from stakeholders, along with VLAWMO's existing reports, studies, and water quality information, were all taken into account when developing the list of priority issues as well as the goals and strategies to address those issues. Once the priority issues were developed, a paired weighting analysis activity was conducted with the VLAWMO Board of Directors and Technical Commission to rank the six identified issues.

Priority Issue 1: Threatened and impaired surface water and natural resources.

Impaired surface waters refers to those waterbodies which have been included on the MPCA's Section 303d Impaired Waters List, as of 2014. Gem Lake, Goose Lake (East & West), Wilkinson Lake, Gilfillan Lake, Pleasant Lake, Tamarack Lake, and West Vadnais Lake have been listed for high levels of nutrients (phosphorus). Sucker Lake has been listed for high levels of mercury in fish, Pleasant Lake has been listed for both high nutrients and high mercury, and Lambert Creek is listed for bacteria (E.coli) levels. The MPCA and VLAWMO completed a Total Maximum Daily Load (TMDL) study and implementation plan for Gem Lake, both basins of Goose Lake, Wilkinson Lake, Gilfillan Lake, and Lambert Creek. The TMDL study sets pollutant reduction goals and assigns a Waste Load Allocation (WLA) for each waterbody which is portioned out to the applicable MS4s. The implementation plan provides guidance towards actions that can be taken by VLAWMO and its MS4 partners to meet the WLAs and restore the waterbodies. VLAWMO will provide support to our MS4 partners to work towards delisting of these water bodies and will focus efforts in the first few years of

the Plan on selected lakes to ascertain and implement the best projects to aid in better water quality. These actions are described in more detail within the goals and strategies in the Plan.

FIGURE 8: VLAWMO IMPAIRED WATERS



In addition to the impaired lakes, there are several high-value water resources within VLAWMO which require continued protection to maintain existing water quality. High-value water resources include natural basins with minimally disturbed natural adjacent uplands valued for floral diversity, unique habitat, and/or high water quality functions. Examples of these high-value resources include Birch Lake and Black Lake and certain wetlands.

Priority Issue 2: Threatened or impaired groundwater quality and quantity.
Statutes require that groundwater, as it relates to surface water, is considered in a Plan. Communities within VLAWMO obtain drinking water via public or private groundwater wells. VLAWMO's general approach to integrating groundwater into the Plan is to complement the extensive work in groundwater resource protection already underway by state and local governments and to use its unique abilities and authorities to support these efforts. VLAWMO will prioritize those efforts that provide the largest cost benefit in terms of surface water quality and quantity improvement.

Priority 3: Need for education and involvement from citizens and stakeholders.
An important aspect for sustainable watershed resources is delivering programs that are effective in developing stewardship of the environment. Communication, education, participation, and behavior change are vital to this effort. Education and participation builds the knowledge and understanding of natural resource systems and issues, which then creates personal connections and drives active stewardship and engagement.

VLAWMO aims to be recognized as an effective, knowledgeable agency within the area for water and natural resource protection and improvement. VLAWMO will be a resource to residents, community groups, business owners and developers living and working within the watershed by providing permit referral information and requirements related to water and natural resources. Both information and programmatic engagement opportunities will be used.

Priority Issue 4: Need for adequate data, analysis, financing, and staff capacity in order to meet goals and accomplish strategies.
VLAWMO needs adequate resources to achieve its goals. A clear Plan, necessary data and data analysis, knowledgeable staff, sufficient administrative support and funding will allow the watershed to make and act on informed decisions. While the financial needs of the plan are quantified and funding sources for core functions and most of the high priority projects and programs are identified, the Plan also includes some larger goals for projects and programs as they relate to individual resources which require data and appropriate funding to implement effectively. VLAWMO will minimize public expenditure through collaboration with other agencies, fostering public stewardship, and utilizing opportunities to prevent degradation of the local natural resources.

Priority Issue 5: Aquatic invasive species (AIS) management.
There is a high level of interest and concern over AIS throughout Minnesota. While VLAWMO's main focus is surface water quality, its work is complementary to the efforts already initiated by other governments and watershed partners. VLAWMO will support activities already underway by state and local governments and will use its unique abilities and authorities to support these efforts. VLAWMO will prioritize those efforts that provide the largest cost benefit in terms of surface water quality improvement.

Priority Issue 6: Localized Flooding.

Water management organizations have a statutory responsibility to prevent and mitigate flooding. While flooding is not a primary issue in the watershed at this time, development and changing precipitation patterns require watchfulness. Climate change resilience will be incorporated into water quantity and rate standards. This Plan provides protection against localized flooding by relying primarily on the MS4s with development authority to ensure that development and redevelopment does not create excessive new volumes and rates of runoff that may cause downstream flooding. VLAWMO will support MS4s in these activities by providing technical assistance and through cost share programs. VLAWMO will continue to update its water management policy to effectively respond to changing climate conditions and will communicate regularly with MS4s to ensure they have the most up to date standards and information.

2.2 GOALS AND STRATEGIES

The goals established for the Plan are associated with each of the priority issues and were developed through an evaluation of watershed data and studies as well as via the stakeholder process. Strategies will provide the methods to reach goals and will be implemented through VLAWMO's watershed-wide core activities (Chapter 3) and through activities in subwatersheds to target particular goals (Chapter 4). Goals and strategies were discussed and revised based on input received at the monthly TEC meetings and the bi-monthly Board meetings as well as from the feedback received from the TAC. Throughout the planning process, gaps in essential information were assessed, and staff capacity and partnerships were considered to make certain the goals were measurable and that they were manageable yet aggressive. Goals will be measured yearly through an assessment of the implementation strategies as part of the annual reporting process (Chapter 5).

VLAWMO frequently teams up with partners to implement strategies and reach its goals. Partnerships are common with MS4 agencies. Other partners include the SPRWS, state agencies, and local groups such as the Birch Lake Improvement District (BLID), the North Oaks Homeowners Association (NOHOA), among others. Because of these vital partnerships, VLAWMO's function in some strategies may be more of a supporting role, while others will require a major role and responsibility.

2.3 BRINGING ISSUES, GOALS, AND STRATEGIES TOGETHER

Priority Issue 1: Threatened and impaired surface water and natural resources.

Goal 1-1: Work to delist all waters within VLAWMO currently on the 303d Impaired Waters List.

Strategy 1-1-1: Show measurable in-lake and stream reductions in targeted impaired waters within the first 5 years:

Goose Lake and Wilkinson Lake: Both lakes are at the upstream end of their respective subwatersheds. Measurable improvements in these two water bodies are required for improvements downstream. VLAWMO has prioritized projects and programs for the first 5 years of the planning cycle to address internal loading in Goose Lake and watershed loading in Wilkinson Lake. VLAWMO will follow the subwatershed plans to schedule and prioritize specific implementation activities. By focusing implementation dollars in the first five years on high benefit, low cost projects and programs for a limited number of priority resources with the ultimate intent of delisting these waters we build organizational capacity for larger

projects and achieve successes early on in the Plan to lay the groundwork for the remainder of the planning period.

Gem Lake and Gilfillan Lake: Both lakes have shown improvement since the 2014 TMDL study. Current trends indicate these lakes may meet standards with existing practices. VLAWMO will monitor these two water bodies for 2 years and reassess priorities based on outcomes. If water quality trends in these lakes do not continue to improve, VLAWMO will consider expanded monitoring to determine source(s) of nutrient loading and possibly implement nutrient reduction projects. If both lakes continue to meet standards, VLAWMO will pursue delisting the lakes from the Impaired Waters List with the MPCA.

Lambert Creek: VLAWMO will provide maintenance of the conveyance system and previous capital improvement projects. VLAWMO will pursue biodiversity, water storage, bacterial reductions and other wetland functions. Restoration will be pursued following BMP implementation when feasible.

Strategy 1-1-2: For lakes in which studies indicate internal loading as a primary source of nutrients, VLAWMO will complete an internal load management feasibility study to identify projects with the best potential for nutrient reduction.

Strategy 1-1-3: Use the annual evaluation process to organize funding, along with technical and staff resources in line with the implementation schedule. Identify gaps in funding, technical and staff resources and set a plan to fill those gaps (e.g. grants or additional revenue, additional staff capacity, consulting services).

Strategy 1-1-4: Support watershed load reductions prescribed in TMDL studies by providing stormwater management program assistance for MS4s to meet their regulatory requirements under the NPDES and Storm Water Pollution Prevention Program (SWPPP), as well as the goals identified in their Local Surface Water Management Plans (LWMP). Communicate with MS4s on a regular basis to identify opportunities and gaps where VLAWMO can provide support through education programs, cost share, and technical support. Checklist of meeting communication topics may include:

- Discuss MS4 concerns and issues regarding natural and water resource protection and restoration and identify strategies for VLAWMO to assist MS4s where consistent with Priority Issues.
- Develop and implement a coordinated communications schedule with each MS4 to support mutually beneficial messaging surrounding water and natural resource protection.
- Work to coordinate the use of consistent stormwater management standards, such as MIDS, or most applicable standard, across the watershed
- Identify cost share prioritization areas.
- Review capital project lists to identify coordination and cost share opportunities.
- Annually evaluate progress towards implementing these action steps, report and adjust resources as necessary. Optimize timelines for regular communication with partners to anticipate their budgeting and planning cycles.
- Assign roles.

Strategy 1-1-5: Seek to achieve watershed load reductions prescribed in TMDL studies by implementing BMPs in lakes, streams, and surrounding areas. Support BMPs with restoration when feasible.

Goal 1-2: Demonstrate stable or improving water quality trends in all of VLAWMO lakes and streams by 2026.

Strategy 1-2-1: Conduct an annual monitoring program that tracks trends in the waters VLAWMO manages. VLAWMO will report data annually to the MPCA's database and create an annual monitoring report which will be available on the VLAWMO website. Share monitoring results with MS4s to identify opportunities for achieving WLAs assigned through the TMDL. Annually evaluate monitoring program and make adjustments to the program as necessary.

Strategy 1-2-2: Develop and implement Sustainable Lake Management Plans (SLMPs) for each major lake within VLAWMO by 2026. Update SLMPs every 10 years.

Strategy 1-2-3: In addition to water quality monitoring, VLAWMO will track and document progress by reporting the number of publicly funded best management projects (BMPs) implemented, along with documenting the volume of runoff reduced, the amount of total phosphorus and total suspended solids reduced, and the acres converted from standard turf grass or impervious surface to native landscaping. The information will be provided in the Annual Report and made available to the MS4s.

Goal 1-3: Minimize loss of major wetland function and value within the watershed boundary.

Strategy 1-3-1: Continue to administer the Wetland Conservation Act (WCA) rules as the local government unit (LGU) for the watershed. MnDOT is the LGU for their right of way.

