LOW IMPACT DEVELOPMENT IN THE TWIN CITIES, MINNESOTA

Jay Riggs, District Manager
Washington Conservation District
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WASHINGTON CONSERVATION DISTRICT

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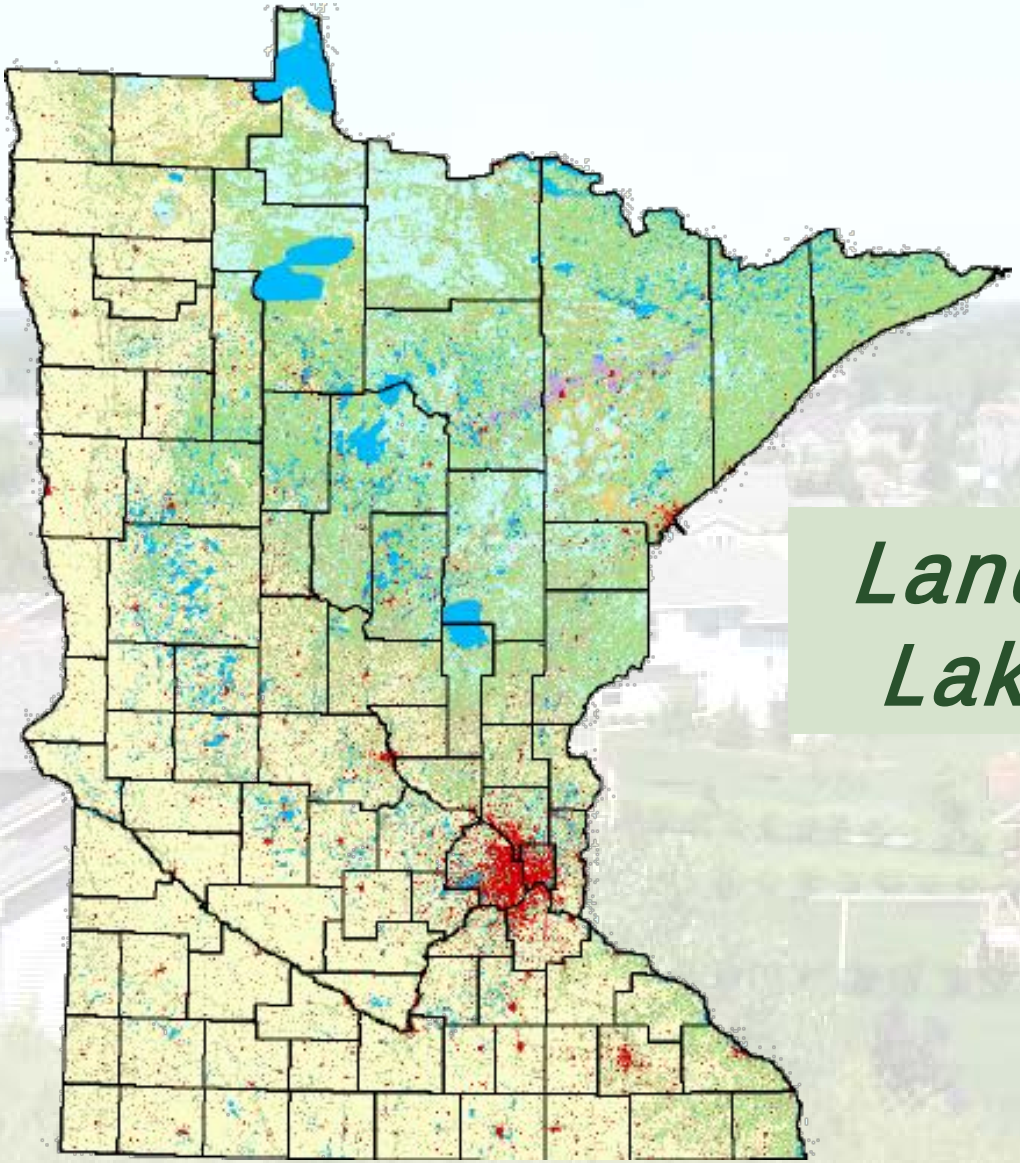
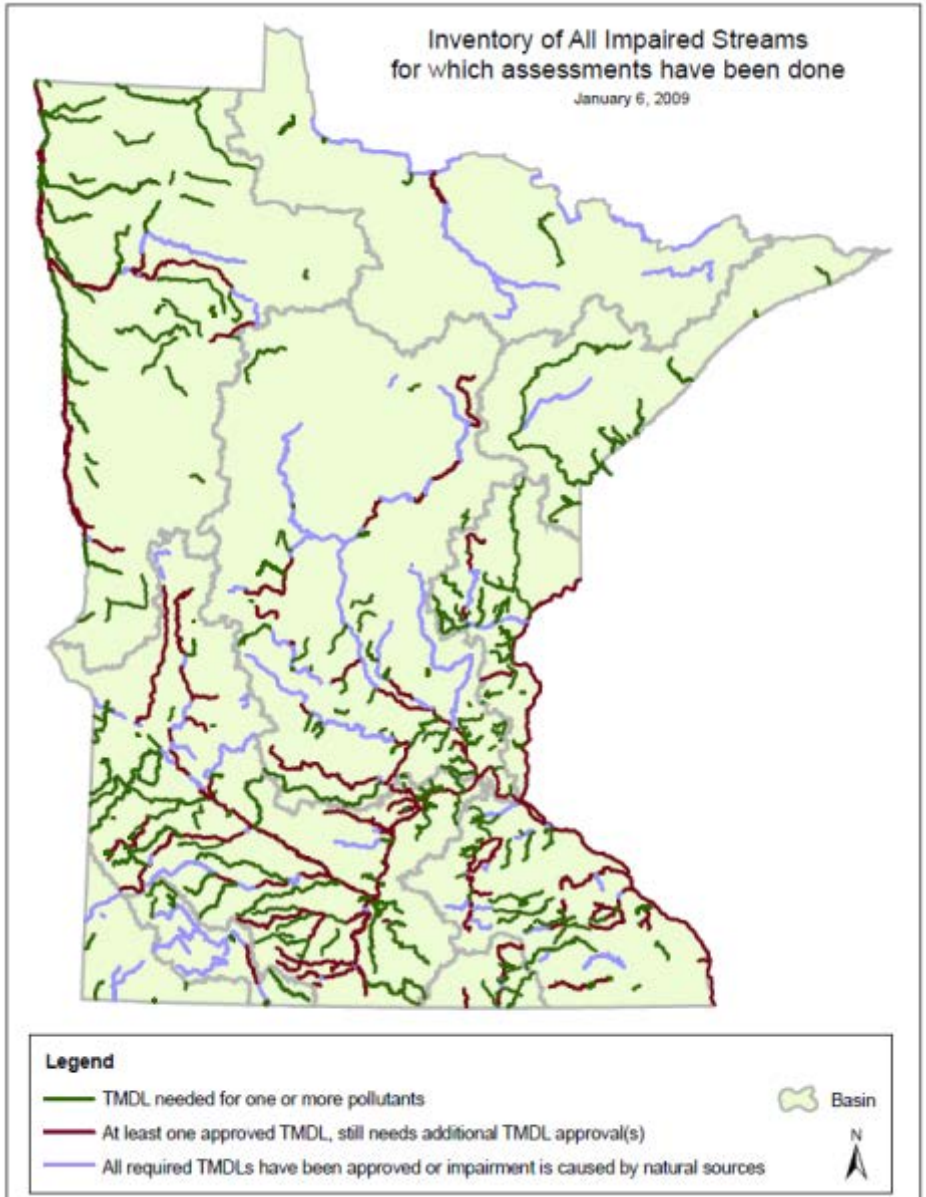
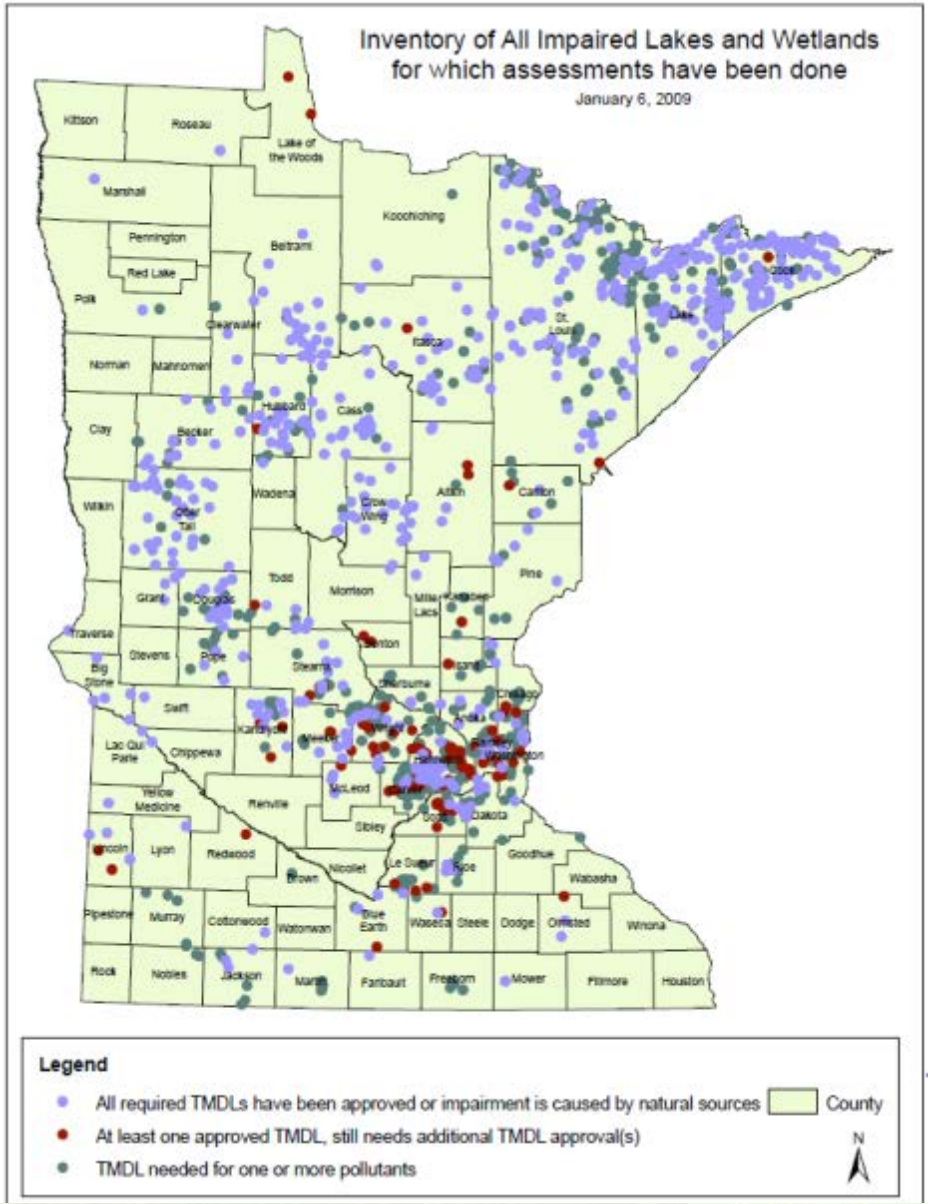
Minnesota



