

Washington County Water Consortium Incorporating Groundwater Protection into Watershed District Rules December 2004

Objective

In the spring of 2004, the Washington County Water Consortium initiated the process of developing model groundwater rules for future adoption by the watershed districts and joint powers agreement water management organizations (WD/WMOs) located within the County. This effort addresses a number of the policies identified in the Washington County Groundwater Plan 2005 Work Plan aimed at developing guidelines and standards to protect groundwater resources. For a complete list of the policies the proposed groundwater rules address see Appendix A.

The County's objective was to develop model standards and language that will serve to protect the wide variety of groundwater resources located in Washington County. The WD/WMOs are encouraged to adopt those standards which are applicable to their specific management goals. Since most of the WD/WMOs in Washington County have rules and regulations, as well as an active permitting process, it would be relatively easy to add standards that would promote the protection of groundwater resources. By encouraging the WD/WMOs to adopt groundwater standards, local units of government will also have to consider the adoption of similar standards as they develop local water management plans consistent with the watershed management plan. As a result, groundwater protection will become an integral part of future land use decisions at both the watershed and municipal level.

Proposed Rules

The Washington County Water Consortium developed model groundwater rules for the following categories: groundwater appropriations, volume control, groundwater quality, and groundwater dependent natural resources. Each model rule addresses the following components of a typical WD rule:

- Purpose and Policy
- Applicability
- Standards
- Management
- Required Exhibits
- Exceptions/Exclusions
- References

Narrative text clarifying the purpose or the intent of each standard is provided within the rule as an *annotation*. This text was intended to clarify future discussions of the proposed rules and was not meant to be included in the final draft of the rules. The following summaries describe the objective of each of the proposed rules as well as a brief discussion of roles other agencies have in regulating the same category. A copy of the draft model rules are provided in Appendix C of this report.

1. Groundwater Appropriations

The objective of this standard is to monitor the use of groundwater in areas where existing wells and/or groundwater dependent natural resources could be negatively impacted by overuse of groundwater. Negative impacts include reduced flow to surface water bodies, lowering of lake or wetland levels, or interference with other wells.

Other agencies enforcing groundwater appropriations – Currently the Department of Natural Resources (DNR) issues water use permits for groundwater appropriations withdrawing more than 10,000 gallons of water per day or 1 million gallons per year. This rule has been developed to address significant groundwater appropriations that are not currently being regulated by the DNR.

2. Volume Control

The objective of this standard is to control the rate and volume of stormwater runoff so that surface water and groundwater quantity and quality are protected, soil erosion is minimized, flooding potential is reduced, and thermal impacts are reduced. In addition, it is designed to address the preservation of natural infiltration and the recharge of groundwater to ensure that subsurface flows are maintained for groundwater dependent natural resources such as lakes, streams, wetlands, plant communities, and drinking water supplies.

Other agencies enforcing volume control – For developments of one acre or more, the Minnesota Pollution Control Agency (MPCA), through the NPDES Phase II permitting program, has established a volume control standard of ½ inch of runoff from new impervious surfaces. For developments that are discharging to Special Waters (see the MPCA's Special Waters list) and warrant extra protection (e.g. the St. Croix River, trout streams, or Falls Creek) the permanent stormwater management system must be designed such that the pre- and post-project runoff rate and volume from the 1, and 2-year 24-hour precipitation events remains the same.

3. Groundwater Quality

The objective of this standard is to protect groundwater quality while promoting groundwater recharge. Many of the current stormwater management/water quality standards prohibit the use of volume control practices in certain applications (e.g. commercial, industrial, and institutional land uses) due to the potential for groundwater contamination. This rule would allow for controlled infiltration in these areas by using best management practices (BMPs) to pretreat the stormwater runoff before it is infiltrated.

Other agencies enforcing groundwater quality – The MPCA regulates stormwater quality from construction projects through the NPDES Stormwater Program. The permit application includes the following language regarding stormwater pretreatment requirements for an infiltration practice: “Infiltration must be used only as appropriate to the site and land uses. Settleable solids, floating materials, oils and grease should be removed from the runoff to the maximum extent practicable before runoff enters the infiltration/filtration system. Filtration systems must have a reasonable chance of achieving approximately 80 percent removal of total suspended solids. To prevent clogging of the infiltration or filtration system, a pretreatment device such as a vegetated filter strip, small sedimentation basin, or water quality inlet must be used to settle particulates before the storm water discharges to the infiltration or filtration system.”

4. Groundwater Dependent Natural Resources

The objective of this standard is to protect the unique and sensitive resources found in Washington County. While there is some overlap in this standard with the volume control and groundwater quality standards, it addresses groundwater protection by providing specific criteria for vegetative buffers, stormwater management, water quality, and wetland bounce and duration.

Other agencies enforcing groundwater dependent natural resources – There is no regulatory authority that provides for the comprehensive protection of groundwater dependent natural resources. The NPDES Stormwater Program administered by MPCA has additional BMP requirements for calcareous fens, trout streams, and wetlands. The Wetland Conservation Act (WCA) provides for the protection of wetlands. However, there are many other groundwater dependent natural resources that currently are not being protected.

Presentation to the Water Consortium

In March, August, and September of 2004, the Water Consortium meeting discussed the proposed groundwater rules. Following each presentation, there was a question and answer session in which Consortium members were given the opportunity to comment on the content of the proposed standards.

A copy of the minutes from the March, August, and September 2004 Water Consortium meetings, as well as a response to the comments presented at the August Water Consortium meeting, is provided in Appendix B.

Technical Review Process

Upon completing the draft model groundwater standards, the County held a technical review meeting. This meeting took place on November 9th, 2004. The main objective of this meeting was to gauge the interest of the WD/WMOs to adopt standards that will enable them to regulate groundwater protection. In addition to WD/WMO managers, administrators and staff, and County staff, the following agencies were asked to send representatives to participate in the discussion: Minnesota Department of Natural Resources, Minnesota Department of Health, and the Minnesota Board of Water and Soil Resources.

At this meeting it was concluded that the technical review process should be an on-going activity of the Water Consortium in 2005. The framework for this review process has not been established at this point in time.

Recommendations and Next Steps

One of the main concerns expressed by members of the Water Consortium is that a Statement of Need and Reasonableness (SONAR) will need to be established for the proposed groundwater standards. While this is not a requirement for WD/WMOs (as they are not governed by Minnesota Rule Chapter 14) it is recommended for the following reasons:

1. It provides the public with a clear narrative of the proposed rule prior to adopting and enforcing the standard.
2. It explains the rationale for developing the standards and provides the public with an opportunity to comment on the standard.
3. It provides the WD/WMOs with the supporting documentation that may be required in the event of a legal challenge to the standard.

As a result, it is recommended that the WD/WMOs pool their resources and develop a single SONAR through the Water Consortium. This SONAR would provide the basis for the proposed groundwater rules and could be modified by an individual WD/WMO prior to rule adoption. This would result in a cost savings to each individual WD/WMO.

Appendix A – Washington County Groundwater Plan 2005 Work Plan

This section includes excerpts from the Groundwater Plan 2005 Work Plan. The model groundwater rules are important in the implementation of the policies and objectives of the Groundwater Plan. The portions of the policies that are addressed by the proposed groundwater rules are underlined.

Chapter 2.0 Non-Agricultural Land Use Goals:

Policy 1 **Washington County supports basing planning, zoning and land use decisions on sound scientific data and understanding.**

Implementation Action 1 Research land use impacts on groundwater quality and quantity

Objective 2 Develop guidelines on building density, percentage of impervious surfaces, stormwater management and groundwater consumption based on hydrogeologic characteristics.

Method 5 Development of model groundwater rules and standards.

Policy 2 **Washington County supports sharing technical information with local units of government for developing land use plans and zoning ordinances, and in making land use decisions protective of groundwater.**

Implementation Action 1 Land use-technical consultation for land use decisions.

Objective 2 Provide cities and townships with specific groundwater-related standards to look for in reviewing and making decisions for conditional use permits.

Method 3 Development of model groundwater rules and standards.

Policy 3 **Washington County promotes local planning, land use and controls that protect groundwater quality and sustainability.**

Implementation Action 2 Land-use integrating groundwater protection into comprehensive plans, zoning ordinances and decisions.

Objective 1 Establish groundwater protection as a goal when making land use decisions and as part of the comprehensive planning process.

Incorporate groundwater plan recommendations into LGU comprehensive plans.

Method 1 Development of model groundwater rules and standards.

Chapter 3.0 Agriculture, Turf and Animal Waste Management Goals:

Policy 1 Washington County supports using sound scientific methods to assess agriculture and turf management impacts to groundwater resources and to develop education and best management practices programs.

Implementation Action 1 Research groundwater impacts from agriculture, turf management and animal wastes.

Objective 2 Provide model zoning language and mitigation strategies in areas shown to have the highest impacts or susceptibility to fertilizers, pesticides or animal wastes.

Method 3 Development of model groundwater rules and standards.

Chapter 6.0 Groundwater Supply Goals:

Policy 1 Promote research and water supply planning to provide for sustainable water supplies and, to the extent possible, minimize the loss of flow to surface water features and groundwater dependent natural resources.

Implementation Action 1 Water supply assessment-research water supply sustainability and affects on natural resources.

Objective 2 Evaluations will be used for developing water management rules and policies, water supply plans, and to provide DNR with support in processing groundwater appropriation permits.