Strategy 1-3-2: Establish a wetland monitoring program to determine the condition of major wetland complexes. Monitor sensitive species in wetlands as indicators of water and habitat quality. Monitor the watershed's major wetland complexes on a five year rotational schedule. Conduct a map review to prioritize and schedule monitoring by January 1, 2018. Major wetland complexes may include Tamarack-Rotary Park, Birch Lake complex, Rice Lake/Sobota, Lambert Lake, Gem Lake, Greenhaven complex, Sucker complex, Gilfillan-Black complex, Long Marsh-Charley Lake, Pleasant Lake complex, Wilkinson-Deep Lake complex, and Amelia Lake.

Strategy 1-3-3: Locate potential wetland restoration sites, assess with WCA technical evaluation panel, and develop a plan for sustainable restoration of degraded wetland functions. Pursue partnerships to assist with funding, monitoring, maintenance or other activities. Restoration of mitigation sites may be considered and undertaken.

Strategy 1-3-4: Follow VLAWMO wetland standards as established in the VLAWMO water management policy.

Priority Issue 2: Threatened or impaired groundwater quality and quantity.

Goal 2-1: Support projects and programs which provide shallow groundwater recharge and deep groundwater conservation.

Strategy 2-1-1: To promote shallow groundwater recharge VLAWMO will maintain cost share and technical support programs to promote infiltration projects exceeding minimum infiltration rates identified in VLAWMO's water management policy.

Strategy 2-1-2: To conserve deep groundwater VLAWMO will continue to implement cost share and technical assistance programs to reduce the need for irrigation by promoting conversion from turf grass or impervious to native prairie, and stormwater capture/ reuse projects.

Strategy 2-1-3: Groundwater sensitivity will be considered for all cost share projects.

Goal 2-2: Support public water suppliers within VLAWMO in developing and implementing water use and protection goals.

Strategy 2-2-1: Coordinate with partner organizations to establish conservation and water use goals and strategies which may include metering, sprinkling bans, tiered fees, etc.

Strategy 2-2-2: Encourage water suppliers within VLAWMO to develop and implement a consistent testing method for private drinking water wells.

Goal 2-3: Enhance education and communication on the use of groundwater and increase the focus on water conservation. Improve the understanding and management of water use for both citizens and MS4s.

Strategy 2-3-1: Coordinate with partner organizations to develop a posting schedule and publish groundwater education materials through social media, community events, and other venues, multiple times per year. Develop a posting schedule with a posting goal. These measures are further described in the Education and Outreach Plan.

Strategy 2-3-2: Promote available cost share programs which support water conservation through social media, community events, and other venues, multiple times per year.

Strategy 2-3-3: Work with the North and East Metro Groundwater Management Area (GWMA) to implement identified protection strategies in the GWMA plan. Attend meetings, and report to Board and TEC as needed. Develop task list as necessary and assign roles.

Priority 3: Need for education and involvement from citizens and stakeholders.

Goal 3-1: Support MS4 partners in the implementation of their MS4 permits through VLAWMO's Education and Outreach Program.

Strategy 3-1-1: Improve stormwater guidance and information. Develop and implement NPDES and MS4 information and documents to assist municipal compliance. Assist MS4s with regulatory questions and information. Collaborate with local governments in achieving a consistent and streamlined municipal education program for various targeted audiences to meet MS4 requirements. Develop and facilitate MS4 staff trainings for best practices and compliance as required, including knowledge and implementation of BMPs.

Strategy 3-1-2: Regularly communicate with MS4 stakeholders to assess their needs and opportunities for collaboration on water resource management.

Goal 3-2: Implement the 2016 Education and Outreach Plan.

Strategy 3-2-1: Build on existing and pursue new partnerships with governmental entities and diverse stakeholders to maximize effectiveness and eliminate gaps in water resource communication. This will be addressed through regular communications with our MS4s, partner with coordinated metro-wide efforts, and timely communication with other stakeholders. Partnership goals will be identified and evaluated annually.

Strategy 3-2-2: Use effective marketing techniques, including social media, brand recognition and regular, timely communications. The annual report, electronic newsletters, website, print, and other communications will use a cohesive brand.

Strategy 3-2-3: Be a resource to residents, business owners, and developers by providing an easy to use website, responsive staff and useful print material.

Goal 3-3: Implement education and outreach programs and activities that include engage adult and school age residents in the watershed.

Strategy 3-3-1: Continue to implement citizen-based science programs and volunteer opportunities which may include the Citizen Lake Monitoring Program (CLMP), Watershed Action Volunteers (WAV – VLAWMO's CAC), Community Blue, and/or others as opportunities are identified. These programs target both adult and school age children. Programs will focus primarily on water resource benefits and public understanding of those resources.

Strategy 3-3-2: Develop at least one ongoing program targeting school age children through either schools, scouts, local nature centers or other organized groups. Target reaching 10% of the school age population per year though programs.

Priority Issue 4: Need for adequate data, analysis, financing, and staff capacity in order to meet goals and accomplish strategies.

Goal 4-1: VLAWMO will have adequate resources to address our priority issues.

Strategy 4-1-1: Continue to operate a robust data collection program to support assessment of progress towards goals by taking a broad-based approach to assessing water quality and water quantity conditions and trends in the lakes and streams of the watershed over time. Prioritize baseline monitoring. VLAWMO will publish an annual water quality monitoring report by January 31st of each year.

Strategy 4-1-2: SLMPs will be written and updated per the schedule in this Plan to assess lake and drainage area conditions and include such things as land use and vegetative cover, as well as water quality, and other ecological assessment data.

Strategy 4-1-3: VLAWMO may, from time to time, retain consultants to provide data and analysis. Staff and Board will evaluate when it is most efficient to use existing staff vs. consultants.

Strategy 4-1-4: Minimize overlap with other agencies and evaluate the potential for collaboration of services. Partnership with lake associations, schools, businesses, and individuals will be sought to implement practices, programs and various education efforts. Collaboration with MS4s and other groups will also be documented annually.

Strategy 4-1-5: Evaluate job descriptions and needed qualifications and training for staff every 5 years or at employee turnover to ensure consistency with VLAWMO's needs. A market assessment will be reviewed on a regular basis to assure VLAWMO's capacity to acquire and retain well qualified staff. Potential modifications would be brought to the Board for consideration.

Strategy 4-1-6: The financial capacity identified in the budget will be reviewed yearly through the annual report and budgeting process with fiscal needs identified for short term and long term projects and programs.

Priority Issue 5: Aquatic invasive species (AIS) management

Goal 5-1: In cases where AIS management overlaps with water quality improvement efforts, especially in shallow lakes (for example rough fish and curly leaf pondweed management), VLAWMO will look for opportunities to improve water quality as they align with the priorities of the VLAWMO Capital Improvements and Programs Plan.

Strategy 5-1-1: Implement rough fish management (harvesting, fish migration barriers, and curly leaf pondweed treatment). These implementation activities should be tied to both the VLAWMO overall prioritization of projects and programs as well as linked to probable improvements in water quality for the resource.

Goal 5-2: Support other LGUs and partners in AIS management.

Strategy 5-2-1: Where appropriate, VLAWMO may act as a partner and fiscal agent to lake associations or other interest groups to manage AIS.

Strategy 5-2-2: Where appropriate, VLAWMO may partner with other agencies or lake associations to provide education on AIS. These partnerships will be described and approved by the Board and will evaluate each opportunity to ensure consistency with VLAWMO's priorities, goals, strategies and statutory responsibilities.

Priority Issue 6: Localized Flooding

Goal 6-1: Minimize flood damage to private and public property within VLAWMO.

Strategy 6-1-1: Communicate regularly with MS4s to assess what they need to address new flooding concerns and support floodplain management in accordance with city, state, and federal regulations.

Strategy 6-1-2: In the event of localized flooding that crosses municipal boundaries but is within the watershed, VLAWMO may collect hydrologic and hydraulic (H&H) data to support MS4 modeling efforts which address flooding and water quality issues. Communicate annually with municipalities on the necessity of H&H modeling and data. Limit modeling support to only those instances where VLAWMO can use its unique abilities and authorities to address its priority issues.

Strategy 6-1-3: Support floodplain management in accordance with municipal, state, and federal regulations.

Strategy 6-1-4: Facilitate the management of intercommunity stormwater flows if necessary. No MS4s report issues of flooding currently, however if flooding issues arise that cross municipal boundaries, mediate and coordinate the necessary modeling and implementation solutions. This can include convening meetings, providing technical support, or implementation support.

Strategy 6-1-5: Use cost share programs and technical support to encourage local partners with land use authority to promote infiltration and shallow groundwater recharge and protect groundwater recharge areas where wellhead protection plans allow. Communicate regularly with MS4s to discuss roles and develop annual action steps. Evaluate effectiveness toward action steps annually.

2 PLAN FRAMEWORK

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3 VLAWMO CORE ACTIVITIES

INTRODUCTION

VLAWMO has five areas of core activities: administration, monitoring, education and outreach, capital improvement projects and programs, and a regulatory program. These activities are done on a watershed-wide basis. This chapter will describe the core activities and their focuses over the life of this Plan, with the understanding the annual evaluation process may result in modifications to better address current issues and trends.

FIGURE 9: VLAWMO CORE ACTIVITIES

3.1 OPERATIONS AND ADMINISTRATION

Operations and Administration activities are those associated with the running of the watershed, including but not limited to: office rent, general office supplies, information technology purchases and support, financial, legal, audit, and bookkeeping costs, worker's compensation insurance, and staff training. Duties such as storm sewer utility fee assessment, preparing the annual budget, preparing for Board and TEC meetings, and human resources activities also fall within this category.