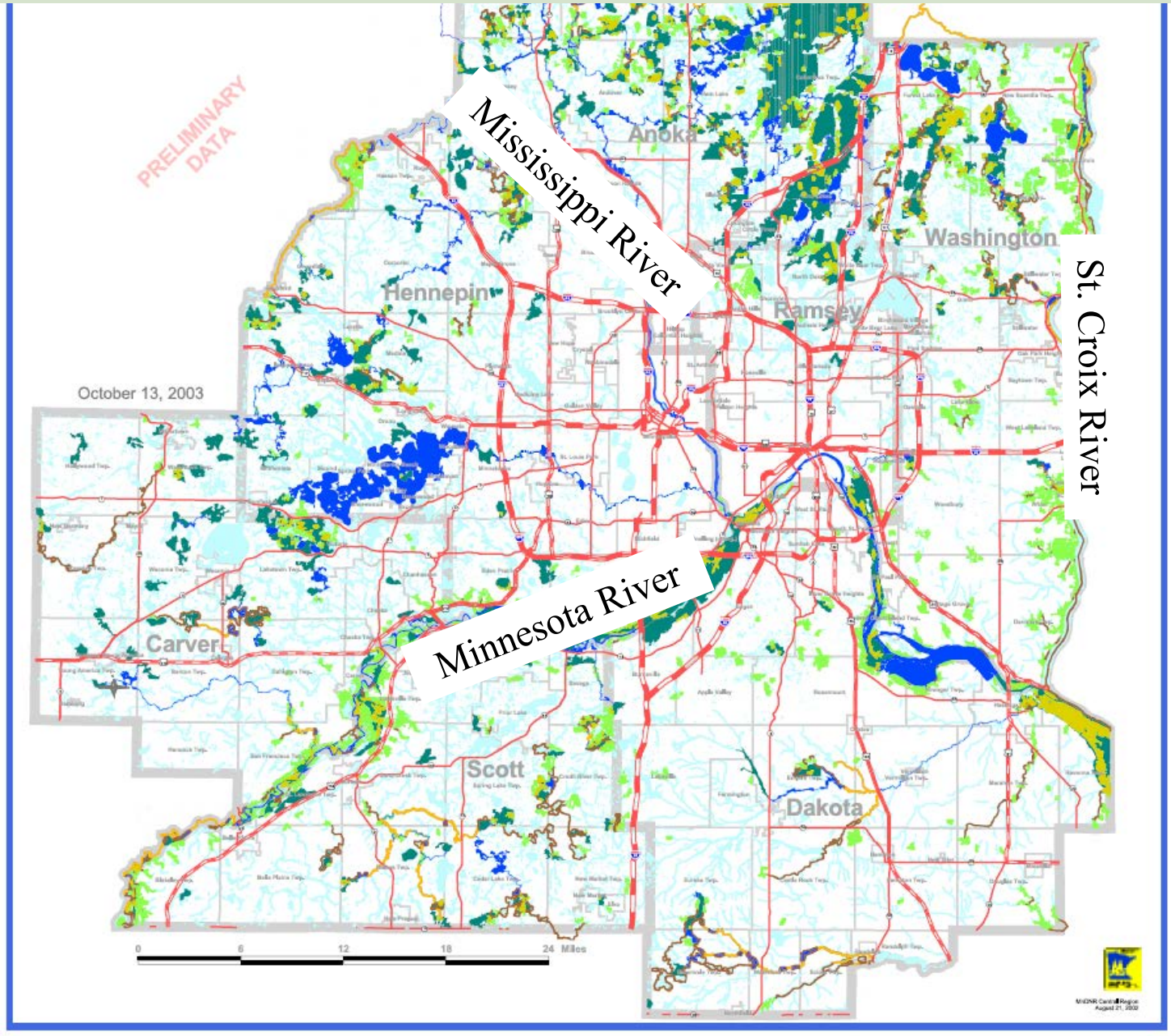
Land of 10,000 Lakes and . . .