Method 3 Development of model groundwater rules and standards.

Policy 2 Supports local and State plans, policies and permitting programs that sustain groundwater supplies and related natural resources.

Implementation Action 2 Groundwater appropriations-rules protecting natural resources.

Objective 1 Develop and adopt rules or policies on the quantity of water used in areas where existing wells and/or groundwater dependent natural resources could be negatively impacted by overuse of groundwater. Negative impacts include reduced flow to surface water bodies, lowering of lake or wetland levels, or interference with other wells.

Method 2 Development of model groundwater rules and standards.

Chapter 7.0 Groundwater Surface Water Interaction Goals:

Policy 2 Supports inter-governmental coordination and cooperation in support of existing and/or in developing new groundwater, surface water and wetland rules, policies and programs.

Implementation Action 2 Groundwater-Surface Water Interaction Education

Objective 1 Provide education to citizens and public officials on the inter-relation of surface and groundwater quality and quantity: the value of and need to protect groundwater recharge areas and wetlands; and implementation of best management practices and low-impact development and redevelopment strategies to protect groundwater resources.

Method 1 Development of model groundwater rules and standards.

Policy 3 Supports the development and adoption of best management practices and rules to control rates and volumes of runoff to reduce non-point source pollution and maintain groundwater recharge.

Implementation Action 1 Develop runoff quality and volume control rules.

Objective 1 For all new developments and re-developments, adopt rules controlling stormwater runoff volume and establish performance standards based on issues identified in water resource plans, inventories or studies, and on available scientific literature.

Method 3 Development of model groundwater rules and standards.

Appendix B
Washington County Water Consortium Meeting Minutes
March 3, 2004

Incorporating Groundwater in Watershed District Rules
Stu Grubb and Camilla Correll, Emmons & Olivier Resources

Washington County Public Health & Environment (PHE) is contracting with Emmons & Olivier Resources (EOR) to develop standard language that will incorporate groundwater management into watershed district rules. In the spring of 2003, EOR worked with the Water Consortium and Washington County Administration to prepare a *Comparative Review of Watershed District Rules and Recommendations for Standardization*. EOR will develop model language for groundwater supply, groundwater pollution prevention, volume control/groundwater recharge protection, and groundwater dependent natural resources. Washington County PHE will facilitate a Technical Review Process where the water consortium, watershed districts, and watershed management organizations can review the standard language and provide comments. This project is a starting point in providing WD/WMOs the ability to incorporate and begin implementing the Washington County Groundwater Plan.

Washington County Water Consortium Meeting Minutes
August 4, 2004

Incorporating Groundwater in Watershed District Rules
Camilla Correll and Stu Grubb, Emmons & Olivier Resources

Washington County Department of Public Health & Environment contracted with EOR to develop standard language that Watershed Districts can use in developing rules for groundwater protection. (Please see attached presentation slides.) It is important to note that if watershed districts adopt these standard rules they could customize them to best serve the needs of their district. Two of the four rules were presented at the meeting and the other two rules will be presented in September.

Stu Grubb presented the standard language for groundwater appropriations. He discussed what type of wells would be considered for permits. Watershed districts can expect less than 5 per year for the entire County. The purpose is to manage water supplies to ensure quality and quantity of groundwater; especially in areas where groundwater dependent natural resources are located. The rule would apply to wells that pump between 1,000 to 10,000 gallons per day (or between 100,000 to 1,000,000 gallons per year). These would be considered 'mid-range wells'. There was some discussion on defining this term in the

Groundwater Plan. (Note: Page 29 of the 2004 Groundwater Plan Work Plan and page 84 of the Groundwater Plan lists the state statute that allows watershed districts to adopt a rule like this.)

Discussion included questions on how the watershed districts would assess impacts from the wells. Stu mentioned that for these mid-range wells there is a standard engineering calculation to determine drawdown. One foot of drawdown could be considered significant interference or location relative to a sensitive groundwater dependent natural resource could be considered interference. The one foot of drawdown is arbitrary so there was some discussion on justifying this value. DNR relies on an interference complaint to act. Stu suggested one way to justify the one foot interference would be the cost to pump the water higher vertically. That could be enough of a monetary impact to define interference. It was suggested that a standard method of calculating drawdown be included with the rules and that it be based on data from the north and south surface water/groundwater studies.

It was suggested that there be an understanding of what would happen if the permits were denied. Would there be alternatives to the well placement on the given property? Watershed districts could grant a variance to the rule and the rule does not apply to domestic wells that provide water for less than 25 people.

Camilla Correll presented the standard language for volume control. Some of the watershed districts already have rules and standards that address volume control but the suggestion is to adopt a uniform volume control standard so that it is consistent throughout the County. The standard language does not include design standards since it was outside the scope of this project. It was suggested that this could create inconsistencies but since there are so many tools that can be used EOR felt that it would restrict watershed districts. There are accepted design manuals that lay out management options and EOR will include these options in the rule language.

There was extensive discussion on the infiltration rate table and the fact that developers might assume the highest rate. It was suggested that they could make the developers do a detailed study to determine infiltration rates. The rates could vary dependent on soil. Rice Creek WD has gone through some exercises in determining infiltration rates.

It was also mentioned that before watershed districts could adopt the rules they would need to look at BWSR guidelines for rule development that BWSR and Smith-Parker developed. There is a recognition that the rules would need to go through a legal review.

There will be a technical review process of the rules by all of the watershed districts. If anyone did not receive a copy of the rules at the meeting or via email and is interested in reviewing the standard language please contact Amanda

Goebel at 651-430-6744. Camilla and Amanda will be presenting these standard rules, implementation of the groundwater plan, and water consortium issues to the Minnesota Association of Watershed Districts annual meeting in December. The watershed districts in Washington County are very proactive in implementation of the groundwater plan and the MAWD conference committee is interested in learning more about the activities in the County.

Washington County Water Consortium

Response to Comments from the August 4, 2004 Meeting

(*Every effort was made to include all questions and concerns from the meeting. Additional comments are encouraged and can be made to the County or EOR.)

Incorporating Groundwater in Watershed District Rules

Camilla Correll and Stu Grubb, Emmons & Olivier Resources

Groundwater Appropriations

Question: How does one evaluate the impacts of mid-size and single wells?

Response: *In practice, an experienced reviewer would first look on the groundwater dependent natural resource map (provided in the rules), determine whether the well is near a sensitive resource, and determine if it warrants further investigation. Well interference is calculated using standard engineering equations (e.g. Thiem equation). A more detailed description of how to evaluate well interference will be provided in the Management Section of the next draft of the proposed rules.*

Question: Could get into expensive dispute?

Response: *The state has a formal process for settling well interference disputes. This is the type of question that should be addressed in a legal evaluation of these proposed rules.*

Question: Does the Washington County Ground Water Management Plan (GWMP) define mid-size (mid capacity) wells? Would the Water Consortium have to define mid-size wells and therefore amend the plan? Is this something that should be added to the GWAC meeting agenda?

Response: *The GWMP does not define mid-size wells. It probably could be discussed at the GWAC meeting.*

Question: Can we develop a standard method of evaluation that could be applied County-wide? How did the one-foot criteria get into the proposed rules? Does the Department of Natural Resources (DNR) have a standard for determining groundwater appropriation impacts? How do wet and dry years impact this criterion?

Response: *A standard method of evaluation will be provided in the Management Section of the rules. However, no one or two simple methods can accurately assess every situation, so there must also be allowances for other, more sophisticated evaluation methods.*

The 1-foot criterion was proposed because it seemed significant and reasonable. Additional justification could be made by calculating the additional energy and cost associated with pumping water from a well an additional one vertical foot.

The proposed rule was written to prevent a single mid-sized well from being constructed and threatening nearby groundwater resources. Multiple wells would have a cumulative impact on groundwater resources. No studies have been conducted to determine what is an acceptable cumulative impact (sometimes called a sustainable yield) from aquifers on a county, watershed district, or township scale. A watershed district could complete a comprehensive plan for their groundwater resources that included a study of sustainable yields and then adopt rules stating that well construction must be compatible with the comprehensive groundwater plan.

Question: How does one determine the original/existing static water level so that a one-foot reduction can be determined? Is this one-foot within or outside of seasonal fluctuations?

Response: *The static water level and seasonal fluctuations have no bearing on this proposed rule. The drawdown of the well is “additive” to the static water level or other influences, such as seasonal fluctuations. This is known as the principle of superposition. For more discussion of groundwater and hydrology and superposition, refer to a general hydrogeology text (i.e. Bear, J., 1979. Hydraulics of Groundwater. McGraw-Hill. Page 150). If a new well is causing a one-foot interference, then the seasonal high water elevation will be one foot lower and the seasonal low water elevation will be one foot lower. The amplitude and frequency of the seasonal fluctuations will not change.*

Question: How does one evaluate incremental impacts (e.g. 5 homes with separate wells might have as much impact as 6 homes with one well)? This may create a first-in situation. What is the recourse if a watershed district says that an applicant can't put in a well? The watershed district needs to understand the implications.

Response: *Incremental impacts are evaluated using the same principles of superposition described above. The impact of each well is added to the impact of the other wells.*

Small wells were exempted from the proposed rule (and are excluded from state rules) to prevent an undue burden on individual homeowners and others with wells that are not likely to significantly impact groundwater resources. A legal evaluation of the proposed rules should provide guidance on how to prevent larger projects, such as a development, from being divided into several smaller projects just to meet the small well exemption.