3 VLAWMO CORE ACTIVITIES

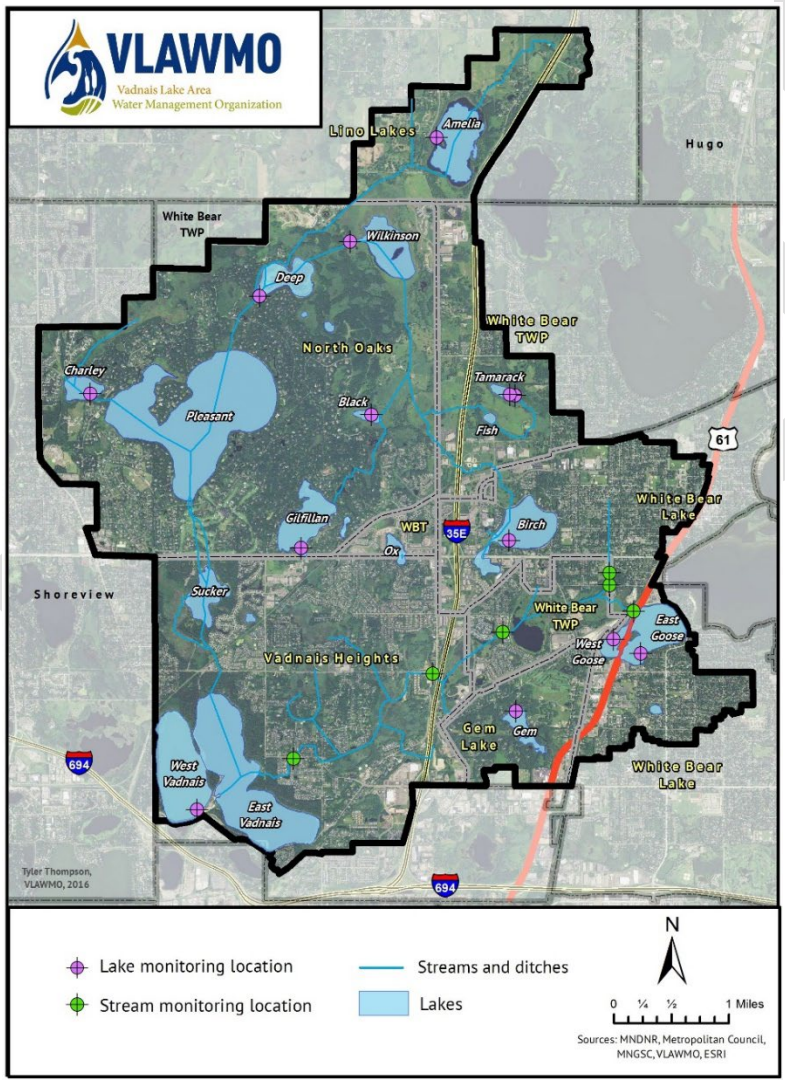
3.2 MONITORING AND STUDIES

WATER QUALITY MONITORING PROGRAM

VLAWMO operates a robust data collection and analysis program on twelve lakes in the watershed and along Lambert Creek. Monitoring data and reports are available on the VLAWMO website.

The purpose of the monitoring program is to track long-term water quality trends; provide a scientific basis to identify, target, and design programs and projects to meet goals; and to evaluate project and program effectiveness and progress towards water quality goals. During the planning process a review of the existing monitoring program was conducted and minor adjustments were made to fully align monitoring with the identified issues and goals.

FIGURE 10: VLAWMO MONITORING LOCATIONS



The program prioritizes baseline monitoring by VLAWMO staff, trained volunteers through the CLMP, and partners such as the SPRWS, as well as periodic special monitoring for a variety of purposes on an as needed basis. The bulk of the water sample collection season is between May through September each year.

3 VLAWMO CORE ACTIVITIES

Table 1: VLAWMO Monitoring Program Summary

Monitoring Location	Station Type	Parameters	Sampling Period	Frequency
Birch Black East Goose West Goose Gem Tamarack Amelia Wilkinson Deep Charley Gilfillan West Vadnais	Lake	Secchi depth, lake level (on some), profile for Temp, DO, pH & Conductivity; TP, TN, SRP, ChlA (surface), Total Iron (bottom only)	May-September	Every two weeks
Birch	Lake	Chloride	9-10 months*	Once per month
Birch, West Goose, Gilfillan, Gem	Lake	Lake Level	May-September	Every two weeks
5 Lambert Creek Stations, Lakes: Black, East Goose, West Goose, Gem, Tamarack, Amelia, Wilkinson, Deep, Charley, Gilfillan, West Vadnais	Stream & Lake	Chloride (surface samples except for Gem Lake where bottom and surface samples are collected due to its depth)	Ice Out	Once per year
Lambert Creek – 6 stations	Stream	TP, ChlA, SRP, TN, TSS, DO, pH, Cond., E. coli	May-September	Every two weeks
Lambert Creek – 3 stations (Oakmede, County Road F, Koehler Road)	Stream	Flow measurement at 3 flumes	May-September	Every two weeks
Lambert Creek – White Bear Storm Sewer Outlet	Stream	Stage & Flow	May-September	Continuous, every 15 minutes

Water samples are collected and analyzed following VLAWMO's quality assurance/quality control protocols identified in its Water Quality Sampling and Monitoring Quality Assurance Project Plan. The SPRWS analyzes E. *coli* samples and VLAWMO uses a contract lab for all other samples.

New CLMP volunteers attend training in sample collection methods and refresher training for staff and returning CLMP members is provided as needed. VLAWMO's annual water quality monitoring report shows current and historic water quality trends. This report is posted on the VLAWMO website and included with the Annual Report submitted to Board of Water and Soil Resources (BWSR) and stakeholder agencies. Water quality data is submitted annually into the Environmental Quality Information System (EQuIS).

VLAWMO will periodically review and update its monitoring program to meet ongoing and developing needs for data.

OTHER MONITORING AND DATA COLLECTION PROGRAMS

Aquatic Invasive Species (AIS) Monitoring: VLAWMO places zebra mussel traps in 4 lakes (Goose Lake, Birch Lake, Gilfillan Lake, Wilkinson Lake), as well as one location on Lambert Creek.

Automated Monitoring: Watershed loads are currently measured through discrete paired flow measurements and water quality samples. Continuous flow measurements are recorded upstream of Whitaker Pond at the White Bear storm sewer outfall. One automated sampling station is planned for the northern inflow to Wilkinson Lake, and another station at the downstream end of Lambert Creek is under consideration. Though grab samples are the standard, VLAWMO will assess the need for and costs and benefits of automated flow measurements and sampling for other locations. Other priority sites include inflows to Wilkinson Lake, Goose Lake and Birch Lake.

Wetland Monitoring: VLAWMO will implement a wetland monitoring program to assess the health of the larger wetland complexes in the watershed. VLAWMO will determine which wetlands to monitor and research methods used to assess wetland health and develop a schedule.

Fish, Invertebrate and Aquatic Plant Surveys: Tamarack, Birch, Wilkinson, Black, and Goose Lakes, and Lambert Creek have all been identified as high priority for additional biological monitoring.

Bathymetry: VLAWMO plans to conduct bathymetry surveys for all lakes which include a BioBase Survey. These surveys can also assist in quantifying aquatic plant density and lake substrate characteristics. Surveys can be used at the height of curly leaf density and then after senescence to assess the severity of curly leaf infestation.

3 VLAWMO CORE ACTIVITIES

STUDIES

VLAWMO conducted a number of watershed studies during the recent 10 year Plan implementation including, but not limited to:

- TMDL Study and Implementation Plan for Gem Lake, Gilfillan Lake, East Goose Lake, West Goose Lake, Wilkinson Lake, and Lambert Creek, was completed and approved in 2014.
- Subwatershed Stormwater Retrofit Studies
- Sustainable Lake Management Plans (SLMPs)
- Goose Lake Sediment Studies

VLAWMO wrote SLMPs for 7 of the lakes in the watershed from 2008 – 2015 and will complete the others as well as update previously completed reports according to the schedule listed in Table 2. Completed SLMPs are available on the VLAWMO website and links are included in the References section. In some cases, a lake association or other group may update the SLMP for their lake. In those cases, VLAWMO works with the SLMP author to provide relevant information, input and comments. An example of such a partnership is the Birch Lake SLMP by Birch Lake Improvement District (BLID). The BLID anticipates performing most of the work necessary to update their SLMP in 2016. VLAWMO will provide support as necessary. SLMPs may include bathymetry surveys, fish surveys to assess rough fish populations and vegetation surveys along any other relevant ecological information such as tree canopy coverage, wildlife facts, and specific information for that particular waterbody drainage area.

TABLE 2: SLMP SCHEDULE

Lake	Year Completed	Year Updated
Charley	2018	
Deep	2018	
Pleasant	2019	
East and West Vadnais, Sucker	2020	
Amelia	2021	
Birch	2009	2021
Tamarack	2009	2022
Gilfillan	2010	2023
Wilkinson	2011	2024
Goose	2013	2025
Gem	2015	2026
Black	2015	

3.3 EDUCATION AND OUTREACH PROGRAM

VLAWMO recognizes that the cornerstone of sustainable watershed resources is delivering programs that are effective in developing people's understanding of our natural resources as well as encouraging behaviors that reflect good stewardship. To assist with these activities, an Education & Outreach Plan (EOP) was developed in 2016 as part of this planning process. The EOP was

developed through an assessment of the existing program as well as consultation with internal stakeholders. This document is available on the VLAWMO website.

EDUCATION FOCUSES

There are four main focuses in the Education and Outreach Program. For efficient implementation and effective organization of VLAWMO's various target audiences, these four education focuses are consolidated into three sub-programs. For a complete description of VLAWMO's education and outreach program, refer to the EOP (link found in the References), which is a standalone document that outlines VLAWMO's education and outreach initiatives in terms of how they fit into the Plan's priority issues (2.2). Activities may be large or small, short-term or to long-term. Each activity described in the EOP supports VLAMWO's mission and goals, tailored to a target audience.

TABLE 3: EDUCATION & OUTREACH PROGRAM SUMMARY

Focus	Description	Sub-Program	Targeted Audiences
MS4 Regulatory Requirements	VLAWMO will collaborate with LGUs to achieve a consistent and streamlined municipal education program to meet MS4 regulatory requirements. Within these requirements, VLAWMO may target specific topics including: volume management and infiltration, turf management, winter snow and ice management, erosion and sediment control, illicit discharge and detection into local water resources.	Officials and Municipalities	Developers, local and state agencies, key personnel, MS4 partners
Schools	VLAWMO will partner with local schools to teach students about complex water resource issues, preparing them to be good stewards for the watershed. VLAWMO will provide curriculum, materials, guest visits, and trainings to support teachers in implementing watershed education that works with their existing instructional plans.	Formal Education	Students and local children, nonprofits, state agencies
Citizen Science and Volunteer Outreach	Volunteer outreach combines hands-on learning with service opportunities for adults and families. Various topics within this area include citizen science (lakes, phenology, macroinvertebrates, and aquatic invasive species), community clean-ups, supplementary education material development, and marketing support.	Informal Education, Interpretation and Outreach	Resident adults and families, community groups, nonprofits, watershed action volunteers, community blue participants
Workshops, Presentations and Trainings	VLAWMO will continue to facilitate and develop watershed workshops, trainings, and public speaking events/presentations.		