Land of 3,638 Impaired Waters

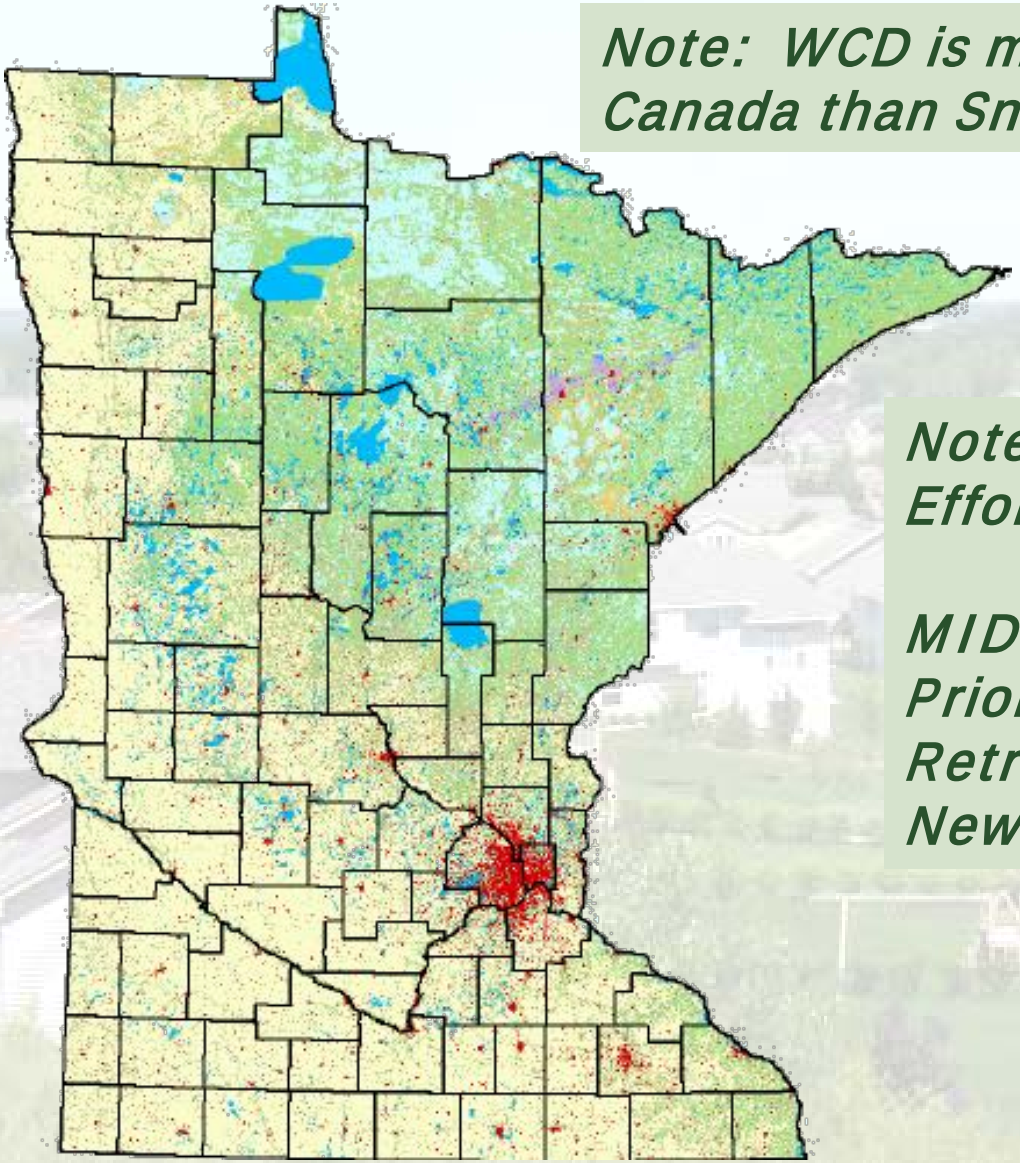




Twin Cities: Confluence of Three Major Rivers



Minnesota



Note: WCD is much further away from Canada than Snohomish CD!

Noteworthy MN LID Efforts:

MIDS and LID Standards
Prioritization
Retrofits
New Technologies

What is LID?