In response to the creation of a first-in situation and how a watershed district should handle this type of situation, this type of question is outside the scope of the project and is something that the watershed districts should discuss in more detail. The watershed districts and the county may look to zoning ordinances for example language in the treatment of subdivision scenarios. Otherwise, this is the type of information that should be provided in a Statement of Need and Reasonableness.

Question: What is the impact of this proposed rule on the siting of septic systems? If a watershed district says that the applicant has to move a well to protect a resource, what is preventing the applicant from moving the septic system to the same location?

Response: *The Minnesota Department of Health and Washington County Public Health and Environment both have rules regarding septic system and well locations. We are not aware of specific examples where a septic system and well cannot be located on a property due to current or proposed regulations.*

Question: How does a watershed district define the functions and values of surface water bodies (specifically referring to the language in the standard which states that a *District may deny a permit if the function and values of a surface water body have been diminished by groundwater appropriations*)?

Response: *Function and value assessment guidelines exist for wetlands, which might be used as a framework or guideline. This definition will be further refined and included in the proposed rule on Groundwater-Dependent Natural Resources.*

Volume Control

Question: Why are design standards not included in the rules? Biggest problem for applicants is how to meet the rules – maybe we should provide this guidance (e.g. suitable basin slopes, drawdown times, etc.) in the rules to reduce the potential for inconsistencies between watershed districts.

Response: *Don't want to make it too prescriptive by including this type of guidance in the standard itself. Expecting that each watershed district or water management organization will develop this type of language in the Management section of the rules (currently says "Specify how the applicant should meet the*

rule”). A reference to local BMP Guidance Manuals will be provided in the next draft of the rules.

Question: Why do the rules provide a range of numbers for the Table *Recommended Infiltration Rates for the Design of Constructed Infiltration Practices*? The fear is that the developer/applicant will automatically use the highest infiltration rate in the range without demonstrating that the rate selected for design purposes reflect the site conditions.

Response: *The infiltration rate table will be changed so that there is one recommended infiltration rate for a given soil classification.*

Suggestion: Instead of assigning ranges of infiltration rates to each hydrologic soil group (A, B, C and D) split the soils into soil classification types (e.g. SM silty sands, silty gravelly sands) and assign an infiltration rate to each type based on laboratory or field evaluations (of infiltration rate).

Response: *The infiltration rate table will be changed so that there is one recommended infiltration rate for a given soil classification.*

Question: How does a volume control standard which requires mitigation for the 2-year 24-hour event for pre-settlement conditions impact the amount of developable land on a given site? Has the County evaluated the impact of this standard on a proposed development site?

Response: *Not specifically at this point. However, the Rice Creek Watershed District (RCWD) is in the process of going through a similar exercise in evaluating their proposed rules. The RCWD is developing a reference point for the 2-year 24-hour event. If the Water Consortium is interested in reviewing this information once it is developed, the RCWD would be happy to share this information.*

Question: How do the standards in the Table 1 *Summary of Infiltration Rate Standards* compare. Specifically, how does the RCWD’s standard of 0.34 inches in 72 hours compare to the 2-year 24-hour (2.8 inches) standard?

Response: *The RCWD’s current standard (0.34 inches in 72 hours) applies to all developments in the district regardless of the soil type and the amount of runoff generated under pre-development conditions. This rule states that a development site has to provide retention for the volume of runoff generated from 0.34 inches of rainfall and that the BMP designed to mitigate for this runoff has to infiltrate it within 72 hours.*

The proposed standard states that a development site has to match the pre-settlement runoff volume for the 2-year 24-hour rainfall event which corresponds to 2.8 inches of rainfall. This standard takes existing land use and soils into

account by allowing for the pre- and post-development comparison. If a site is located on hydrologic soil group A soils (very permeable material) there will be little runoff generated under pre-settlement conditions. The applicant will be required to provide storage and retention to infiltrate the volume of runoff generated for the 2-year event (which should be feasible given the permeable nature of the soils). This volume may exceed the RCWD's current standard of 0.34 inches. However, if the site is located on hydrologic soil group D soils (very low permeability) the amount of runoff generated for the 2-year event may be close to what is generated under pre-settlement conditions. As a result, the applicant won't have to provide a lot of retention for infiltration and in this case the standard may be less than the RCWD's current standard.

Suggestion: The Water Consortium needs to take a look at the WD Rule Development Guidelines developed by BWSR and Smith Parker. These proposed rules will have to go through some form of legal review (e.g. develop a Statement of Need and Reasonableness (SONAR) so the County should lay out a process for this next step.

Response: *At this point the County is interested in getting feedback and consensus from the water consortium on the content of the rule language. The County has outlined a draft process but seeks input from the watershed districts in the rule development process and in setting up a time frame for rule approval. The County will internally review the standard language with the County Board of Commissioners and Departments of Administration, Attorneys, Land Management, and Transportation. Another step of this review process will be to perform a legal review of the rules to make sure that the rules have the content required to stand up in court.*

Question: Who else has adopted a volume control standard using pre-settlement conditions as a benchmark? How successful has this been?

Response: *Other volume control standards have been adopted that use pre-settlement rates as a benchmark for stormwater control. Scott County, in their Zoning Ordinance No. 3 (2001), requires that the 2-year, 10-year, and 100-year storm peak discharge rates do not exceed pre-settlement conditions. Under conditions of no runoff under pre-settlement conditions, which occurs in regions with A soils, this ordinance indirectly requires that the pre-settlement peak volume not be exceeded as well. Outagamie County, in north-eastern Wisconsin, has adopted a similar ordinance.*

Other units of government are currently considering similar approaches to stormwater management. The Scott WMO is considering a stormwater management rule that would require peak runoff rates to not exceed pre-settlement conditions. The draft Water Resources Management Plan of the Lower St. Croix WMO requires runoff volumes to not exceed pre-settlement conditions for the 2-year event. This resulted from the St. Croix Basin Nutrient

Management Goal of a 20% reduction in existing nutrient loads. Since nutrient loads had to be decreased to this level, the approach of setting a goal that is more restrictive than pre-development conditions was extended to stormwater volume.

Question: Why shouldn't these rules apply to any development site irregardless of the land-use? Suggest that they apply to sites meeting an impervious threshold.

Response: *This is a good suggestion which might make the rules easier to use/read. This is a matter of preference and can be changed if the watershed districts or the county want to change the applicability criteria. The reason EOR chose these applicability standards was to prevent certain land-uses from slipping through the loop. For example, a golf course (which has the potential to significantly impact water resources) may not trigger an impervious threshold and therefore not be required to meet the Districts rules.*

Comment: One of the implementation strategies of the County Groundwater Management Plan was to develop model rules for watershed districts to adopt. Everyone agrees that groundwater is a significant resource that merits protection. Watershed Districts have never tried to enforce the protection of groundwater resources. The implementation of these rules may require a case-by-case evaluation but watershed districts need to put these rules in place and see where the conflicts arise.

Washington County Water Consortium Meeting Minutes September 1, 2004

Incorporating Groundwater in Watershed District Rules

Camilla Correll and Tony DeMars, Emmons & Olivier Resources

Washington County Department of Public Health & Environment contracted with EOR to develop standard language that Watershed Districts can use in developing rules for groundwater protection. (Please see attached presentation slides.) It is important to note that if watershed districts adopt these standard rules they could customize them to best serve the needs of their district. Two of the four rules were presented at the meeting and the other two rules were presented at the August meeting.

Tony DeMars presented the standard language for Groundwater Dependent Natural Resources. This rule can be used as a tool in Watershed Districts that are looking to provide protection of groundwater dependent resources. The north and south surface water/groundwater interaction studies will provide useful information to the Watershed Districts in the protection of these resources

through the rules. The rule provides standards for streams, creeks, lakes, wetlands, etc.

Camilla Correll presented the standard language for groundwater quality which consists of two standards. The first standard involves land-altering activity and direct discharges of stormwater runoff to volume control (infiltration) practices. This uses the protection zones identified in the north surface water/groundwater interaction study. These zones will also be identified in the south surface water/groundwater interaction study. The second standard involves discharge of regulated substances to an infiltration practice that may have harmful effects on groundwater. When the watershed district reviews permits they could use this rule to ensure that the facilities that handle these wastes will adhere to the regulated standards.

A comment to the rule was an example of deteriorating underground storage tanks. The Pollution Control Agency regulates underground storage tanks but it would be nice if the watershed districts had an inventory of these tanks in case a problem arises.

Camilla prepared responses to the comments made at the August Consortium meeting and those were distributed at the meeting. Amanda Goebel handed out a timeline of the process that the County will go through to solicit comments on the proposed language. There will be an internal review of the proposed rules by the Washington County Departments of Administration, Attorneys, and Transportation and Physical Development. There will also be a technical review process of the rules by all of the watershed districts. If anyone did not receive a copy of the rules at the meeting or via email and is interested in reviewing the standard language please contact Amanda at 651-430-6744.

Appendix C Groundwater Appropriations

Purpose and Policy

Annotation: These policy statements have been taken directly from the Washington County Groundwater Plan (2003-2013). The adoption of these policies by the watershed districts or water management organizations is in line with what many of the watershed districts currently reflect in their Watershed Management Plans. For example, the BCWD, CMWD, SWWD and RWMWD Watershed Management Plans currently contain language that supports following the recommendations of the County Groundwater Plan.