3 VLAWMO CORE ACTIVITIES

Additional components of the Education and Outreach Plan

- Planning and Assessment: VLAWMO will evaluate its priority concerns and goals for the best education and involvement opportunities annually or bi-annually. The Education and Outreach Program will define and measure results in order to improve current programs, ensure accountability, and maximize the effects of future efforts. Assessment techniques and tools are integrated into the program and considered early in the planning stage.
- Develop Products and Resources: Effective VLAWMO education and outreach activities are built on a foundation of quality instructional materials and resources that contribute to the larger goal of watershed literacy. This includes developing or redeveloping existing required materials, such as the Annual Report, into a quality education resource for residents and local officials.
- Partnering: We prioritize collaboration and coordination with our partners to eliminate duplication and maximize benefit. VLAWMO has successfully collaborated with a number of organizations to develop and implement programs and activities that are most effective at the Metro level, or target specific topics of interest. These partners include: our member MS4s, the Minnesota Department of Natural Resources (DNR), WaterShed Partners, Blue Thumb, Northland NEMO, and Tamarack Nature Center, among others.

REGULAR ASSESSMENT OF PROGRESS

VLAWMO will evaluate its education and outreach efforts annually for effectiveness and alignment with the Plan's priorities and goals. Results will be defined and measured in order to improve current programs, ensure accountability, and maximize the effects of future efforts.

3 VLAWMO CORE ACTIVITIES

FIGURE 11: EXAMPLE OF A VLAWMO EDUCATIONAL PIECE

3 VLAWMO CORE ACTIVITIES

3.4 CAPITAL IMPROVEMENT PROJECTS AND PROGRAMS

VLAWMO will prioritize the projects and programs that provide the most cost effective progress towards meeting water quality goals. As described in Chapters 1 and 2 of this Plan, capital projects and programs were determined through a review of existing monitoring data and studies and input from our partners and stakeholders. Funding for these projects and programs will come from the VLAWMO budget or through grants.

Chapter 4 expands on capital projects and programs for each of VLAWMO's subwatersheds. In this chapter, each subwatershed is represented, and the waterbodies within them were given the management classifications of restore, protect, or monitor. Issues and potential partners are also listed. The information presented in this chapter is also represented in the Implementation Budget and Schedule located in Chapter 5.

Costs and benefits of planned projects and programs will be evaluated annually so plans can be adjusted as needed. VLAWMO staff will communicate with stakeholders regularly, in advance of their internal planning cycles to assess their priorities, needs and opportunities to collaborate and coordinate efforts.

Capital Projects: Capital projects will be implemented according the priority issues and goals set in the Plan and are listed in the implementation schedule located in Chapter 5. Focus for the first 3-5 years of this Plan will be on projects to help provide nutrient reductions in East and West Goose Lake and Wilkinson Lake with emphasis placed on the impact of load reductions on the priority resource not just necessarily the load reduction of the practice itself. VLAMWO will prioritize projects with the biggest impact on the resource. In addition to prioritizing high benefit projects, VLAWMO will consider opportunistic projects that arise through redevelopment or through partners implementing their Capital Improvement Plans.

Past capital projects include:

- Birch Lake shoreline restoration – a partnership between VLAWMO, the City of White Bear Lake, Ramsey Conservation District, and the BLID that restored approximately 700 feet of shoreline.
- Central Middle School Swale – Clean Water Legacy funds supported the installation of storage and infiltration structures underneath a reconstructed swale filled with native plants.

Upcoming capital projects include:

- Whitaker Wetlands Treatment project – funding from the Legislative Citizen Commission on Minnesota Resources (LCCMR) will allow for the installation of engineered wetlands within the Lambert Creek subwatershed with the goal of reducing nutrients in the creek. Installation planned for 2017.
- Internal load mitigation project – Expanded monitoring in 2016-2017 will assist in the determination of the best internal load reduction project for East and West Goose Lakes which is planned for installation in 2018.

3 VLAWMO CORE ACTIVITIES

Capital Programs: Capital programs will also be prioritized based on their impact to water resources. Programs will be targeted based on the subwatershed plans. VLAWMO has two landscape cost share programs: Landscape Level 1 and Landscape Level 2. Landscape Level 1 grants focus on projects for individual home owners. Level 2 grants target larger projects and prioritizes volume and nutrient reduction as well as habitat. BMPs for both programs can include rain gardens, prairie restorations, conversion of turf grass or impervious to native plants, stormwater management that goes above the standards listed in VLAWMO's water management policy, erosion reduction, and habitat restoration. The amount of funding allocated to the cost share programs will be evaluated each year and included with the annual budget. The program will document completed projects and will collect information to determine pollution reduction estimates (TP & TSS). This information will be shared with MS4s with to support their SWPPP requirements. VLAMWO will also collaborate and coordinate with MS4s to improve street sweeping, BMP installation and maintenance, as well as their education and outreach efforts.

VLAWMO will regularly communicate with each of its municipalities, counties, and the SPRWS to discuss upcoming projects and determine where partnership opportunities may exist. This proactive approach allows for opportunities to partner and allows more lead time and buy-in when pulling together funds for larger scale projects and programs.

Capital project and program implementation will be evaluated annually and Plan Amendments will be prepared as necessary to accurately reflect the plans within this core activity.

OPERATIONS AND MAINTENANCE OF INFRASTRUCTURE

For projects which receive cost share funding through the landscape grant programs, the applicants enter into an agreement with VLAWMO whereby they commit to maintaining their projects so that they function as designed for a minimum of five years. Maintenance workshops are offered whereby information and resources are offered to assist with the upkeep of their projects. Staff perform site visits at least once per year to ensure maintenance is occurring and is available to meet with the landowners to discuss and specific issues they may be experiencing.

For capital projects implemented by VLAWMO or in conjunction with partners, a maintenance agreement is included with all contracts or memorandums of understanding. Maintenance duties will vary by project. Past examples of maintenance agreements are:

- Birch Lake shoreline restoration project: an on-going maintenance agreement where VLAWMO manages the maintenance oversight and collects a set, annual amount from the BLID and the City of White Bear Lake to assist with maintenance costs.
- Whitaker Pond: agreement states that Ramsey County will dredge built up sediment from the forebay of the pond on a periodic basis.
- Central Middle School swale: VLAWMO agreed to cover the costs associated with the first two years of maintenance by a professional company, and then provided an operations and maintenance manual to the school district groundskeepers to assist them with the subsequent 8 years of required maintenance duties.

For stormwater infrastructure installed by MS4s, such as storm retention ponds or vegetated swales, they are responsible for the inspection, operation, and maintenance. Regular communication between agencies will allow the opportunity to discuss any concerns or new issues regarding their projects.

For Lambert Creek, VLAWMO conducts maintenance on the Ditch 13/14 public ditch drainage system pursuant to the VLAWMO Board's direction, the VLAWMO Watershed Management Plan and public ditch inspection program. The VLAWMO Board directs drainage system maintenance on an as-needed basis. The VLAWMO Board has recently approved proposed ditch maintenance on Ditch 14 on approximately 2,400 linear feet of Ditch 14, east of Edgerton Street in the City of Vadnais Heights, at an estimated cost of $87,000 for years 2021-2022. VLAWMO intends to implement these activities under Core Activities - Capital Projects and Programs and utilizing funding authority under MN Statute 103B.

3.5 Regulatory Program

VLAWMO does not operate a regulatory program for development review. All member cities or townships are MS4s with approved permits to discharge stormwater, and they, along with Ramsey County, Anoka County and the Minnesota Department of Transportation (MNDOT) as MS4s will be responsible for ensuring that development, redevelopment and construction meets NPDES requirements. Each member city or township is required to operate a permitting program and have local controls consistent with VLAWMO water management policy.

VLAWMO is the LGU administering the Wetland Conservation Act (WCA) and has been since 1991 except in MnDOT right of way area. VLAWMO established performance and control standards for managing stormwater runoff, and management classifications, standards and procedures governing the use of wetlands as set out in the VLAWMO water management policy. The current VLAWMO water management policy was written in April 2009. The current policy is in the process of being updated to follow the most recent standard changes within the WCA, Minimum Impact Design Standards (MIDS), Atlas 14, and Minnesota Stormwater Manual, along with state groundwater and buffer rules. The updated VLAWMO water management policy will be revised as standards in these manuals are amended. The updated policy will be on the VLAWMO website and distributed directly to the appropriate partners.

Ramsey County transferred Drainage Authority for Ditches 13 and 14 to VLAWMO in 1986. These Drainage Systems are otherwise known as Lambert Creek and the Dillon or Whitaker storm sewer system (#07010206-801 & #07010206-637). Ditch Drainage System management activities are conducted under the authorities of chapters 103B, including maintaining conveyance, and are not specifically enumerated in this Plan except as they relate to protecting and improving downstream water resources. VLAWMO plans to continue its Drainage Authority role and will actively look for opportunities to use its unique abilities and authorities under 103B to implement water quality improvement projects concurrently with ditch maintenance and repair projects. VLAWMO acknowledges its role as a ditch authority in implementing the State buffer law and will pursue buffers consistent with requirements.

4 SUBWATERSHED ACTIVITIES

INTRODUCTION

This chapter provides a list of specific activities planned for each of the VLAWMO subwatersheds (identified in Figure 4). For each subwatershed, there is a table which identifies the water resources VLAWMO actively manages and includes a management classification, along with any correlating issues or constraints and potential partners for programs and projects.

There are three management classifications for the waterbodies:
Restore – for waterbodies which have threatened or impaired water quality, such as those listed on the Impaired Waters List. These may have more involved studies or projects planned in order to meet state standards.
Protect – for waterbodies that currently meet state standards. Activities will be focused on protecting the water quality and preventing degradation.
Monitor – for waterbodies that are meeting state standards or are trending towards meeting state standards. All waterbodies are monitored as part of VLAWMO's core activities. If a waterbody is given this classification, it is meant to represent that VLAWMO will be carefully considering the water quality data to determine if future actions are needed for those that are close to the state standards.

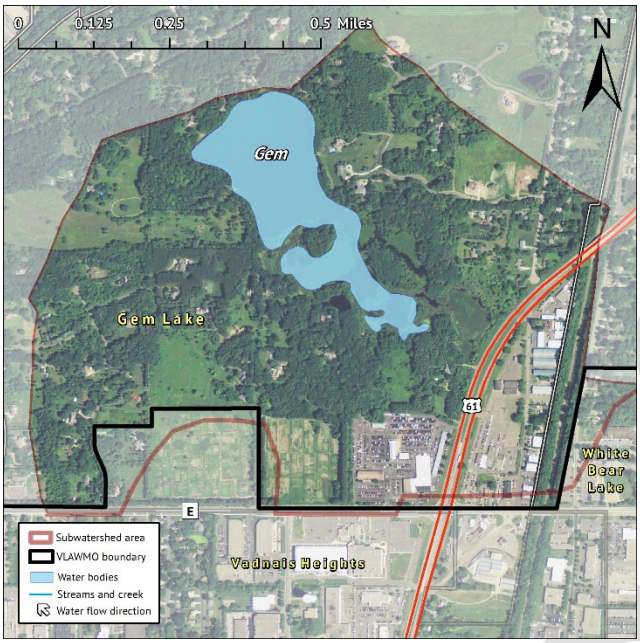
Waterbodies may have more than one management classification. These classifications serve as a guide for what activities may need to be implemented.