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Low-impact development

From Wikipedia, the free encyclopedia

(Redirected from Low impact development)

Low-impact development (LID) may refer to:

- Low-impact development (Canada/US), the term is used in Canada and the United States to describe a land planning and engineering design approach to managing stormwater runoff.
- Low-impact development (UK), the term is used in the UK for a type of development which through its low negative environmental impact either enhances or does not significantly diminish environmental quality.

This disambiguation page lists articles associated with the same title.
If an internal link led you here, you may wish to change the link to point directly to the intended article.

Categories: Disambiguation pages

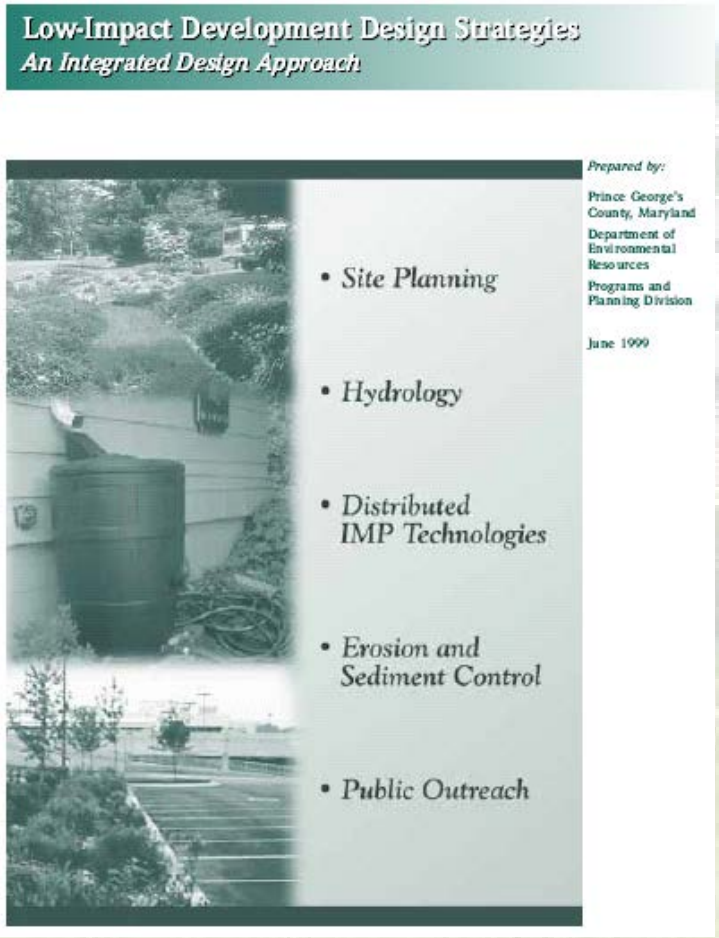
lid (lid)

1. A removable or hinged cover for a hollow receptacle or box.
2. An eyelid.
3. *Biology.* A flaplike covering, such as an operculum.
4. A curb, restraint, or limit: *approved a new lid on corporate spending.*
5. *Informal.* An act of concealment; a cover: "*Put a lid on it!*"
6. *Slang.* A hat.
7. *Slang.* An ounce of a certain noxious weed.

What is LID?

Low-Impact Development: An Integrated Environmental Design Approach

"Match Predevelopment Curve Number"



This requirement is identical to the State of Maryland's definition of the predevelopment condition. The CN for the predevelopment condition is to be determined based on the land cover being woods in good condition and the existing HSG. The design storm is to be the greater of the rainfall at which direct runoff begins from a woods in good condition, with a modifying factor, or the 1-year 24-hour storm event. The rainfall at which direct runoff begins is determined using Equation A.9. The initial rainfall amount at which direct runoff begins from a woodland is modified by multiplying this amount by a factor of 1.5 to account for the slower runoff release rate under the wooded predevelopment condition.

$$P = 0.2 \times \left(\frac{1000}{CN_c} - 10\right) \qquad \text{Eq. A.9}$$

where P is rainfall at which direct runoff begins.

Minimal Impact Design Standards

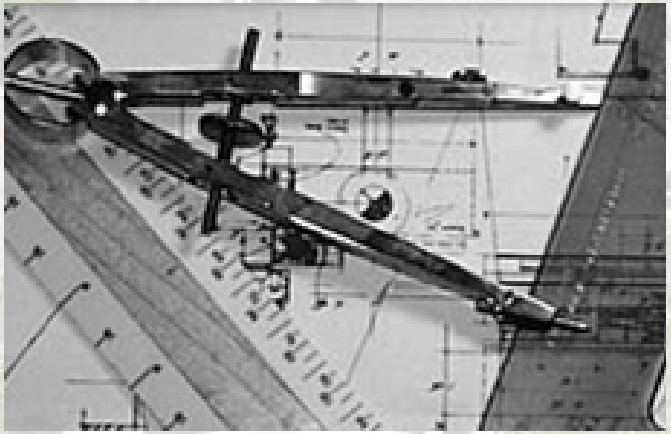
New State Legislation

(c) The agency shall develop performance standards, design standards, or other tools to enable and promote the implementation of low-impact development and other stormwater management techniques. For the purposes of this section, "low-impact development" means an approach to storm water management that mimics a site's natural hydrology as the landscape is developed. Using the low-impact development approach, storm water is managed on-site and the rate and volume of predevelopment storm water reaching receiving waters is unchanged. The calculation of predevelopment hydrology is based on native soil and vegetation.

- *Minnesota Statutes 2009, section 115.03, subdivision 5c*

Minimal Impact Design Standards

Ordinance Package



Performance Goal

Calculation Methodologies for a Menu of Techniques

Minimal Impact Design Standards

New development

Redevelopment

Linear Projects

Flexible Treatment options – when a site just cannot meet the goal.

Performance Goal

Dennis O'Hara – Northernimages.com

Minimal Impact Design Standards

New development

For new, nonlinear developments that create more than one acre of new impervious surface on sites without restrictions, stormwater runoff volumes will be controlled and the post-construction runoff volume shall be retained on site for 1.1 inches of runoff from impervious surfaces statewide.

Minimal Impact Design Standards

Redevelopment

Nonlinear redevelopment projects on sites without restrictions that create one or more acres of new and/or fully reconstructed impervious surfaces shall capture and retain on site 1.1 inches of runoff from the new and/or fully reconstructed impervious surfaces.