It is the policy of the District or WMO:

1. To manage a sustainable water supply ensuring ample, high quality groundwater availability for residential, commercial, and natural resource needs.
2. To restrict large volume pumping of aquifers in regions where overuse of groundwater will negatively impact natural resources or interfere with current well use.
3. To develop and adopt rules or policies on the quantity of water used in areas where existing wells and/or groundwater dependent natural resources could be negatively impacted by overuse of groundwater. Negative impacts include reduced flow to surface water bodies, lowering of lake or wetland levels, or interference with other wells.

Applicability

Annotation: Currently the Department of Natural Resources (DNR) issues water use permits for groundwater appropriations withdrawing more than 10,000 gallons of water per day or 1 million gallons per year (as indicated in Minnesota Statutes 103G.271 and Minnesota Rules 6115). One of the requirements that the DNR must comply with as part of the permitting process is to solicit comments from the watershed districts, water management organizations and the counties.

In addition to water use permits, the DNR may also issue a general permit which covers activities such as animal feedlots, livestock operations, and temporary construction dewatering.

This rule has been developed to address those groundwater appropriations that are not currently being regulated by the DNR. The types of activities that this rule may apply to include: wells for commercial buildings and multiple residences in areas not served by municipal water supplies and construction dewatering.

Subject to an exception, the requirements of this section apply to groundwater appropriations or excavations that extend below the water table that meet the following conditions:

1. Water is pumped at rates greater than 1,000 gallons per day or 100,000 gallons per year, and
2. A DNR permit is not required because pumping is less than DNR permit limits (10,000 gallons per day or 1,000,000 gallons per year) or because the activity is covered under a general permit.

Standards

Annotation: The term “surface water body” used in the following standard may be defined as “a watercourse or waterbody including lakes, wetlands, trout streams, spring creeks, fens and other groundwater dependent natural resources as defined in the Groundwater Dependent Natural Resources Rule”.

Groundwater appropriations must not cause any of the following conditions:

1. Reduction of the static water level in another existing well of greater than 1 foot.
2. Reduction of groundwater discharging to a surface water body greater than 1 percent of the total groundwater discharge to the surface water body.

The District may also consider the incremental, cumulative impact of groundwater appropriations on a surface water body. The District may deny a permit if the following conditions exist:

1. The function and values of a surface water body have been diminished by groundwater appropriations, and
2. The proposed appropriation will further diminish the function and values of the surface water body.

Management

According to the County Well Index, a database of well logs maintained by the Minnesota Geological Survey, approximately two (2) to three (3) wells meeting the above criteria are installed in Washington County each year.

Currently, well owners are responsible for obtaining permits and submitting annual reports to the DNR and the Department of Health. Well contractors typically file permit applications on behalf of the well owner. Licensed well contractors who disregard or do not inform well owners about permit requirements may be subject to disciplinary action (Minnesota Rules 4725.1500).

Watershed Districts and Watershed Management Organizations can promote compliance with this rule by informing the Minnesota Department of Health, the Department of Natural Resources, and industry trade groups (i.e. the Minnesota Water Well Association) about this rule. These organizations are involved with providing continuing education opportunities for licensed well contractors.

Required Exhibits

The following items shall accompany all permit applications submitted to the District:

- (a) Proposed well construction diagram, including:
 - Well depth and diameter
 - Anticipated stratigraphy
 - Location and surface elevation
 - Depth and length of the well screen or open borehole
- (b) If excavating, a diagram showing the location depth and extent of the excavation;
- (c) Estimated pumping rate;
- (d) Diagram showing all surface water features within 1,000 feet or the nearest surface water feature such as a wetland, spring, stream, or lake.

The permittee must submit the following information to the Watershed District or Watershed Management Organization annually:

- (a) Actual pumping rate from the well or excavation;

(b) Changes to the information submitted with the original permit.

Exceptions/Exclusions

1. This rule does not apply to domestic wells that provide water supply for domestic use by less than 25 persons.
2. Variance - The District may grant a variance to any requirement of this rule.

References

Comparative Review of Watershed District Rules and Recommendations for Standardization. Washington County Water Consortium. 2003.

Washington County Groundwater Plan 2003-2013. Washington County, Minnesota.

Minnesota Rules 4725 Department of Health – Wells and Borings. 10/30/03.

Minnesota Rules 6115 Department of Natural Resources – Public Water Resources. 9/29/03.

Minnesota Statutes 103G Waters of the State. 2003.

Volume Control Standard

Annotation: While this volume control standard is being presented on its own as part of the County's efforts to develop common county-wide standards for water management, it should be one component of a comprehensive stormwater management rule. A watershed district or water management organization's stormwater management rule should be written to address the following issues: rate, volume, water quality, wetland bounce and duration, and thermal impacts to downstream waterbodies.

Purpose and Policy

It is the policy of the District or WMO to:

1. Assure that property owners control the rate and volume of stormwater runoff originating from their property so that surface water and groundwater quantity and quality is protected, soil erosion is minimized, flooding potential is reduced and thermal impacts are reduced.
2. Preserve natural infiltration and the recharge of groundwater and to maintain subsurface flows which maintain groundwater dependent resources including lakes, streams, wetlands, plant communities and drinking water supplies.

Applicability

Subject to an exception, the requirements of this section apply to:

3. Residential subdivision or development of four or more lots;
4. Non-residential development, including commercial, industrial and institutional development creating impervious surface that, in the aggregate, exceeds one acre or five percent of a site, whichever is least;
5. Redevelopment on a site of five acres or more, where pervious surface is disturbed and final impervious surface, in the aggregate, exceeds one acre or five percent of the site, whichever is least;
6. The creation of 5,000 square feet or more of additional impervious surface appurtenant to existing non-residential development;
7. The creation of road, bikeway, sidewalk or other linear impervious surface of one acre or more;
8. Any development activity taking place in a landlocked basin that does not have an approved subwatershed plan.

Standards

Annotation: A number of watershed districts and counties in the Metropolitan Area, as well as other states, have adopted volume control standards to regulate stormwater runoff. Table 2 summarizes the results of a preliminary review conducted to identify the types of standards being enforced today. As this table indicates, there is a significant amount of variability in how the standards are applied:

- *some of the standards refer to a 24-hour rainfall event (e.g. 1.5-year, 2-year, 10-year, “less than the 2-year” and/or “less than the 1-year”);*
- *some of the standards refer to a rainfall depth (e.g. 0.34 inches, 0.5 inches, and 0.75 inches); and*
- *some of the standards apply to volume of runoff generated on the impervious portions of the site while the others apply to the volume of runoff generated on the entire site.*

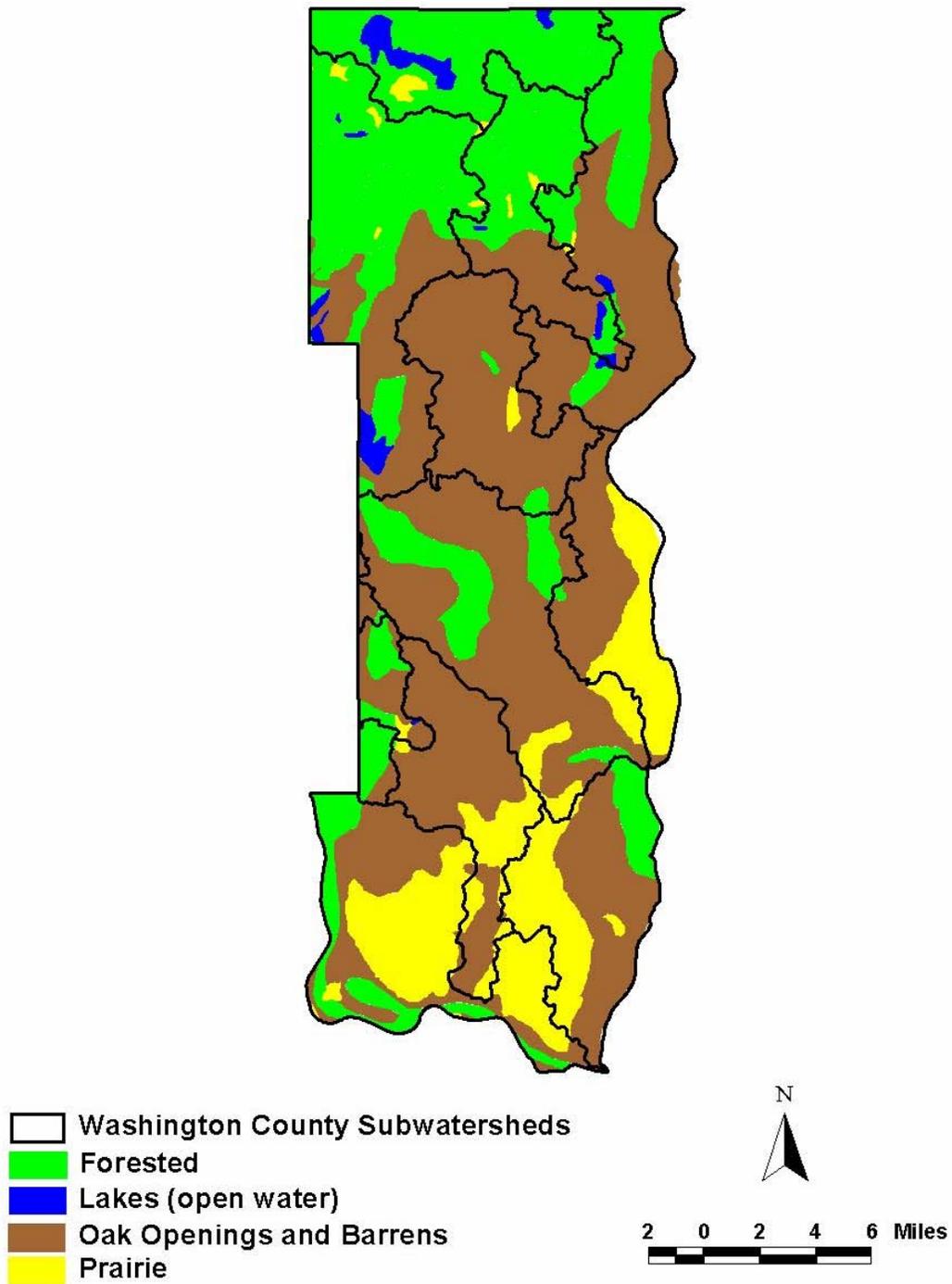
In order to meet the objectives of the Water Governance Study, it is recommended that the watershed districts and water management organizations located in Washington County (1) adopt a uniform standard for volume control or (2) adopt a modified volume control standard that applies the same general principles. The point has been made that each WD or WMO is unique and has its own set of issues that may make the application of a uniform standard difficult. However, if the same methods are used to apply the standard, they will be easier for the public to comply with.