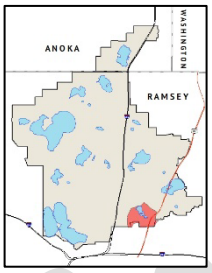
The activities identified are for those outside of the watershed-wide core activities described in Chapter 3. Note that in this Chapter, the Lambert Creek subwatershed has been subdivided further to separate out the Goose Lake drainage area. The Goose Lake drainage area requires significant effort to meet the water quality goals for the 2 basins and there are numerous activities planned over the next 10 years, which justified the creation of its own activity page.

The action steps presented in this section are a starting point for implementation of programs and projects to achieve goals. Funding for some activities will require assistance from grants and/or partner contribution. VLAWMO staff will communicate with relevant stakeholders for each subwatershed regularly to coordinate implementation of projects and programs in each subwatershed. Annual reviews will determine if changes to activities are necessary.

More information about the waterbodies is available in Appendix B of this Plan and on the VLAWMO website.

4.1 GEM LAKE SUBWATERSHED





Gem Lake is currently impaired for nutrients, but may be removed from the Impaired List by 2020 based on current monitoring data which shows it has met the nutrient standard for shallow lakes between 2010 and 2014. The lake has no public access and there are imposed buffers for all properties around the lake. Studies indicate no curly leaf pondweed or rough fish. If water quality data indicates an increase in nutrients, another fish survey may be completed to determine if rough fish are now present and/or expanded water sampling and biotic studies may occur to better ascertain sources of nutrients.

Water Resource	Gem Lake
Management Classification	Monitor/Protect
Issues or Constraints	Impaired for nutrients (may be removed from Impaired List)
Potential Partners	City of Gem Lake, MnDOT, Ramsey County

Monitoring:

- Complete fish, bathymetric and vegetation surveys when the SLMP is updated (2024).
- If water quality data shows degradation, pursue another fish survey to determine if rough fish are now present and expand monitoring to better characterize watershed loadings.

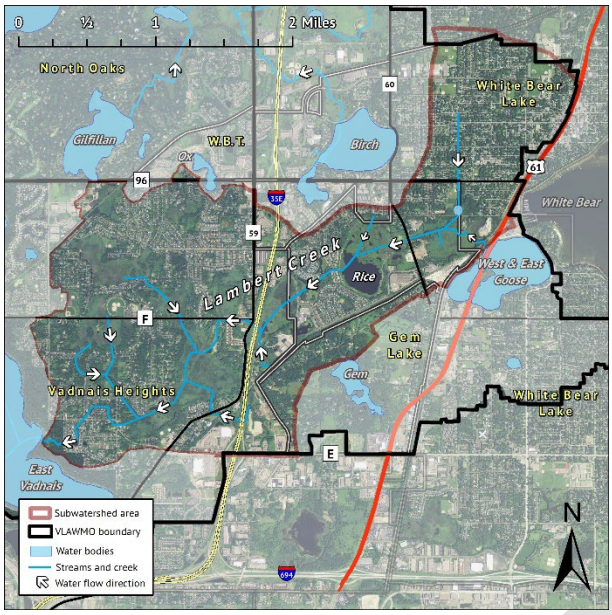
Education and Outreach:

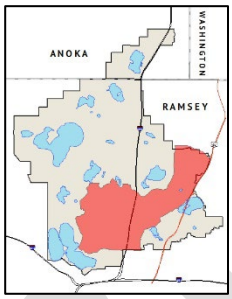
- Support septic system management by passing information on programs through to landowners interested testing, maintaining, or upgrading their systems.
- Support evolution of a lake association as interest arises.

Capital Projects and Programs:

- Work with the Cities of Gem Lake and White Bear Lake to discuss stormwater management and retrofit opportunities ~~with future redevelopment of properties along Hoffman Road~~. Evaluate cost and benefit of stormwater BMPs and prioritize for implementation accordingly. Pursue implementation with partners when feasible within budget constraints.

4.2 LAMBERT CREEK SUBWATERSHED TARGETED ACTIVITIES





Lambert Creek flows through the southern portion of VLAWMO. It starts at Goose Lake and its tributaries include storm sewers from the City of White Bear Lake City of Vadnais Heights, and White Bear Township. VLAWMO has implemented a bacterial source study to better assess where efforts should be placed to reduce *E.coli* levels in the creek. VLAWMO is also interested in continuing to implement projects to protect the stream banks and prevent erosion.

Water Resource	Lambert Creek
Management Classification	Restore/Protect
Issues or Constraints	Impaired for *E.coli* Possible future impairment for nutrients Altered hydrology and habitat
Potential Partners	City of Vadnais Heights, City of White Bear Lake, White Bear Township, Ramsey County, SPRWS

Monitoring:

- Develop stage/discharge relationships at all Lambert Creek sampling locations. Install a pressure transducer at 1-3 locations (downstream is highest priority, major pour points or storm sewer outfalls are the second priority).
- Conduct monitoring and inspection to assess public ditch status and determine maintenance needs.

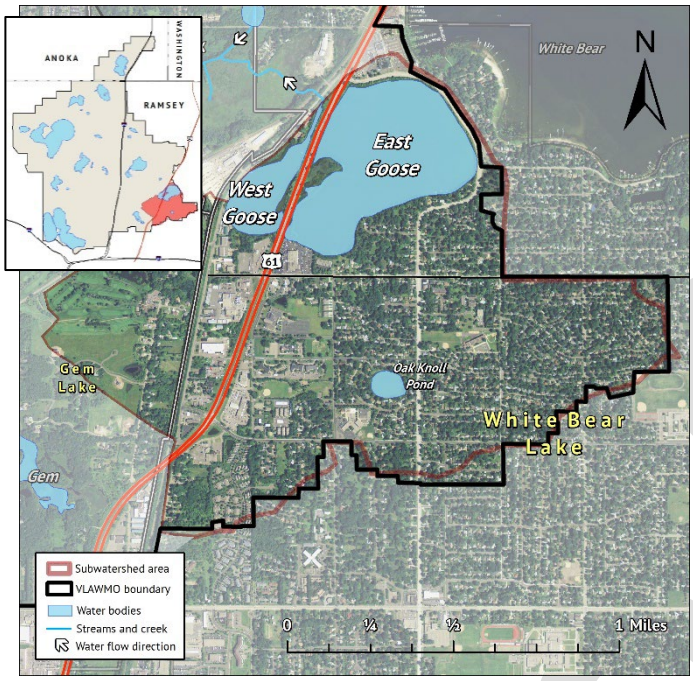
Education and Outreach:

- Work with the MS4s to actively manage pet waste along the creek through education and/or ticketing campaign.

Capital Projects and Programs:

- Conduct a wildlife survey to determine contribution to the bacteria impairment and a stream restoration assessment. Implement restoration and stabilization projects based on cost-benefits and opportunistic partnerships.
- Implement enhanced wetland project at Whitaker Pond targeting bacteria and nutrient removal with grant assistance using LCCMR funds; pursue expansion of the project is successful.
- Address capital maintenance and repair needs for Lambert Lake pond and the public ditch system. ~~and p~~Pursue restoration opportunities with the potential to improve water quality, bacterial impairment, and/or wetland functional capacity.

4.25 Goose Lake (East & West) Subwatershed Targeted Activities



East and West Goose Lakes are on the 303d Impaired Waters List for high nutrients. Internal loading is the primary source of the impairments. The internal load in East Goose has been impacted by historical discharge from the former White Bear Lake Waste Water Treatment Plant. East Goose Lake requires a 91% load reduction which will come primarily from internal sources with some watershed load reduction. The required 70% load reduction to meet state standards in West Goose Lake will come from internal, watershed, and East Goose Lake load reductions. Other factors that influence water quality in the two lakes are rough fish and invasive aquatic macrophytes. West Goose Lake is also used for extensive waterskiing, which a recent study has shown impacts lake water quality.

Water Resource(s)	East and West Goose Lakes
Management Classification	Restore
Issues or Constraints	Impaired for nutrients
Potential Partners	City of White Bear Lake, Ramsey County, SPRWS

Monitoring:

- Conduct a fish survey every 3-4 years to monitor rough fish populations.
- Complete bathymetric and vegetation surveys when SLMP is updated (2023).
- Possible expansion of water sample collections to better characterize watershed loads.
- Investigate the need to manage curly leaf pond weed populations in the lake by quantifying the impact of curly leaf on summer internal loads.

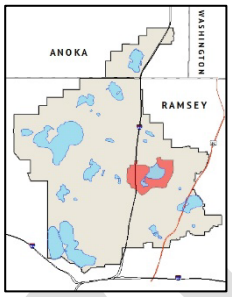
Education and Outreach:

- Due to the recreational use of the lake, provide proactive education to partners and other affected parties for nutrient reduction activities.

Capital Projects and Programs:

- Ongoing management of rough fish populations through harvesting and other technologies.
- Complete internal loading core study and prepare a feasibility study to identify internal load management strategies which may include recreational management, whole or partial lake alum applications, dredging, and other technologies.
- Pursue vegetative restoration, AIS management, or other treatment options to target watershed load and internal loading.
- Implement BMPs to reduce nutrients being delivered to the lake and reduce internal loading.

4.3 Birch Lake Subwatershed Targeted Activities



Birch Lake's water quality meets state standards. The Birch Lake Improvement District (BLID) had concerns regarding the potential for increasing chloride levels in this shallow lake due to its proximity to major roadways: Highway 96 and Interstate 35E. In 2015, the BLID provided funds for VLAWMO staff to measure for chloride throughout the year rather than the standard protocol of one measurement in the spring. Currently the level of chloride is not a concern but VLAWMO will continue to collect the additional measurements if the BLID supports that activity. Due to the abundance of vegetation in the lake, the BLID operates a harvester to manage nuisance levels.

Water Resource	Birch Lake
Management Classification	Protect
Issues or Constraints	Proximity to major roads
Potential Partners	City of White Bear Lake, Ramsey County, MnDOT, BLID

Monitoring:

- Support the BLID in their fish and vegetation surveys.
- Explore costs and benefits of better characterization of watershed loading through automated sampling.