Definition: **Any development that is not considered new development.**

Minimal Impact Design Standards

Linear Projects

Linear projects on sites without restrictions that create one acre or greater of new and/or fully reconstructed impervious surface, shall capture and retain the larger of the following:

- ❑ 0.55 inches of runoff from the new and fully reconstructed impervious surfaces
- ❑ 1.1 inches of runoff from the net increase in impervious area

Mill and overlay and other resurfacing activities are not considered fully reconstructed.

Definition: **Construction or reconstruction of roads, trails, sidewalks, and rail lines that are not part of a common plan of development or sale.**

Minimal Impact Design Standards

Flexible Treatment Options Sequence & Design Guidance Flow-Chart

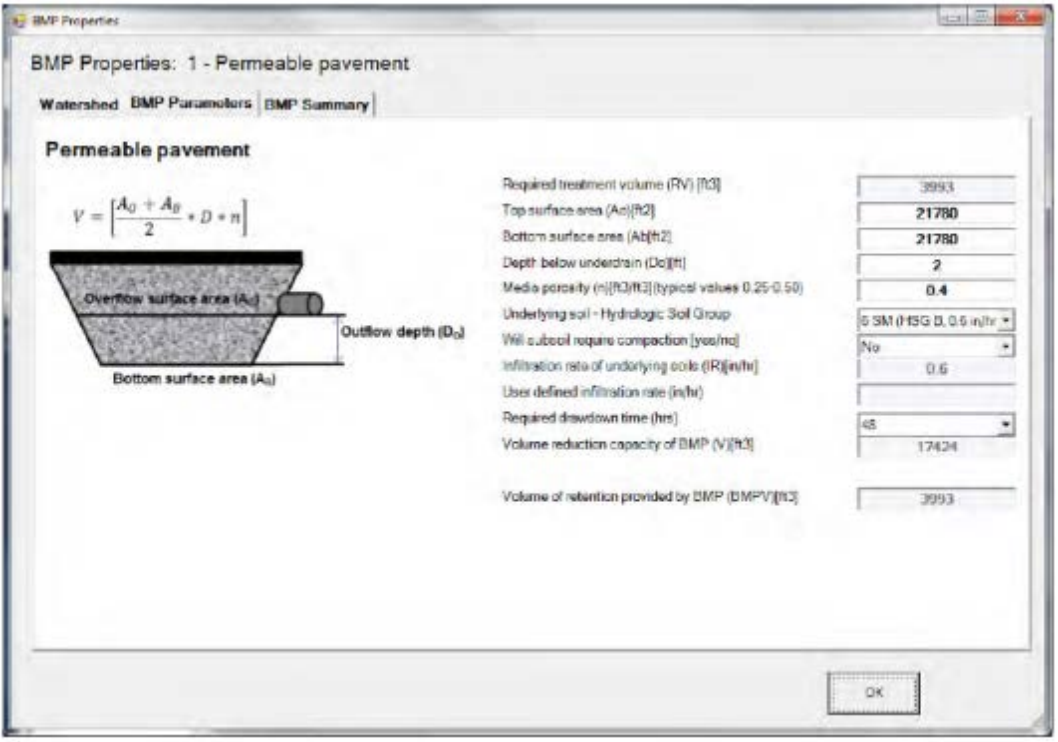
When site restrictions exist: Tight clay soils, shallow bedrock, or Karst topography, soil contamination, existing building or utility conflicts, or other site constraints such as zoning requirements.

Option #1 = 0.55" Volume control + 75% annual TP + evidence

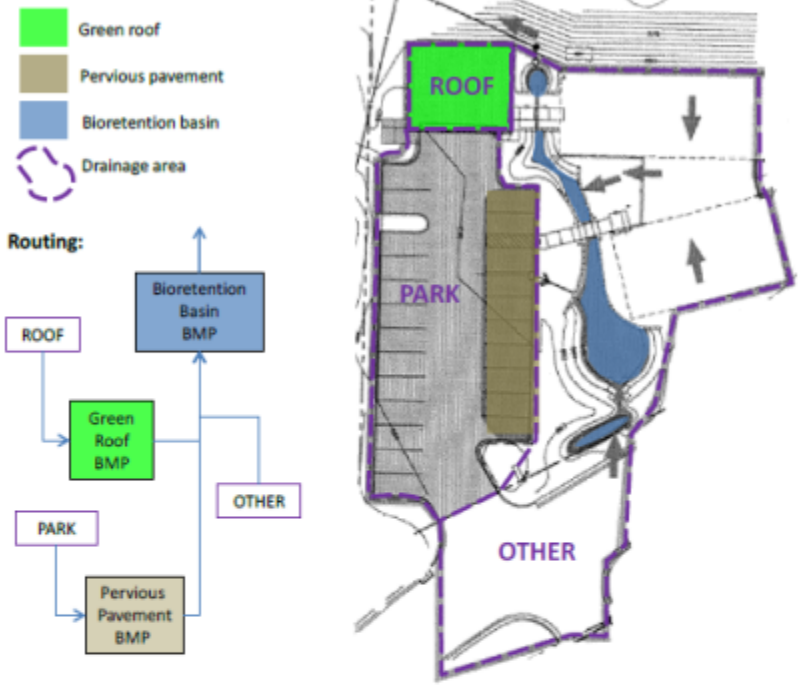
Option #2 = Maximum possible volume control + 60% annual TP + evidence

Option #3 = Off-site mitigation through banking or another project

Minimal Impact Design Standards



MIDS Calculator GUI Demonstration Example



Drainage Area	Land Cover (acres) - assume all 'B' Soils			Total
	Turf	Forest/Open Space	Impervious	
ROOF	0.00	0.00	0.10	0.10
PARK	0.00	0.00	1	1
OTHER	1	0.00	0.75	1.75
Total:	1	0.00	1.85	2.85

Drainage Area	BMP Description	BMP Information							
		Top Area (ft^2)	Bottom Area (ft^2)	Depth (ft)	Underlying Soil Type	Drawdown Time (hrs)	Media Depth (ft)	Media Porosity (ft^3/ft^3)	Outflow Depth (ft)
ROOF	Green roof	4,356					0.2	0.33	
PARK	Pervious pavement	21,780					2	0.40	2.0
OTHER	Bioretention basin (w/o underdrain)	2,136	848	1.5	SM (HSG B)	48			1.4

p-gen3-15k

Calculation Methodologies for a Menu of Techniques

Minimal Impact Design Standards

The Community Assistance Package (CAP) provides ordinances and policies that integrate the MIDS performance goal, calculator, and overall LID principles.