It is recommended that the watershed districts and watershed management organizations in Washington County consider adopting the following volume control standard to provide uniformity in the regulatory process:

1. The proposed land-altering activity will not increase the stormwater runoff volume from the site, under pre-settlement conditions, for anything less than a 24-hour precipitation event with a return frequency of 2-years (equivalent to 2.8 inches). Pre-settlement conditions shall assume “good hydrologic conditions” for appropriate land covers as identified in TR-55 or an equivalent methodology. The meaning of “hydrologic Soil group” and “runoff curve number” are as determined in TR-55. Pre-settlement conditions for Washington County are based on the pre-settlement vegetation survey performed by Marschner (1974).

Table 1. Minimum Pre-Settlement Runoff Curve Numbers for Areas in Washington County (Source: Marschner, 1974).				
Hydrologic Soil Group	A	B	C	D
Runoff Curve Number for Forested Communities	30	55	70	77
Runoff Curve Number for Oak Opening and Barrens Communities	30	57	70	77
Runoff Curve Number for Prairie Communities	30	58	71	78

Figure 1. Pre-Settlement Vegetation Communities for Washington County (Marschner, 1974).



Annotation: A review of the literature indicates that there is a substantial difference in the infiltration rates being recommended for design purposes. Table 2 summarizes the results of this literature review. As this table indicates, most of the design manuals published in the eighties and nineties referenced the same study results developed by Rawls, Brakensiek and Saxton (1982). Many of the design manuals published after 2000 recommend using much lower infiltration rates which is likely due to the availability of infiltration rate data collected in the field.

Using the information presented in Table 2 as well as field data collected in Washington County the following infiltration rates are recommended for incorporation in this volume control standard:

2. In evaluating the infiltration capacity of a constructed BMP under post-development conditions the infiltration rates in the following table shall be used. These rates do not apply to depressions left in their natural state. Using the appropriate hydrologic soil group, multiply the recommended infiltration rate by two (2) to evaluate the infiltration capacity of the area under post-development conditions.

Hydrologic Soil Group	Infiltration Rate [inches/hour]	Soil Textures	Corresponding Unified Soil Classification
A	0.5 - 0.3	Sand, loamy sand or sandy loam	GW - Well-graded gravels, sandy gravels GP - Gap-graded or uniform gravels, sandy gravels GM - Silty gravels, silty sandy gravels SW - Well-graded, gravelly sands SP - Gap-graded or uniform sands, gravelly sands
B	0.3 - 0.15	Silt loam or loam	SM - Silty sands, silty gravelly sands MH - Micaceous silts, diatomaceous silts, volcanic ash
C*	0.15 - 0.03	Sandy clay loam	ML - Silts, very fine sands, silty or clayey fine sands
D	< 0.03	Clay loam, silty clay loam, sandy clay, silty clay or clay	GC - Clayey gravels, clayey sandy gravels SC - Clayey sands, clayey gravelly sands CL - Low plasticity clays, sandy or silty clays OL - Organic silts and clays of low plasticity CH - Highly plastic clays and sandy clays OH - Organic silts and clays of high plasticity

3. All infiltration practices designed to meet the volume control standard must provide pretreatment of stormwater runoff prior to infiltrating into the groundwater system as specified in the Groundwater Quality Rule.

Management

Specify how the applicant should meet the rule (outside the scope of this project).

Required Exhibits

The following items, submitted in duplicate and certified by a professional engineer registered in the State of Minnesota, registered land surveyors, or other appropriate professional, shall accompany all permit applications submitted to the Watershed:

- (a) Property lines and delineation of lands under ownership of the applicant;
- (b) Topography showing existing and proposed conditions and pre-development and post-development subwatersheds, including areas necessary to determine downstream analysis for the proposed stormwater management facilities;
- (c) Existing and proposed stormwater facilities' location(s), alignment and elevation;
- (d) Delineation and elevation of the OHWL of each public water on site and corresponding buffers (if applicable);
- (e) Delineation of the existing and proposed 100-year water elevations on-site;
- (f) Stormwater runoff volume and rate analysis for the 2 and the 100 year critical events under existing and proposed conditions;
- (g) All hydrologic, hydraulic and water quality computations completed to design the proposed stormwater management facilities;
- (h) Geotechnical investigations including soil maps, borings, site-specific recommendations, and any additional information necessary for the proposed stormwater management design;

- (i) Delineation of any flowage and drainage easements and other property interests dedicated to stormwater management purposes, including, but not limited to, county or judicial ditches;
- (j) All necessary construction specifications;
- (k) A sequence of construction;
- (l) A maintenance schedule for the stormwater management facilities.

Stormwater Management Easements

1. Stormwater management easements shall be provided by the applicant for (1) access for facility inspections and maintenance and (2) preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities, including the overflow route.
2. A maintenance agreement and stormwater management easement shall be recorded with the County prior to issuance of a permit.

Exceptions/Exclusions

1. Infeasibility of On-Site Infiltration - If the Watershed finds that site design practices and on-site infiltration, applied to the extent feasible, do not suffice to maintain stormwater flow volume off-site at the level specified, the applicant will be excepted from strict compliance with this portion of the rule. The use of site design practices, on-site infiltration and off-site infiltration shall be required to the extent feasible to reduce flow volume to the level specified in this rule before discharge into a receiving water.
2. Variance - The District may grant a variance to any requirement of this rule.
3. Regional Treatment - Management of site stormwater in a regional facility constitutes compliance with this rule in any of the following circumstances:
 - (a) Management is pursuant to and in accordance with a local water management plan approved by the District.
 - (b) An applicant has demonstrated infeasibility of on-site and off-site infiltration and the District, in writing, finds that the proposed

method of management would meet the District's overall stormwater management goals.

4. Basin Outlet – This rule does not apply to a capital project in a watershed management plan or approved local water management plan intended to create an outlet for a landlocked basin.

References

Wisconsin Administrative Code NR.151.002 Runoff Management (Register, September, 2002, No.561)

Legislative Fact Sheet – Karst Workgroup Recommendations. Minnesota Pollution Control Agency. January 17, 2001.

Groundwater Quality

Annotation: Many of the current stormwater management/water quality standards prohibit the use of volume control practices in certain land uses (e.g. commercial, industrial and institutional land uses) due to the potential for groundwater contamination. This type of policy could have a significant impact on the amount of groundwater recharge taking place within a watershed given each municipalities land use plan and the location of these areas in relation to specific groundwater management areas. A number of studies have been published indicating that most of the pollutants associated with stormwater runoff are removed as water is infiltrated through the soil column. This rule would allow for controlled infiltration in these areas by using BMPs to pretreat the stormwater runoff before it is infiltrated. The ultimate goal of this model rule is to protect groundwater quality while promoting groundwater recharge.

Purpose and Policy

Annotation: A number of the watershed districts and water management organizations in Washington County have identified protection or improvement of groundwater quality as a priority by addressing this topic in their rules and/or watershed management plan. For example, the BCWD addresses groundwater quality in their rules while the SWWD, RWMWD and RCWD address this issue in their plans.

It is the policy of the District or WMO to:

1. Manage land-use activities to minimize adverse impacts to groundwater quality.
2. Require management of stormwater flow to limit sediment, nutrient and metals conveyed to the groundwater system.

Applicability

Subject to an exception, the requirements of this section apply to:

1. Residential subdivision or development of four or more lots;
2. Non-residential development, including commercial, industrial and institutional development creating impervious surface that, in the aggregate, exceeds one acre or five percent of a site, whichever is least;
3. Redevelopment on a site of five acres or more, where pervious surface is disturbed and final impervious surface, in the aggregate, exceeds one acre or five percent of the site, whichever is least;
4. The creation of 5,000 square feet or more of additional impervious surface appurtenant to existing non-residential development;

5. The creation of road, bikeway, sidewalk or other linear impervious surface of one acre or more;
6. Handling, movement, and storage of hazardous waste, petroleum products and regulated substances.