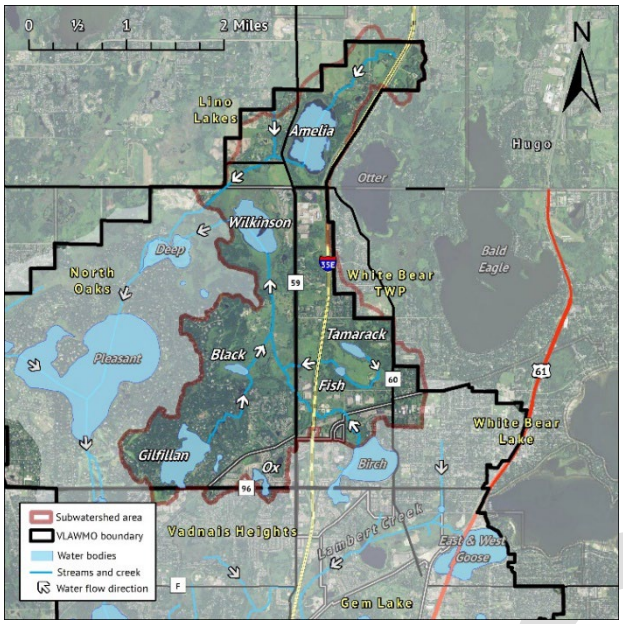
Education and Outreach:

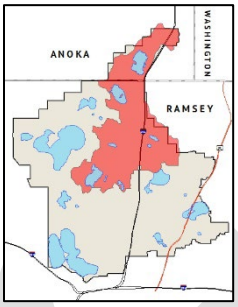
- Engage with the City and offer support towards better street sweeping and road salt application methods (assist with training for their Public Works staff) with guidance from the Twin Cities Metropolitan Area Chloride Management Plan (link in the References section).
- Use existing educational materials and/or create materials for homeowners about chloride, raking leaves, and other water friendly yard management techniques. Materials may include postcards or handouts, as well as content for the City's website and newsletter consistent with the Education and Outreach Plan. Engage with the City's Environmental Commission with this information to help spread the word. Send direct mailings/postcards to those who live on the lake and/or within the subwatershed area.

Capital Projects and Programs:

- Assess potential for stormwater management projects that coincide with road reconstruction projects or are identified as optimal retrofit and restoration opportunities ~~at 4th and Otter Lake Road and implement if feasible~~.
- Pursue subwatershed raingarden projects or other stormwater BMP projects ~~runoff projects~~, and restoration projects, and implement when feasible to proactively protect Birch Lake.

4.4 GILFILLAN-TAMARACK-BLACK-WILKINSON-AMELIA SUBWATERSHED TARGETED ACTIVITIES





VLAWMO actively manages five water bodies in this subwatershed and they are all shallow lakes. Three of the five are on the Impaired List for nutrients (Tamarack, Gilfillan and Wilkinson). The water bodies are connected through a series of ditches, storm sewers, ponds and numerous wetlands and ultimately discharge to Deep Lake. The recent diversion of high-quality water from Pleasant Lake to augment Gilfillan Lake levels is improving water quality in Gilfillan which is typically a land locked basin. Amelia and Black Lakes are currently meeting state standards. Wilkinson will be a focus for nutrient source studies and project implementation.

Water Resource	Gilfillan Lake	Tamarack Lake	Black Lake	Wilkinson Lake	Amelia Lake
Management Classification	Monitor	Restore	Protect	Restore	Protect
Issues or Constraints	Impaired for nutrients	Impaired for nutrients	None identified	Impaired for nutrients	None identified
Potential Partners	City of North Oaks, NOHOA	Ramsey County, Tamarack Nature Center	City of North Oaks, NOHOA	City of North Oaks, North Oaks Company, NOHOA	City of Lino Lakes

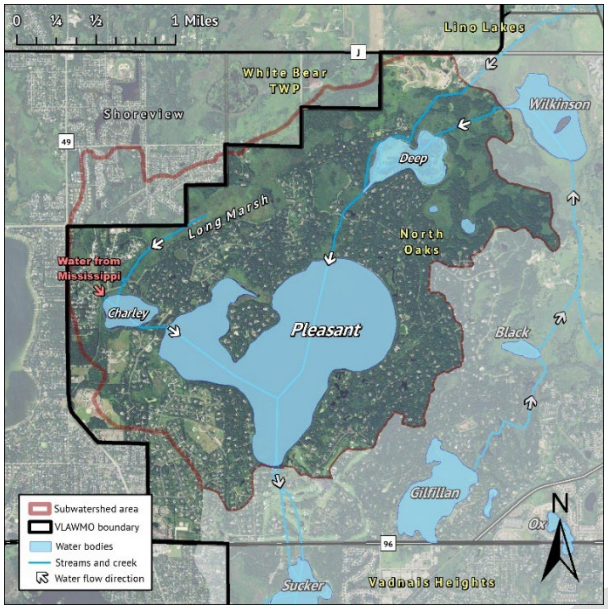
Monitoring:

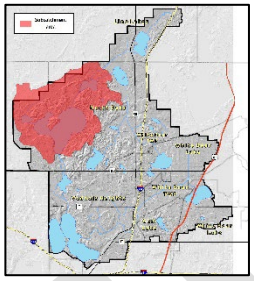
- On Black Lake, survey wild rice and other vegetative communities every 3-4 years.
- On Gilfillan, Tamarack, Black and Amelia, complete fish, bathymetric and vegetation surveys when SLMPs are written or updated.
- Conduct fish survey on Wilkinson to assess rough fish population.
- Utilize auto-sampler at one of the inlet areas at Wilkinson and do grab samples at other inlet and outlet.

Capital Projects and Programs:

- Conduct watershed and internal load assessment on Wilkinson and Tamarack Lakes for nutrient mitigation project development and implementation. Implement identified projects when feasible.
- Possible rough fish management on Wilkinson if deemed feasible.
- Offer assistance to the City of North Oaks and North Oaks Company to discuss and review development plans and offer possible partnership for stormwater management opportunities. Assist with implementation when feasible.
- Implement subwatershed BMPs and/or restoration partnership projects.

4.5 Pleasant-Charley-Deep Subwatershed Targeted Activities





Pleasant, Charley and Deep Lakes are part of the SPRWS chain of lakes. Pleasant Lake is on the Impaired Waters List for high nutrient levels and is actively managed by the SPRWS. Charley Lake is the first in the chain of lakes, receiving Mississippi water via pipe. There is concern from the City of North Oaks regarding the buildup of sediment in Charley Lake from the river water. Though past aerial photos have shown algae blooms at major stormwater inlets in Charley Lake and Pleasant Lake, the primary sources of nutrients to the lakes are the Mississippi River and potentially internal loading.

Water Resource	Pleasant Lake, Charley Lake, Deep Lake
Management Classification	Monitor/Restore
Issues or Constraints	Potential excess nutrients, Mississippi River inputs
Potential Partners	City of North Oaks, SPRWS, Met Council, NOHOA

Monitoring:

- Complete fish, bathymetric, AIS, and vegetation surveys/monitoring when SLMPs are written or updated, or as prioritized by the Board and as per the budget.

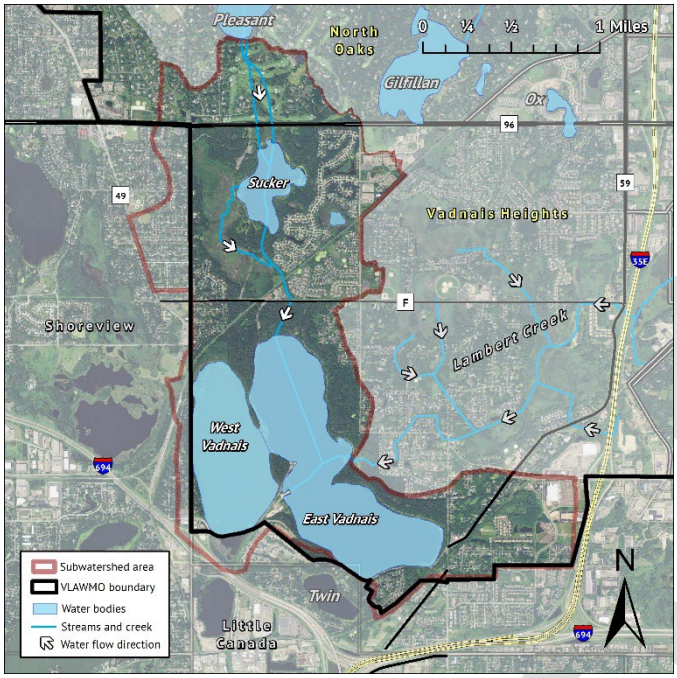
Education and Outreach:

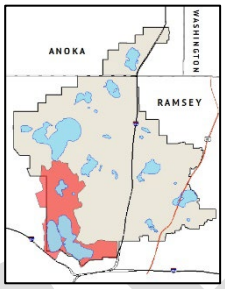
- Attend SPRWS Board meetings and communicate regularly with SPRWS staff to discuss upcoming projects and coordination and partnership with VLAWMO.

Capital Projects and Programs:

- Conduct a water and nutrient balance study for the lakes; this may be conducted as part of a feasibility study in preparation to assess impacts of potential operational changes intended by the SPRWS.
- ~~Partner with the City of North Oaks and the SPRWS on a feasibility study regarding the effect on water quality due to possible increased pumping of water by the SPRWS.~~
- Conduct watershed load assessment ~~on Deep Lake~~ and implement BMP projects based on outcomes.
- Consider BMPs to improve water quality ~~on Deep Lake~~ including but not limited to controlling rough fish. Implement when feasible with involvement of partners.
- Conduct a sedimentation study on Charley and Pleasant Lakes.
- Partner on shoreline stabilization projects and subwatershed raingarden projects on Pleasant Lake where deemed appropriate.
- Partner with the City of North Oaks, the City of Vadnais Heights, and the SPRWS on a feasibility study regarding the effect on water quality due to possible increased pumping of water by the SPRWS.

4.6 SUCKER-VADNAIS SUBWATERSHED TARGETED ACTIVITIES





Sucker and East Vadnais are part of the SPRWS chain of lakes and are surrounded by parkland and protected open space. SPRWS monitors and manages Sucker and East Vadnais. East Vadnais is the drinking water reservoir and water is continuously pumped to the SPRWS treatment facility located in Roseville. West Vadnais Lake is on the Impaired Waters List for high nutrients. It has a small drainage area and it is unknown if there is an underground connection to East Vadnais Lake.

Water Resource	Sucker Lake, East Vadnais Lake	West Vadnais Lake
Management Classification	Monitor/Protect	Monitor/Restore
Issues or Constraints	Potential excess nutrients, Mississippi River input	Nutrient impairment; proximity to major road.
Potential Partners	SPRWS, City of Vadnais Heights, Ramsey County	City of Vadnais Heights, Ramsey County

Monitoring:

- Complete bathymetric and vegetation surveys when SLMPs are written or updated.