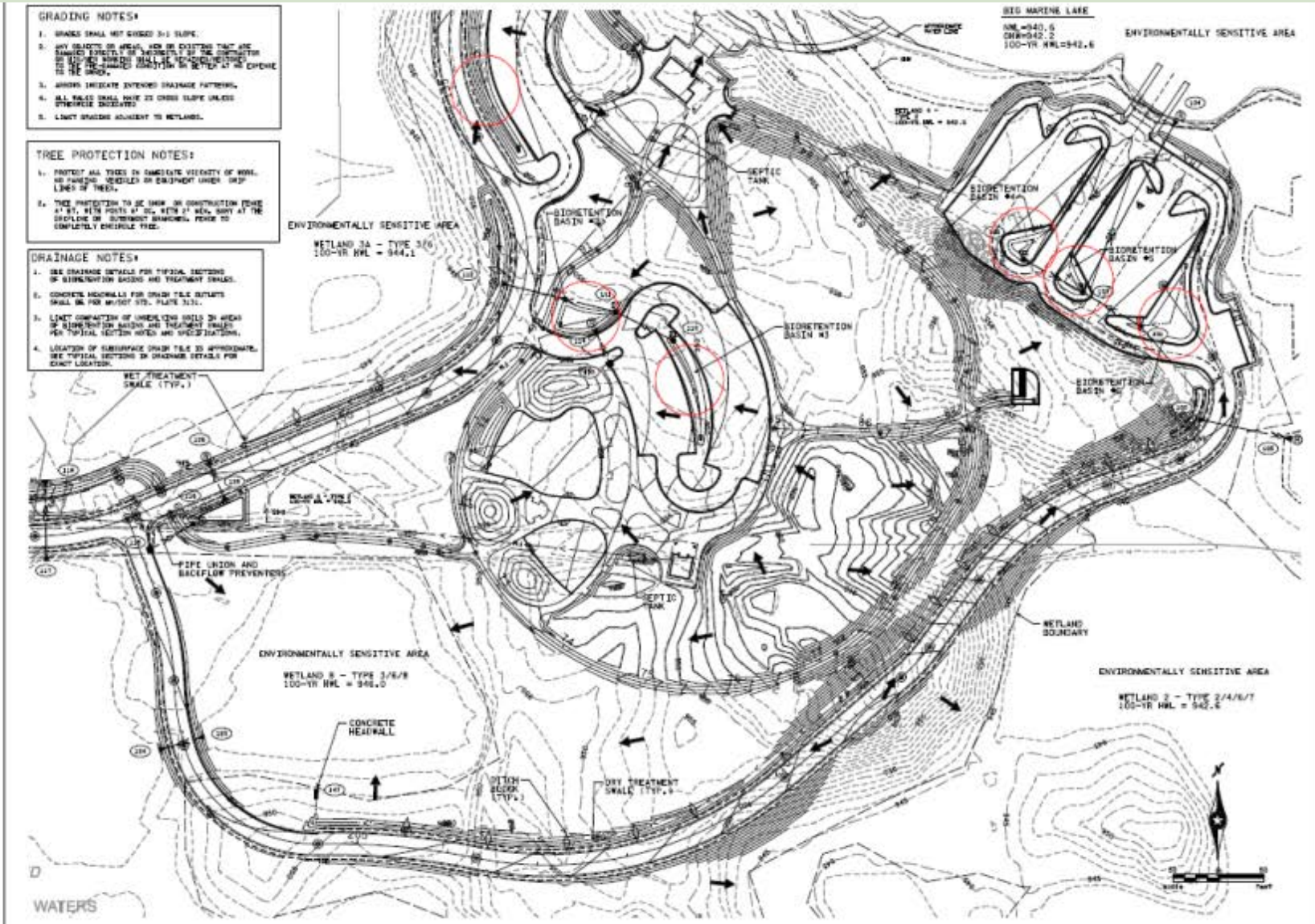
Help cities comply with federal regulations and requirements under Total Maximum Daily Load (TMDL), Municipal Separate Storm Sewer System (MS4), Anti-Degradation, and Outstanding Resource Value Waters (ORVW) programs.

Community Assistance Package


Carrol Henderson

Watershed District Volume Control/LID Standards

Big Marine Park



SRF Consulting Group, Inc

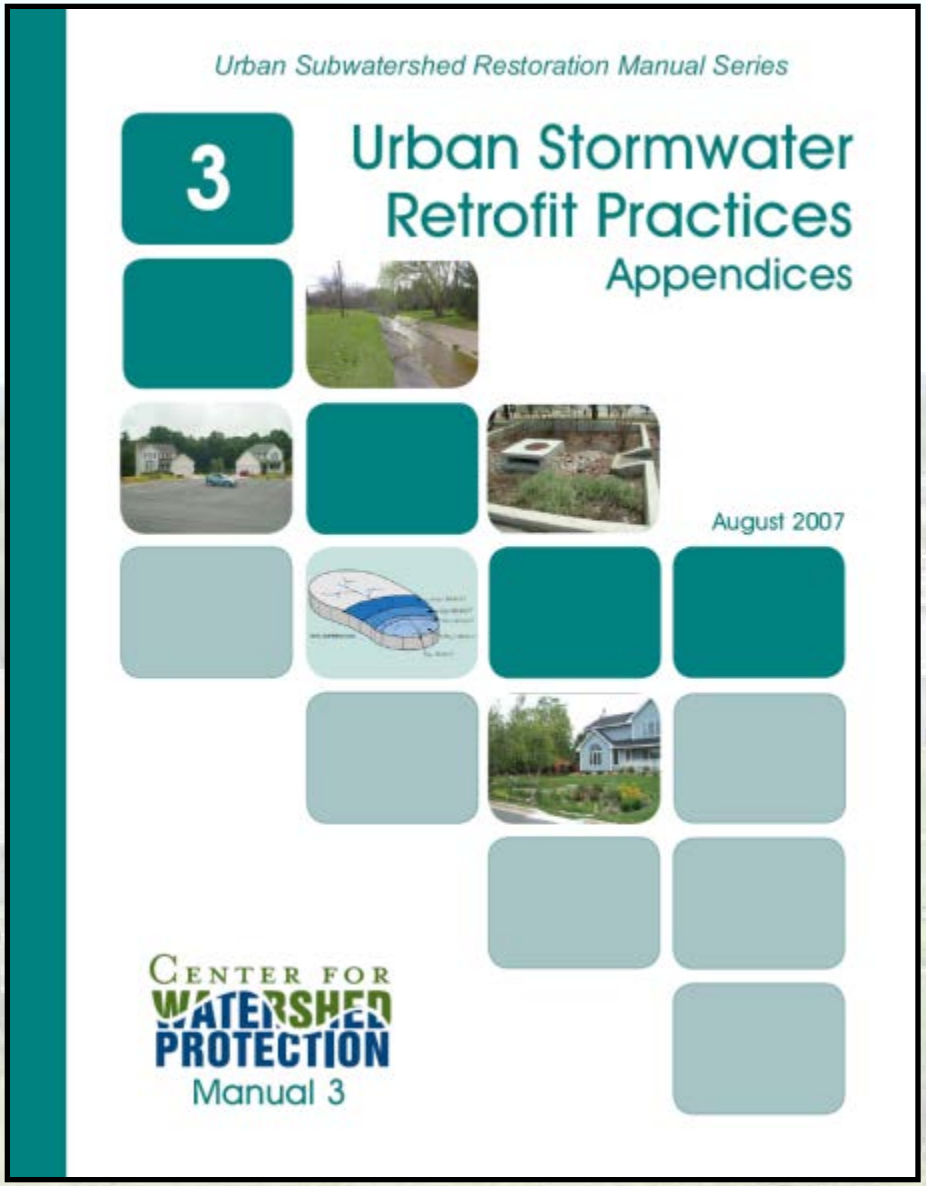
BIG MARINE PARK RESERVE
PHASE 1 SITE IMPROVEMENTS
Washington County Parks