Standards

Annotation: The County has been broken down into management zones to classify similar landscapes and landforms that require varying degrees of management for protection of aquifers and groundwater dependent resources. The infiltration potential, key recharge and discharge areas, and surficial geology were all used to generate the management zones. The study area was differentiated geographically into three management zones - 1, 2, and 3. Zone 1 requires the highest level of management and zone 3 requires the lowest. Figure 1 illustrates the management zones for the Northern portion of the County.

Zone 1: Critical Groundwater Quality Impact Zone - Zone 1 is primarily high quality discharge and recharge areas with high infiltration potential. This zone characteristically has very rapid infiltration and poor soil treatment capacity. Typically these areas are outwash plains or terrace deposits where sand and gravel comprise the primary geologic material.

Zone 2: Groundwater Quality Impact Zone - Zone 2 is primarily recharge areas with medium infiltration potential. Typically these areas have more clay and silt as part of a glacial till formation or a remnant lake bed.

Zone 3: General Groundwater Quality Protection Zone - Zone 3 is primarily areas with low infiltration potential. This final area generally covers the upland glacial till portions that do not rapidly infiltrate, but still infiltrate and recharge to the groundwater system.

Sources of information the applicant can use to identify karst features or groundwater dependent natural resources: karst feature database and map of groundwater dependent natural resources. Each watershed district could have this information in one central location (e.g. on the County's web-site or on the watershed district's web-site) for the applicant to access.

An applicant for a permit must demonstrate to the District or WMO that the proposed land-altering activity will not:

1. Result in direct discharges of stormwater runoff to volume control (infiltration) practices.
 - a. If the site is located in Groundwater Protection Zone 1 it is required to provide pretreatment at the Level II Stormwater Management

Pretreatment Standard before stormwater is discharged to an infiltration practice.

- b. If the site is located in Groundwater Protection Zone 2 it is required to provide pretreatment at the Level III Stormwater Management Pretreatment Standard before stormwater is discharged to an infiltration practice.
 - c. If the site is located in Groundwater Protection Zone 3 it is required to provide pretreatment at the Level IV Stormwater Management Pretreatment Standard before stormwater is discharged to an infiltration practice.
 - d. If the site is located within a wellhead protection zone, within 200 feet of a public water system well it is required to provide pretreatment at the Level I Stormwater Management Pretreatment Standard before stormwater is discharged to an infiltration practice.
 - e. If the site is located within 300 feet of a karst feature or a highly sensitive groundwater dependent natural resources it is required to provide pretreatment at the Level I Stormwater Management Pretreatment Standard before stormwater is discharged to an infiltration practice.
2. Result in the discharge of any regulated substance, hazardous or biological waste, or petroleum product, whether treated or untreated, to an infiltration practice that may have a deleterious effect upon the groundwater, unless the discharge is in compliance with Federal, State and local regulations.

Management

Annotation: It will be up to the individual water management organization to define “facilities” as it is presented in bullet item 2. The following list identifies many of the potential facilities that this rule may be designed to regulate for pretreatment standards and insuring appropriate spill prevention procedures:

- *Automobile body/repair shop*
- *Gas station*
- *Fleet/trucking/bus terminal*
- *Dry cleaner*
- *Electrical/electronic manufacturing facility*
- *Machine shop*
- *Metal plating/finishing/fabricating facility*

- *Chemical processing/storage facility*
- *Fertilizer manufacturing/large-scale storage*
- *Wood preserving/treating facility*
- *Junk/scrap/salvage yard*
- *Equipment maintenance/fueling areas*
- *Uncovered storage of de-icing salt and salt/sand mix areas or loading areas*

1. Sequence of Management Methods. To meet the stormwater pretreatment standard, the following pretreatment methods shall be used given the requisite level of pretreatment:

Level of Pretreatment	Type of Pretreatment	Sequence of Pretreatment Methods*
Level I	Biological and Physical	<i>Physical Methods include:</i> Sand Filter or Oil Grit Separator or Sediment Forebay
		<i>Biological Methods include:</i> 50 foot Filter Strip or 50 foot vegetated swale + two (2) to three (3) feet of soil amendment
Level II	Biological and Physical	<i>Physical Methods include:</i> Sand Filter or Oil Grit Separator or Sediment Forebay
		<i>Biological Methods include:</i> 50 foot Filter Strip or 50 foot vegetated swale
Level III	Biological and Physical	<i>Physical Methods include:</i> Sand Filter or Oil Grit Separator or Sediment Forebay
		<i>Biological Methods include:</i> 25 foot Filter Strip or 25 foot vegetated swale
Level IV	Physical only	<i>Physical Methods include:</i> Sand Filter or Oil Grit Separator or Sediment Forebay

* The lengths of physical pretreatment requirements apply to the minimum cases under the Applicability section of this rule. Larger developments may be required to provide additional pretreatment depending upon the size of the infiltration practices designed for the stormwater management plan.

2. Facilities that handle any regulated substance, hazardous or biological waste, or petroleum product, whether treated or untreated, shall adhere to the following handling and management methods to meet the regulated substance standard:
 - Perform all operations on impervious surfaces and in conformance with any applicable federal spill prevention requirements and local fire code requirements.
 - Develop a spill prevention plan in conformance with any applicable federal spill prevention requirements and local fire code requirements.
 - Establish and implement plans and procedures to prevent spills and other accidental releases of materials that may contaminate stormwater.
 - Establish and implement plans and procedures for immediate containment and other appropriate action regarding spills and other accidental releases to prevent contamination of stormwater.
 - Provide a minimum of 100 feet between the infiltration practice and the materials handling area to prevent the direct discharge of any regulated substance, hazardous or biological waste, or petroleum product to the infiltration practice in the event of a spill.

Required Exhibits

1. Spill Prevention Plan, if applicable, including the location and detailed design of any spill and leak collection systems designed for the purpose of containing accidentally released hazardous or toxic materials.
2. Construction plans and specifications of all proposed facilities.
3. All hydrologic, water quality and hydraulic computations completed to design the proposed facilities.
4. An operation and maintenance plan for all pretreatment facilities.

Exceptions/Exclusions

1. The following substances are not subject to the provisions of this Rule provided these substances are handled, stored, and disposed of in a manner that does not result in an unauthorized release or cause contamination of groundwater:

- Regulated substances stored at residences that do not exceed ten (10) pounds (dry) or five (5) gallons (liquid) and are used for personal, family, or household purposes;
- Fertilizers, pesticides, herbicides, erosion control products, and soil amendment, in quantities normally available at retail outlets, when stored, handled and applied in accordance with the manufacturer's instructions, label directions, and nationally recognized standards;
- Commercial products limited to use at a commercial or industrial site solely for office or janitorial purposes when stored in quantities of less than fifty (50) pounds for dry products, or fifty five (55) gallons for liquids;
- Prepackaged consumer products available through retail sale to individuals for personal, family, or household use, that are properly stored;
- Water-based latex paint, or oil-based finishes, in quantities normally available at retail outlets, when stored, handled and applied in accordance with the manufacturer's instructions, label directions, and nationally recognized standards;
- Compressed gases;
- Substances or mixtures which may pose a hazard but are labeled pursuant to the Federal Food, Drug and Cosmetic Act;
- The transportation of any regulated substance(s), hazardous waste or petroleum products through any Groundwater Quality Impact Zone shall be allowed provided that the transporting vehicle is in continuous transit.