Education and Outreach:

- Attend SPRWS Board meetings and communicate regularly with SPRWS staff to discuss upcoming projects and coordination and partnership with VLAWMO.

Capital Projects and Programs:

- Complete internal loading study on West Vadnais and prepare a feasibility study to identify internal load management strategies and implement projects.
- Partner with the City of North Oaks, the City of Vadnais Heights, and the SPRWS on a feasibility study regarding the effect on water quality due to possible increased pumping of water by the SPRWS.
- Assess wetland health, especially in native vegetation areas, implementing restoration when feasible.
- Conduct research on indicator species in the watershed. Conduct or partner on invasive species management including rough fish for West Vadnais Lake.
- Conduct subwatershed feasibility studies, and implement BMP projects/retrofits where feasible.

5 PLAN IMPLEMENTATION AND ROLES

5.1 RESPONSIBILITIES OF VLAWMO AND ITS PARTNERS

The Metropolitan Surface Water Management Act defines specific authorities and requirements for different types of watershed management organizations. As a Joint Powers watershed management organization (WMO) the following table identifies those responsibilities as mandatory (M) or discretionary (D) and the role VLAWMO will assume in each case.

TABLE 4: VLAWMO DUTIES AND RESPONSIBILITIES

Duties and Responsibilities	Joint Powers WMO	Vadnais Lake Area WMO
Adopt a Watershed Management Plan	M	Adopts a Watershed Management Plan
Prepare an Annual Report	M	Prepares an annual report
Appoints an advisory committee	M	Appoints a TEC and convenes the WAV
Manage transferred drainage system	D	VLAWMO accepted drainage authority over Co. ditches 13 (Dillon) and 14(Lambert)
Receive drainage system improvement & establishment petitions	D	VLAWMO manages the ditches as urban stormwater conveyance systems with its partner municipalities
Adopt water management rules	D	Water management standards have been adopted in its Water Policy
Receive petitions for projects	D	Solicits and acts upon project requests
Conducts hearing on annual budget	D	Public review of the annual budget is at its regular June meeting prior to adoption
Hire employees	D	Employees are hired by VLAWMO
Enters into contracts & agreements	D	Enters into contracts & agreements
Regulate development	D	No
Administers the Wetland Conservation Act	D	Yes
Initiates projects	D	Initiates projects
Approve local water management plans	M	Approves LWMPs
Finance Authority	D	Storm sewer utility

As noted above, VLAWMO does not exercise land use or permitting authority at this time. VLAWMO may assume a permitting program under the following circumstances:

- A local government does not have an approved and adopted local water management plan or has not adopted the standards identified in the VLAWMO Water Policy or official controls to implement those standards.
- A permit application to a local government requires an amendment or variance from the adopted local water management plan or official controls.

During the 2007-2016 VLAWMO Watershed Management Plan, all 6 local governments developed and adopted an approved LWMP. The annual reporting and evaluation requirement in Minnesota Rules 8410.0150 specify that VLAWMO evaluated the status of local water plan adoption and local implementation of activities required by the watershed management organization. Oversight of LWMP implementation has been informal to date. In 2017, VLAWMO will develop a more formal oversight process for local government implementation of official controls.

5 PLAN IMPLEMENTATION AND ROLES

5.2 Annual Review Process

Programmatic and project specific gaps will be identified through internal evaluations and regular meetings between VLAWMO and its partners. This allows all local and state units of government to make minor adjustments during the next 10 years by selecting from the prioritized list of actions, also by adding to the list and deleting items as the science is updated and the policies or resources change. This will be done on a subwatershed basis and with consideration to VLAWMO's core activities.

FIGURE 12: IMPLEMENTATION AND REVIEW PROCESS

During this Plan period, the Board will annually review progress towards goals. This self- assessment will be done through the annual reporting process which takes into consideration the annual water quality monitoring report and evaluation of the success of core activities and subwatershed activities Report cards for each subwatershed will aid in tracking progress (Figure 13). The VLAWMO Annual Report will compile all of the evaluations and adjustments will be considered where necessary.

To assist in this self- assessment process VLAWMO will meet with member cities and townships annually to assess progress towards goals. Core activities will be reviewed to assure that they are still supporting the mission and priorities of the watershed. Results of that self-assessment will be reflected in the Annual Report as well as direction for the next year. The review of the annual work plan includes the goal being addressed, the strategy being implemented and a description of the results.

5 PLAN IMPLEMENTATION AND ROLES

FIGURE 13: EXAMPLE OF SUBWATERSHED REPORT CARD

2018 REPORT CARD			
BIRCH LAKE	2017 Activities and Resuts	Progress in 2018	Plans and Goals for 2019
Monitoring:			
TP (ug/L)			
Chl A (ug/L)			
SDT (m)			
Support BLID in fish and vegetation surveys			
Education and Outreach:			
Engage partners on additional street sweeping and chloride management			
Capital Projects and Programs:			
Assess potential for stormwater management project at 4th & Otter Lk Rd			
Support stormwater management activities during redevelopment			
Landscape Grant Projects completed			

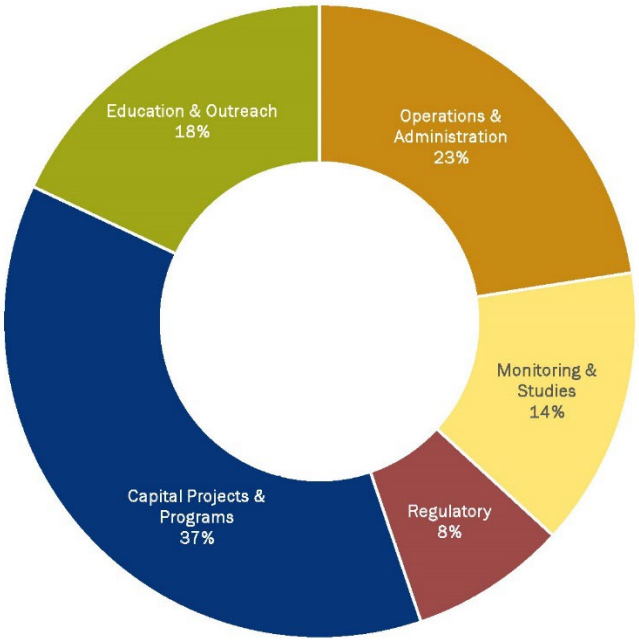
5 PLAN IMPLEMENTATION AND ROLES

5.3 VLAWMO IMPLEMENTATION BUDGET AND SCHEDULE

VLAWMO's Joint Powers Agreement allows for a variety of funding mechanisms. The chief funding method that will continue to be used is the Storm Sewer Utility (SSU) fee. The SSU Rule is included in Appendix C of this Plan. It was adopted by the Board in 2007 and provides a funding mechanism based on land use classification. Fees are collected by the counties through the property tax collection system. The SSU continues to provide a stable source of funding for the watershed. A small portion of funding may also come from service fees, WCA grant reimbursement, and interest from bank accounts. The funding is used to conduct VLAWMO's core activities.

Figure 14 shows how the 2017 budget is expected to be spread among the five core activities. Employee salaries and associated human resources costs are prorated among the various core activities to demonstrate the level of involvement required for each activity. Large capital projects may be funded through a variety of mechanisms. SSU fees collected over time, partner contributions, grant funding, in-kind labor or material contributions, or special assessment areas set up through our municipal partners may all play a role. VLAWMO's grant funding has ranged from $0 to $500,000 per year for the past 5 years.

FIGURE 14: 2017 VLAWMO BUDGET DISTRIBUTION FOR CORE ACTIVITIES



The overall cost, sequencing, and potential partnerships for implementation of this Plan is shown in Figure 15.