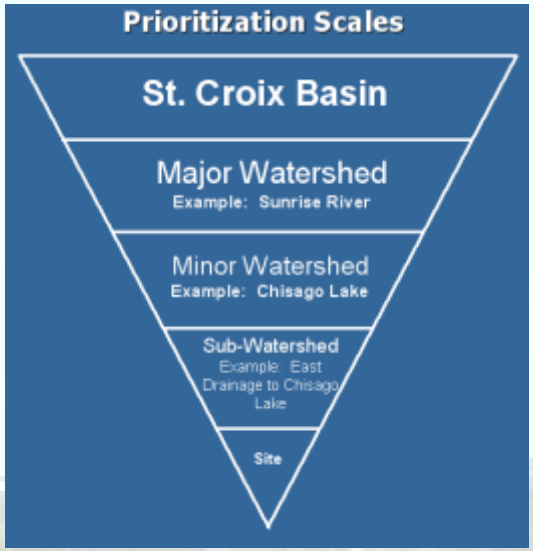
OVERALL GRADING & UTILITIES PLAN

37

OF 105

PRIORITIZATION FOR LID





Prioritization Approaches

Subwatershed Assessments

Water Quality Model, Field Work, and Cost-Benefit Analysis

Lake McKusick

Stormwater Retrofit Assessment

Prepared by:

With assistance from:
THE METRO CONSERVATION DISTRICTS
for the
MIDDLE ST. CROIX WATERSHED MAN

Lily Lake

Stormwater Retrofit Assessment

Prepared by:

With assistance from:
THE METRO CONSERVATION DISTRICTS

Powers Lake

Stormwater Retrofit Assessment

Prepared by:

With assistance from:
THE METRO CONSERVATION DISTRICTS
for the
ATERSHED DISTRICT

COMPLETED URBAN SWAs

Highway 61 Corridor Subwatershed:
Stormwater Retrofit Assessment

Prepared by:

With assistance from:
THE METRO CONSERVATION DISTRICTS
for the
SOUTH WASHINGTON WATERSHED DISTRICT

Colby Lake

Stormwater Retrofit Assessment

Prepared by:

With assistance from:
THE METRO CONSERVATION DISTRICTS
for the
SOUTH WASHINGTON WATERSHED DISTRICT

Lake DeMontreville Subwatershed
Stormwater Retrofit Assessment

Prepared by:

WASHINGTON CONSERVATION DISTRICT

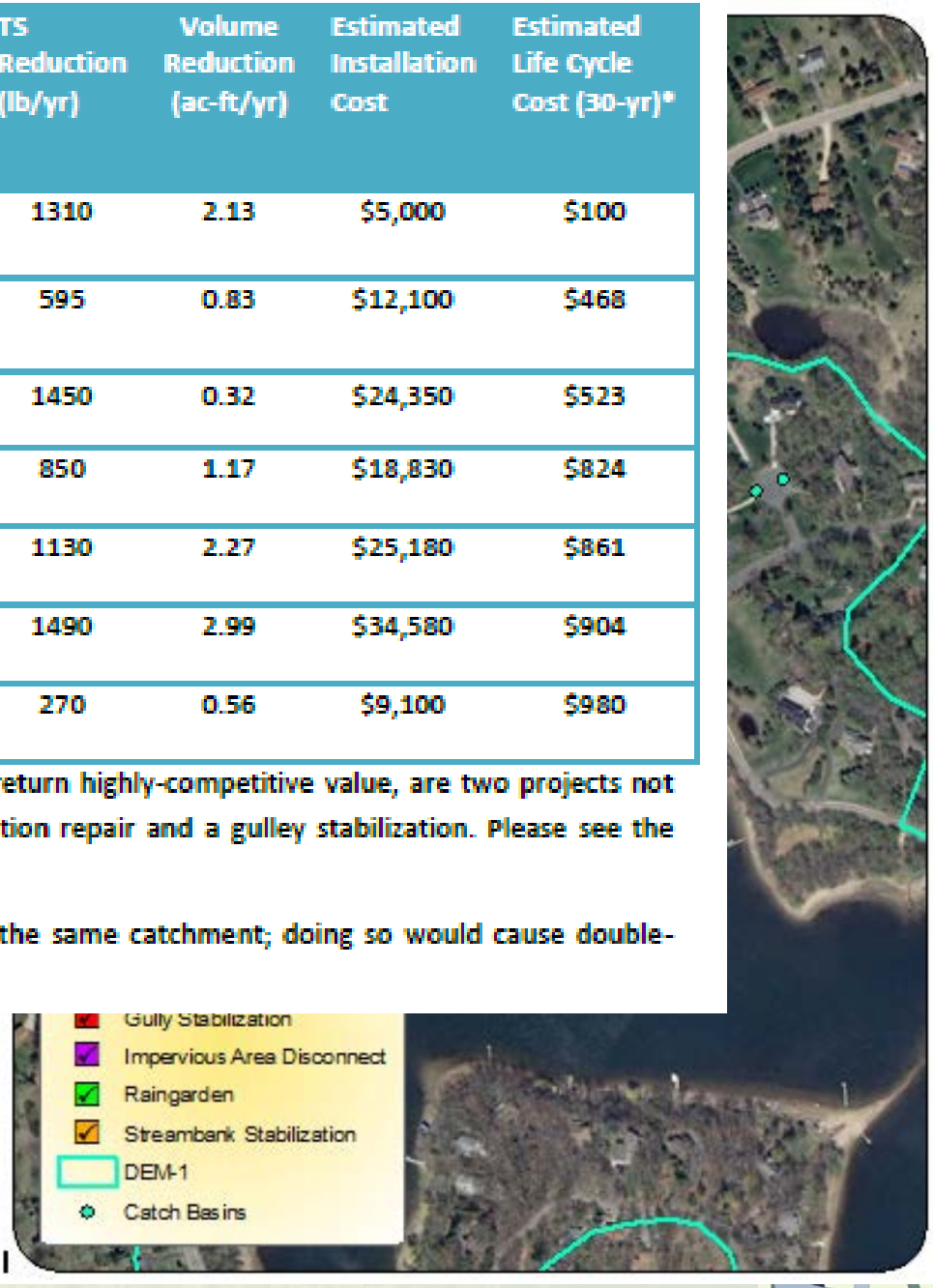
for the
VALLEY BRANCH WATERSHED DISTRICT