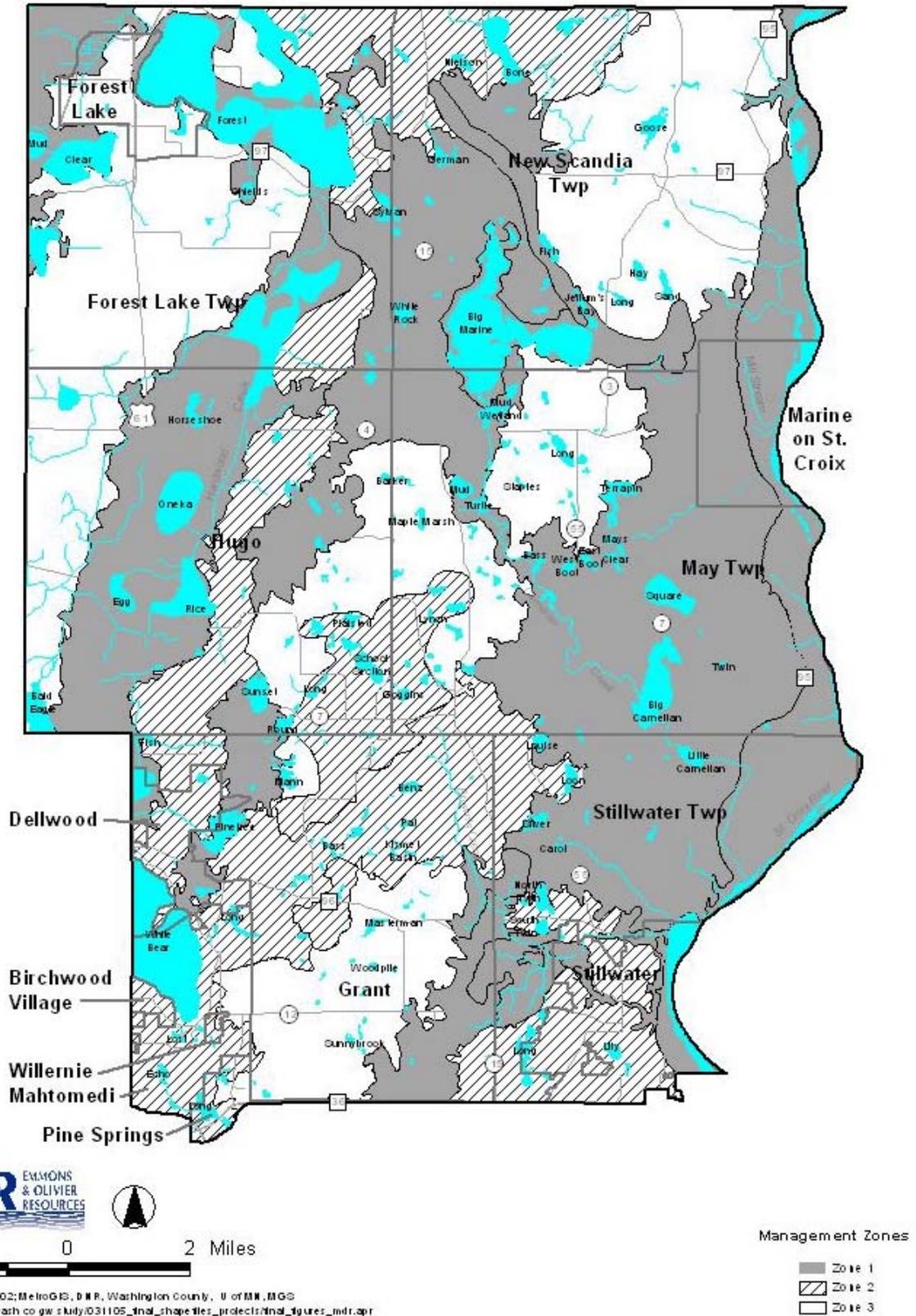
References

Emmons and Olivier Resources, Inc. 2003. Integrating Groundwater and Surface Water Management – Northern Washington County. Prepared for Washington County Department of Public Health and Environment.

Minnesota Pollution Control Agency. 2001. Legislative Fact Sheet: Karst Workgroup Recommendations. January 17, 2001.

Washington County. 2003. Washington County Groundwater Plan. Washington County Department of Public Health and Environment and Washington County Groundwater Advisory Committee.

Figure 1. Management Zones



Groundwater Dependent Natural Resources

Definition – Groundwater dependent natural resources occur where groundwater discharges to the surface in the form of springs or seeps and support plant communities and/or aquatic ecosystems that are reliant upon groundwater to maintain their structure, function and diversity. Groundwater dependent natural resources may be sustained from local, regional, or a combination of local and regional groundwater sources. Examples of groundwater dependent natural resources in northern Washington County are identified on the attached figure and include:

- Cold water trout stream;
- Spring creek;
- Groundwater dependent lake;
- White cedar swamp;
- Black spruce swamp;
- Mixed hardwood swamp;
- Tamarack swamp;
- Shrub swamp;
- Alder swamp;
- Wet prairie;
- Wet-brush prairie, seepage subtype;
- Black ash swamp;
- Rich fen;
- Poor fen;
- Calcareous seepage fen;
- Wet meadow;
- Seepage meadow;
- Talus slope; and
- Moist / moderate slope

This figure will be expanded to include the southern portion of Washington County when the current study is complete.

Purpose and Policy

Annotation: A number of the watershed districts and water management organizations in Washington County have already identified the protection of groundwater dependent natural resources as a high priority. For example, the MWMO is in the process of incorporating specific language into their Water Management Plan and the SWWD and the CMWD have incorporated general language addressing this issue in their rules.

It is the policy of the District or WMO to:

1. Provide a high level of protection for groundwater systems by maintaining natural patterns of recharge and not disrupting groundwater levels that are critical for ecosystems (e.g. lakes, wetlands, streams, spring creeks, fens, aquifers and plant communities).
2. Carefully evaluate the potential impacts of public or private infrastructure (including private and municipal groundwater appropriations and interference of flows on groundwater recharge, transmission and discharge);
3. Avoid the use of groundwater dependent resources to pretreat, store or convey stormwater;
4. Promote groundwater/surface water management practices that protect the hydrologic functions of groundwater dependent resources;
5. Limit activities that result in the loss of locally rare/unique groundwater dependent resources.

Applicability

Annotation: Depending upon the types of groundwater dependent natural resources found in a particular watershed, a water management organization may adopt more specific applications for these rules. For example, there are a number of small landlocked depressions located in the northern portion of Washington County that contain sensitive spring creeks that feed the St. Croix River. As a result, the Marine Water Management Organization may chose to add the following language to the "Applicability" section of the rules: "Within a groundwater dependent stream or creek watershed that is less than one-square mile in size and tributary to the St. Croix River, this section shall apply to residential subdivisions or development of one or more lots".

Subject to an exception, the requirements of this section apply to:

1. All sites containing, tributary to, or within 200 feet of a groundwater dependent resource.
2. Residential subdivision or development of four or more lots;
3. Non-residential development, including commercial, industrial and institutional development creating impervious surface that, in the aggregate, exceeds one acre or five percent of a site, whichever is least;
4. Redevelopment on a site of five acres or more, where pervious surface is disturbed and final impervious surface, in the aggregate, exceeds one acre or five percent of the site, whichever is least;

5. The creation of 5,000 square feet or more of additional impervious surface appurtenant to existing non-residential development;
6. The creation of road, bikeway, sidewalk or other linear impervious surface of one acre or more;
7. Permanent structures that extend below the water table and divert the direction of groundwater flow away from a groundwater dependent natural resource;
8. Any development activity taking place in a landlocked basin that does not have a watershed approved subwatershed plan.

Standards

Annotation: The environmental conditions that characterize groundwater dependent natural resources include: stable, year-round water temperatures, minerotrophic to calcareous pH water chemistry, moderate to low fertility, and streams with small contributing watersheds and stable hydrologic regimes. Locally, adjacent land uses, hydrologic alterations and riparian plant community type and quality can also have a profound impact on the integrity of these systems. On a broader scale, groundwater quality and quantity is important, since, without groundwater, these systems either become surface water-fed or ephemeral with flow only present during periods of precipitation runoff.

1. The following standards apply to sites tributary to or containing perennial reaches of **groundwater dependent streams and creeks**:
 - a) Vegetative Buffer:
 1. Create and/or maintain a minimum 200-foot vegetative buffer, measured from the top of bank and extending on either side of the stream or creek channel.
 - a. The vegetative buffer should consist of a canopy of native trees, shrubs and herbaceous vegetation for thermal protection.
 - b. The vegetative buffer should include wetlands contiguous with the stream or creek channel
 2. The vegetative buffer should be expanded to include steep slopes, defined as lands having average slopes over 12 percent, as measured over a horizontal distance of 50 feet or more.
 3. Land disturbing activities shall not be permitted within the buffer except for activities required to protect or restore the stream, adjoining slopes, or natural features. Stormwater facilities shall not be located within the buffer unless no other feasible alternative exists.

4. Buffer averaging may be used provided that the minimum buffer width is not less than 50 feet or the width of the Washington County Shoreland Management Ordinance *shore impact zone*, whichever is greater.
- b) Stormwater Management:
1. Limit stormwater rate and volume discharges as prescribed in the Stormwater Management Standard.

Annotation: Phosphorus and sediment can be used as indicator pollutants to determine overall water quality treatment provided by stormwater management facilities. PondNET, a typical water quality model, can be used to evaluate sites for phosphorus removal efficiencies in ponds. It is likely that additional guidance will be required to determine the pollutant removal efficiencies of other various best management practices. A review of existing event mean concentrations and monitoring data for total phosphorus and suspended solids in the Midwest and nation wide was conducted as part of setting the allowable concentration. U.S. EPA data from the Nationwide Urban Runoff Program are used to indicate developed conditions. Presettlement conditions are based on available monitoring data from the South Washington Watershed District and Carnelian Marine Watershed District. These values can be refined with watershed specific monitoring data.