FIGURE 15: 2017 - 2026 IMPLEMENTATION SCHEDULE AND BUDGET

VLAWMO IMPLEMENTATION BUDGET											
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Partners
Core Activites											
Operations & Administration	$146,420	$150,800	$155,300	$190,000	$194,800	$199,700	$204,800	$210,000	$215,400	$221,000	
Monitoring & Studies	$92,640	$95,400	$98,300	$111,200	$114,200	$117,300	$120,500	$123,800	$127,200	$130,700	SPRWS, CLMP Volunteers
Education & Outreach	$119,790	$123,400	$127,100	$130,900	$134,800	$138,800	$143,000	$147,300	$151,700	$156,300	Member MS4s and others
Capital Projects and Programs	$196,630	$202,500	$208,600	$214,900	$221,300	$227,900	$234,700	$241,700	$249,000	$256,500	MS4s, BWSR, RCD & others
Regulatory Program	$49,760	$51,300	$52,800	$54,400	$56,000	$57,700	$59,400	$61,200	$63,000	$64,900	Member MS4s and others
Subwatershed Activities											
Gem Lake											
Fish survey (done during SLMP years)										$1,600	Contractor
Bathymetry & vegetation surveys (done during SLMP years)										$3,200	RCD
~~Commercial area retrofit feasability study & project implementation~~ Retrofit and other stormwater BMP partner feasibility studies and projects						$150,000		$150,000		$95,000	City of Gem Lake, City of White Bear Lake, Ramsey Co
Lambert Creek											
Pet Waste Management	$1,000	$1,000									MS4s
Bacteria reduction project implementation				$50,000		$30,000					Contractor, Consultant, MS4s
Wildlife survey & stream restoration assessment		$22,000									DNR, Consultant
Stream restoration, watershed protection, and retrofit projects			$200,000	$100,000	$100,000	$100,000	$200,000	$85,000		$105,000	Contractor, Consultant, MS4s
Public drainage program maintenance and inspection								$30,000	$45,000	$45,000	City of Vadnais Heights, City of White Bear Lake
Ditch repair and maintenance projects								$50,000	$100,000	$200,000	City of Vadnais Heights, City of White Bear Lake
Debt service on infrastructure replacement								$40,000	$40,000	$40,000	
Whitaker Pond wetlands retrofit installation	$400,000	$20,000	$80,000								LCCMR, Contractor, Consultant, MS4s
Whitaker Pond wetlands expansion and/or restoration					$500,000			$70,000			Contractor, Consultant, MS4s
Goose Lake											
Curlyleaf Pondweed Survey			$3,000								RCD
Load assessment for nutrient mitigation project development	$10,000										Consultant, MS4s, SPRWS
Internal load mitigation project implementation & invasive species treatment				$220,000				$205,000	$55,000	$185,000	Consultant, MS4s, DNR
Bathymetry & vegetation surveys (done during SLMP years)									$5,000		RCD
Fish survey & rough fish harvest	$4,000				$4,500				$5,000		MS4s
Subwatershed loading project implementation			$99,000	$30,000	$30,000		$50,000	$25,000	~~$30,000~~ $50,000	$150,000	Consultant, MS4s, SPRWS, Property Owners
Birch Lake											
Bathymetry, vegetation & fish surveys (done during SLMP years)			$5,000								RCD, BLID
Engage partners on additional street sweeping & chloride management			$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	City of White Bear Lake, RCD, MNDOT, BLID
Subwatershed ~~neighborhood~~ raingarden and restoration projects				$7,500		$30,000		$20,000	$10,000	$10,000	City of White Bear Lake, BLID
Support BLID efforts			$1,000	$1,500	$1,500	$1,500	$1,500	$2,000	$2,000	$2,000	BLID
~~4th and Otter Lake Road project development~~		$8,000									City of White Bear Lake, RCD, WFB Grant, BLID
~~4th and Otter Lake Road project implementation~~ Reconstruction and retrofit project development and implementation			$127,000					$70,000		$20,000	WBF Grant, City of White Bear Lake, BLID
Gilfillan-Tamarack-Black-Wilkinson-Amelia											
Wilkinson - Bathymetry, vegetation, & fish surveys	$2,600							$8,000			RCD, NOHOA, City of North Oaks
Wilkinson - Load assessment and related feasibility studies for nutrient mitigation project development	$15,000								$15,000		NOHOA, City of North Oaks, Consultant
Wilkinson - Rough fish management		$3,000		$3,000		$3,000		$3,000			NOHOA, City of North Oaks
Wilkinson and/or Tamarack - Nutrient reduction (watershed and internal load) project implementation			$50,000	$20,000	$50,000			$163,000	$200,000	$283,000	NOHOA, City of North Oaks, NOC, Anoka County, Ramsey County, WBT
Gilfillan/Tam/Black/Amelia - Bathymetry, veg, & fish surveys (SLMP years)				$3,000	$5,000	$3,200	$5,000				RCD, NOHOA, MS4s, Ramsey Co Parks
~~North Oaks s~~Stormwater management and restoration opportunities		$24,000			$24,000			$10,000		$125,000	NOHOA, City of North Oaks, Lino Lakes, Anoka County
Pleasant-Charley-Deep Lakes											
Bathymetry & vegetation surveys (done during SLMP years)	$1,200	$5,000									RCD
Fish survey and carp/AIS mgmt			$5,000	$10,000	$4,500			$25,000	$10,000	$35,000	SPRWS, NOHOA, City of North Oaks
Watershed load mitigation project implementation ~~- Deep~~					$50,000		$30,000	$30,000	$10,000	$45,000	NOHOA, City of North Oaks, SPRWS
Pleasant Lake shoreline stabilization and subwatershed raingarden projects							$15,000		$15,000	$10,000	NOHOA, City of North Oaks, SPRWS
Charley & Pleasant Lakes sedimentation study			$15,000								
Water and nutrient balance study for the three lakes						$165,000					Consultant, SPRWS, NOHOA, City of NO, Met Council
Sucker-East & West Vadnais Lakes											
Bathymetry & vegetation surveys (done during SLMP years)			$9,000	$12,000							RCD
West Vadnais internal loading study & TMDL development					$23,000			$50,000			City of Vadnais Heights, SPRWS, MPCA, Consultant, RWMWD
West Vadnais nutrient reduction project development and implementation, including rough fish study/removal						$10,000		$15,000	$100,000	$125,000	City of Vadnais Heights, SPRWS, RWMWD
West Vadnais nutrient reduction project implementation							$50,000				City of Vadnais Heights, SPRWS
Retrofit, restoration, and other stormwater BMP partner feasibility studies and projects								$65,000	$45,000	$85,000	City of Vadnais Heights, SPRWS, Ramsey County, North Oaks City/Golf Course
Sucker & East Vadnais Human Alteration Impact Study						$165,000					City of Vadnais Heights, SPRWS, Met Council
											Source of Funding
Core Activities	$ 605,240	$ 623,400	$ 642,100	$701,400	$721,100	$741,400	$762,400	$784,000	$806,300	$829,400	~~<- Storm Sewer Utility~~
Subwatershed Activities Total	$433,800	$83,000	$589,200	$458,200	$793,700	$508,900	$352,700	~~$14200~~ $1,117,200	~~$58200~~ $658,200	~~$18000~~ $1,566,000	~~<- Grant Funding/ Partner Contribution~~
Total	$1,039,040	$706,400	$1,231,300	$1,159,600	$1,514,800	$1,230,300	$1,115,100	~~$798200~~ $1,901,200	~~$864500~~ $1,464,500	~~$847400~~ $2,395,400	

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6 PLAN AMENDMENTS

This Plan provides direction to VLAWMO for management activities through the year 2026. The Board may initiate amendments to the Plan at any time based on new requirements, policies, programs, or practices.

VLAWMO is required to evaluate Plan implementation at least every two years. The Plan provides annual estimates for activities through 2026. The Board will annually review core activities and subwatershed implementation activities which may result in future minor or major Plan amendments. The Board may choose to make to respond to changes in watershed conditions, to improve or clarify language, or to provide more specificity for projects and programs.

6.1 AMENDMENT PROCEDURES

All amendments to the Plan except minor amendments shall adhere to the full review and process set forth in Minnesota Statutes 103B.231, and this section. The Board shall adopt proposed major Plan amendments upon their approval by the BWSR in accordance with Minnesota Statutes 103B.231. The amendment procedure for minor Plan amendments shall be in accordance with Minnesota Rules 8410.0140 as such rules now exist or as subsequently amended.

Any agency or individual who has received the Plan should receive a copy of an approved amendment. Additionally, all amendments must be posted on the VLAWMO website within 30 days of adoption.

6.2 FORM OF THE AMENDMENT

Unless the entire document is redone, all adopted amendments adopted must be in the form of replacement pages for the Plan, each page of which must conform to the following:

1. Show deleted text as ~~stricken~~ and new text as <u>underlined</u>.
2. Be renumbered as appropriate.
3. Include the effective date of the amendment on each page

6 PLAN AMENDMENTS

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7 IMPACTS ON LOCAL GOVERNMENT

7.1 LOCAL WATER MANAGEMENT PLANS (LWMP)

Pursuant to Minnesota Statutes 103B, following the approval and adoption of the Plan, governmental units having land use planning and regulatory responsibility within VLAWMO are required by statute to complete and adopt a LWMP that conforms to Minnesota Statutes 103B.235 and Minnesota Rules 8410.0160 by December 31, 2018. The LWMPs must be consistent with VLAWMO's Plan and address the priority issues identified in the Plan as it pertains to their community. Each municipality must consider the VLAWMO water management policy in the development of their LWMPs. A municipality must prepare their LWMP, distribute it for comment, and have it approved by VLAWMO, before it is adopted. Each municipality shall submit its proposed LWMP to the VLAWMO Board and the Metropolitan Council for review before adoption by its governing body. The Metropolitan Council review period is 45 days and the Board review period is 60 days after plan receipt.

At a minimum, LWMPs are required to do the following:

- Update the existing and proposed physical environment and land use. Information from previous plans that has not changed may be referenced and summarized but does not have to be repeated. Local plans may adopt sections of this Plan's Inventory and Condition Assessment by reference unless the city has more recent information, such as revised figures and data.
- Explain how the goals, policies, rules and standards in this Plan will be implemented at the local level, including any necessary modifications of local ordinances, policies, and practices, and a schedule for their adoption.
- Show how the municipality will take action to achieve the load reductions and other actions identified in and agreed to in any TMDL Implementation Plans, including identifying known upcoming projects including street or highway reconstruction projects that will provide opportunities to include load and volume reduction BMPs.
- Update existing or potential water resource related problems and identify nonstructural, programmatic, and structural solutions, including those program elements detailed in Minnesota Rules 8410.0100, Subp. 1 through 6.
- Set forth an implementation program including a description of adoption or amendment of official controls and local policies necessary to implement the Rules and Standards; programs; policies; and a capital improvement plan.

TABLE 5: LAST LWMP UPDATE

Municipalities in VLAWMO	Last Update
Gem Lake	2010
Lino Lakes	2011
North Oaks	2008
Vadnais Heights	2010
White Bear Lake	2007
White Bear Township	2010

7 IMPACTS ON LOCAL GOVERNMENT

Local suppliers of public drinking water must develop a plan as part of their comprehensive plan. They must also address any expansions of that drinking water supply in the plan.

If certain water bodies have been identified then the shoreland zone must be regulated by local ordinance or other code. Similarly floodplain areas as identified by Floodplain identification maps must be regulated by local controls.

All subsurface sewage treatment systems (SSTS) must also be regulated through local ordinance or code.

7.2 TMDL RESPONSIBILITIES

For the impaired waterbodies that have a completed TMDL study, the MS4s have Total Phosphorus (TP) and bacterial waste load allocations (WLAs) for which they are responsible. Some additional information regarding the TMDL study and WLAs is located in Appendix B of the Plan. The full TMDL study and implementation plan was approved by the Environmental Protection Agency and can be found via the link in the References section.

TABLE 6: ASSIGNED TP WLAS FOR VLAWMO WATERBODIES WITH COMPLETED TMDL STUDY

			MS4s								
Lake	WLA (lbs/yr)	M-Foods Dairy	Anoka County	City of Gem Lake	City of Lino Lakes	MN DOT	City of North Oaks	Ramsey County	City of Vadnais Heights	City of White Bear Lake	White Bear Township
Gem	47.0	-	-	23.9	-	5.2	-	9.0	-	8.9	-
Goose – East	78.7	-	-	2.2	-	7.9	-	3.9	-	64.7	-
Goose – West	40.0	24.7	-	2.8	-	3.6	-	1.6	-	7.3	-
Gilfillan	17.0	-	-	-	-	-	14.7	0.5	0.1	-	1.7
Wilkinson	179.4	-	0.1	-	1.2	47.2	26.4	1.8	-	35.1	67.6

TABLE 7 : ASSIGNED BACTERIAL WLAS FOR LAMBERT CREEK

	MS4 Wasteload Allocation (Billions of org) (Daily)						
Critical Condition	City of Gem Lake	MN DOT	Ramsey County	City of Vadnais Heights	City of White Bear Lake	White Bear Township	Total Waste Load
High Flow	0.68	1.17	0.56	8.78	3.74	0.45	15.38
Wet	0.21	0.36	0.17	2.73	1.16	0.15	4.78
Mid-Range	0.10	0.17	0.08	1.28	0.55	0.07	2.25
Dry	0.04	0.06	0.03	0.45	0.19	0.02	0.79
Low Flow	0.00	0.00	0.00	0.00	0.00	0.00	0.00

VLAWMO looks forward to continuing its strong partnerships with the MS4s as we work together to accomplish the goals of this Plan.

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