- c) Water Quality:
1. Maintain presettlement total annual phosphorus and sediment loads to all groundwater dependent resources. Presettlement total phosphorus and total suspended sediment concentrations should be equal to 0.10 mg/l and 35 mg/l respectively. In evaluating post-development conditions, the allowable phosphorus and total suspended sediment concentrations in the following table shall be used (unless the applicant can demonstrate that another value is more appropriate for the site being evaluated):

Table 1. Allowable Phosphorous and Total Suspended Solid Concentrations for Post-Development Conditions.		
Land Use	Allowable TSS concentration (mg/L)	Allowable TP concentration (mg/L)
Residential	101	0.34
Commercial, Institutional, Office	69	0.20
Mixed	67	0.26
Open Space	70	0.12

(U.S. EPA, 1983)

2. No direct (untreated) discharges of stormwater to groundwater dependent resources are allowed.
2. The following standards apply to sites tributary to or containing **groundwater dependent natural communities and wetlands**:

a) Vegetative Buffers:

1. Create and/or maintain a minimum 100-foot vegetative buffer as measured from the edge of the groundwater dependent natural community or wetland.
2. The vegetative buffer should be expanded to include steep slopes, as defined as lands having average slopes over 12 percent, as measured over a horizontal distance of 50 feet or more.
3. Land disturbing activities shall not be permitted within the buffer, except for activities required to protect or restore the groundwater dependent natural community or wetland.
4. Buffer averaging may be used provided that the minimum buffer width is not less than 50 feet or the width of the Washington County Shoreland Management Ordinance shore impact zone, whichever is greater.

b) Wetland Bounce and Duration:

1. The land-altering activity will not increase the bounce in water level or duration of inundation, during a precipitation event of critical duration with a return frequency of 2, 10, or 100 years in the subwatershed drainage area in which the site is located, for any downstream groundwater dependent natural resource beyond the following limits:

Permitted Bounce	Inundation Period for the 1.5-Year Event	Inundation Period for the 10-Year Event or Greater
Pre-Development	Existing	Existing

Source: State of Minnesota Stormwater Advisory Group "Stormwater and Wetlands Planning and Evaluation Guidelines for Addressing Potential Impacts of Urban Stormwater and Snowmelt Runoff on Wetlands" (June 1997).

c) Stormwater Management:

1. For groundwater dependent wetlands in landlocked basins, avoid any stormwater discharges.

Annotation: Phosphorus and sediment can be used as indicator pollutants to determine overall water quality treatment provided by stormwater management facilities. PondNET, a typical water quality model, can be used to evaluate sites for phosphorus removal efficiencies in ponds. It is likely that additional guidance will be required to determine the pollutant removal efficiencies of other various best management practices. A review of existing event mean concentrations and monitoring data for total phosphorus and suspended solids in the Midwest and nation wide was conducted as part of setting the allowable concentration. U.S. EPA data from the Nationwide Urban Runoff Program are used to indicate developed conditions. Presettlement conditions are based on available monitoring data from the South Washington Watershed District and Carnelian Marine Watershed District. These values can be refined with watershed specific monitoring data.

d) Water Quality:

1. Maintain presettlement total annual phosphorus and sediment loads to all groundwater dependent resources. Presettlement total phosphorus and total suspended sediment concentrations should be equal to 0.10 mg/l and 35 mg/l respectively. In evaluating post-development conditions, the allowable phosphorus and total suspended sediment concentrations in the following table shall be used (unless the applicant can demonstrate that another value is more appropriate for the site being evaluated):

Table 2. Allowable Phosphorous and Total Suspended Solid Concentrations for Post-Development Conditions.		
Land Use	Allowable TSS concentration (mg/L)	Allowable TP concentration (mg/L)
Residential	101	0.34
Commercial, Institutional, Office	69	0.20
Mixed	67	0.26
Open Space	70	0.12

(U.S. EPA, 1983)

2. No direct (untreated) discharges of stormwater to groundwater dependent resources are allowed.
3. Structures that extend below the water table must not result in the reduction of groundwater discharging to a groundwater dependent

- natural resource greater than 1 percent of the total groundwater discharge to the natural resource.
4. No direct or indirect impacts are allowed due to the incremental or cumulative impact of the regulated activities.
 5. Landlocked Basins: The following applies to groundwater dependent natural communities and/or groundwater dependent streams or creeks that may receive runoff from partially or completely landlocked basins:
 - a) The rate and volume of stormwater outletting from landlocked basins may not be increased beyond predevelopment conditions. Where no outlet presently exists for a landlocked basin, new outlets may not be created unless a subwatershed plan has been approved by the watershed organization.
 - b) A landlocked basin stormwater management plan must be prepared for all stormwater discharges into landlocked basins (or landlocked basin complexes). The landlocked basin stormwater management plan must be consistent with the *Washington County Landlocked Basin Plan*.
 - c) A discharge of stormwater into groundwater dependent wetlands and natural communities located within land locked basins is not permitted unless the applicant first demonstrates that other alternative sites (including regional facilities) are not feasible.
 - d) All discharges to groundwater dependent wetlands and natural communities within depressions as allowed under item 5.c. must first provide pretreatment for water quality and limit to the extent possible the magnitude and duration of stormwater bounce.

Management

Annotation: The management section of the rules should provide recommendations/guidelines for determining stormwater rates and volumes, annual phosphorous and sediment loads, reductions in groundwater discharge to a groundwater dependent natural resource and a method for determining incremental or cumulative impacts.

1. Calculating Off-Site Stormwater Flow.
2. Calculating Annual Phosphorous and Sediment Loads.

3. Quantifying Groundwater Discharge.
4. Evaluating Incremental or Cumulative Impacts.

Required Exhibits

The following items shall accompany all permit applications submitted to the Watershed:

- (a) Map identifying groundwater elevation contours and flow direction before and after (predicted) construction of permanent structure.
- (b) Calculation of the volume of water flowing to a groundwater dependent natural resource before and after (predicted) construction of permanent structure.
- (c) Site plan or other plan view that shows property lines, delineation of lands under ownership of the applicant, 200-foot set-back from the site, the location of the project with respect to known or potential groundwater dependent natural resources, the delineation of groundwater dependent natural resources, and the buffer delineation;
- (d) Landscaping/vegetative plan for the buffer including maintenance plan for the buffer;
- (e) Stormwater runoff rate analyses for the 2, 10, and 100 year critical events and runoff volume for the 2 year event under pre-settlement and proposed conditions;
- (f) All hydrologic, water quality, and hydraulic computations completed to design the proposed stormwater management facilities;
- (g) Where groundwater impacts may occur, groundwater interference/drawdown analysis with respect to subject stream or plant community.

Exceptions/Exclusions

1. If the applicant can demonstrate that a WMO/WD approved Comprehensive Wetland Management Plan (Plan) exists for their site, the performance standards for the groundwater dependent natural resource identified in the Plan will supersede the requirements of these rules.

2. Building foundations and other foundations will typically not be covered by this rule unless they are designed to regularly pump water from a tile system or a sump.

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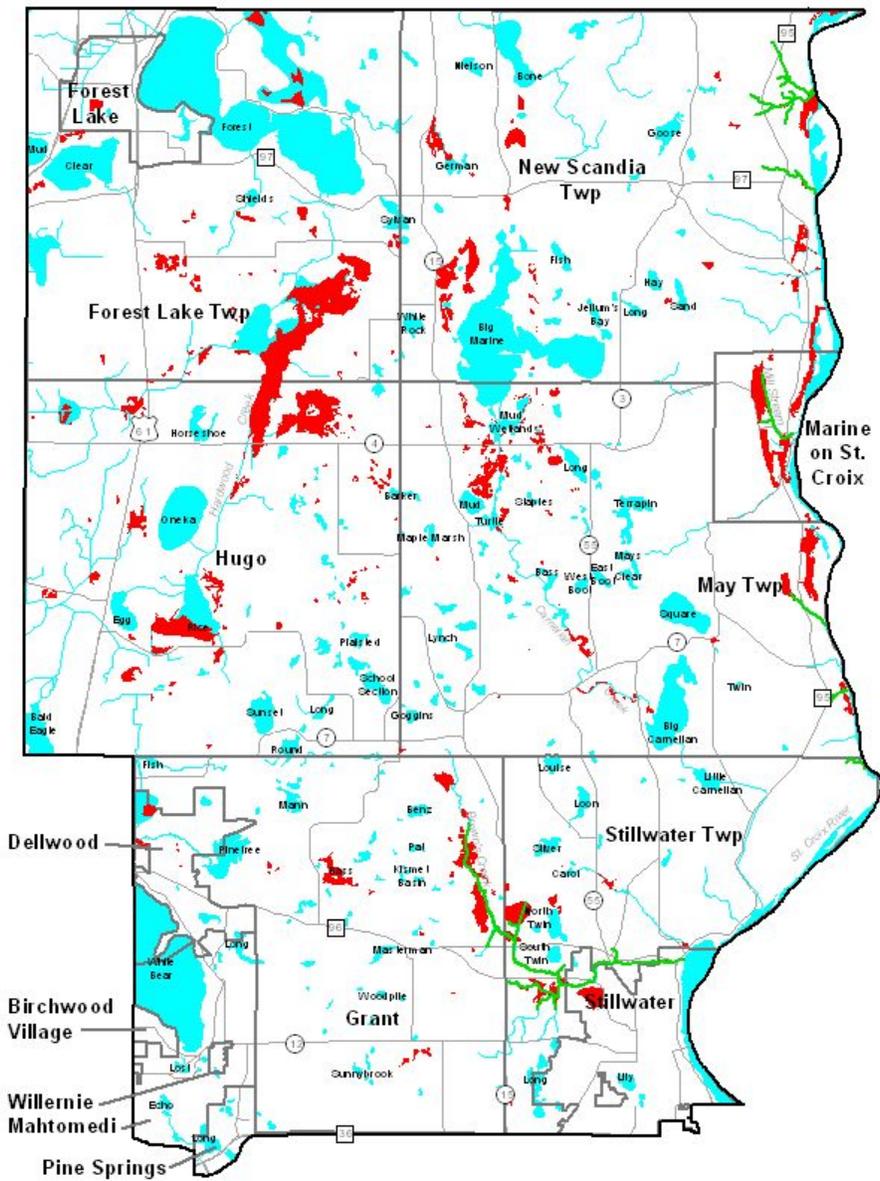
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Groundwater Dependent Resources

- Plant Communities
- Streams / Spring Creeks

Source: EOR, 2003; DNR, 2003.