Plus Carver Inititiated

Catchment	Retrofit Description (refer to catchment profiles for additional detail)	Projects Identified	TP Reduction (lb/yr)	TS Reduction (lb/yr)	Volume Reduction (ac-ft/yr)	Estimated Installation Cost	Estimated Life Cycle Cost (30-yr)*
DEM-1-3	Impervious Area Disconnect	1	3.6	1310	2.13	$5,000	$100
DEM-1-4	Boulevard Bioretention	2	1.7	595	0.83	$12,100	$468
DEM-2	Bioswale (WQ)	1-2	4.4	1450	0.32	$24,350	$523
DEM-3	Boulevard Raingardens	5	1.9	850	1.17	$18,830	$824
DEM-3**	Boulevard Raingardens	7	2.5	1130	2.27	$25,180	$861
DEM-3**	Boulevard Raingardens	10	3.4	1490	2.99	$34,580	$904
DEM-1-5**	Boulevard Raingardens	2	0.7	270	0.56	$9,100	$980

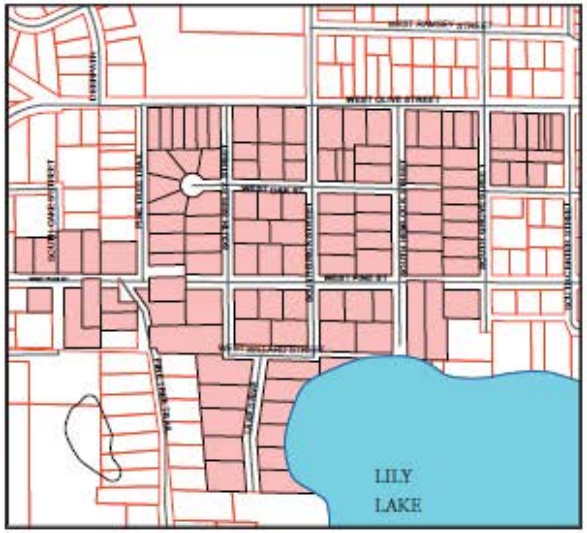
*The first projects that need to be addressed, that will likely return highly-competitive value, are two projects not quantified within this table: an extensive stream bank restoration repair and a gulley stabilization. Please see the Catchment Profile for DEM-1, North for guidance on this.

**These options can't be summed with other options within the same catchment; doing so would cause double-counting of treatment estimates.



PROJECT LOCATION MAP

Residents within the red shaded area on the map below, are eligible to get a FREE raingarden! Not sure if you qualify? Call us!



FREE RAINGARDENS

For select LILY LAKE residents
Fall 2012 GROUND-BREAKING

What Happens When It Rains?

In your neighborhood, rain that runs off of rooftops, driveways and streets goes into storm sewers that flow directly into Lily Lake without getting cleaned. Water from Lily Lake eventually goes to the St. Croix River.

Rain runoff can wash oils, fertilizers, pesticides, and dirt straight into Lily Lake.

A raingarden in your yard will soak runoff into the ground before the water can carry these pollutants down the road and into Lily Lake.

FOR MORE INFORMATION or to SIGN UP FOR A FREE RAINGARDEN:

Contact: Amy Carolan
MSCWMO Administrator
amy.carolan@mnwcd.org
651-275-1136 x 22

or

Contact: Angie Hong
Water Resource Education Specialist
angie.hong@mnwcd.org
651-275-1136 x 35

Washington Conservation District
1380 W. Frontage Road, Hwy 36
Stillwater, MN 55082
651-275-1136

WASHINGTON CONSERVATION DISTRICT

MIDDLE ST. CROIX WATERSHED MANAGEMENT ORGANIZATION

LID Installation Funding

Minnesota's Legacy

Watch the progress

Search projects go

Legacy Home | All Projects | About the Funds | Opportunities for Funding | Funding Overview

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

CLEAN WATER LAND & LEGACY AMENDMENT

In About the Funds

- Arts & Cultural Heritage Fund >
- Clean Water Fund >
- Environment & Natural Resources Trust Fund >
- Outdoor Heritage Fund >
- Parks & Trails Fund >

Administering Agencies

Learn more about the Agencies that administer our Funds.

About the Funds

Legacy Funds

In 2008, Minnesota's voters passed the Clean Water, Land and Legacy Amendment (Legacy Amendment) to the Minnesota Constitution to: protect drinking water sources; to protect, enhance, and restore wetlands, prairies, forests, and fish, game, and wildlife habitat; to preserve arts and cultural heritage; to support parks and trails; and to protect, enhance, and restore lakes, rivers, streams, and groundwater.

CLEAN WATER LAND & LEGACY AMENDMENT

The Legacy Amendment increases the state sales tax by three-eighths of one percent beginning on July 1, 2009 and continuing until 2034. The additional sales tax revenue is distributed into four funds as follows: 33 percent to the clean water fund; 33 percent to the outdoor heritage fund; 19.75 percent to the arts and cultural heritage fund; and 14.25 percent to the parks and trails fund.

Environment and Natural Resources Trust Fund

In 1988, Minnesota's voters approved a constitutional amendment establishing the Environment and Natural Resources Trust Fund

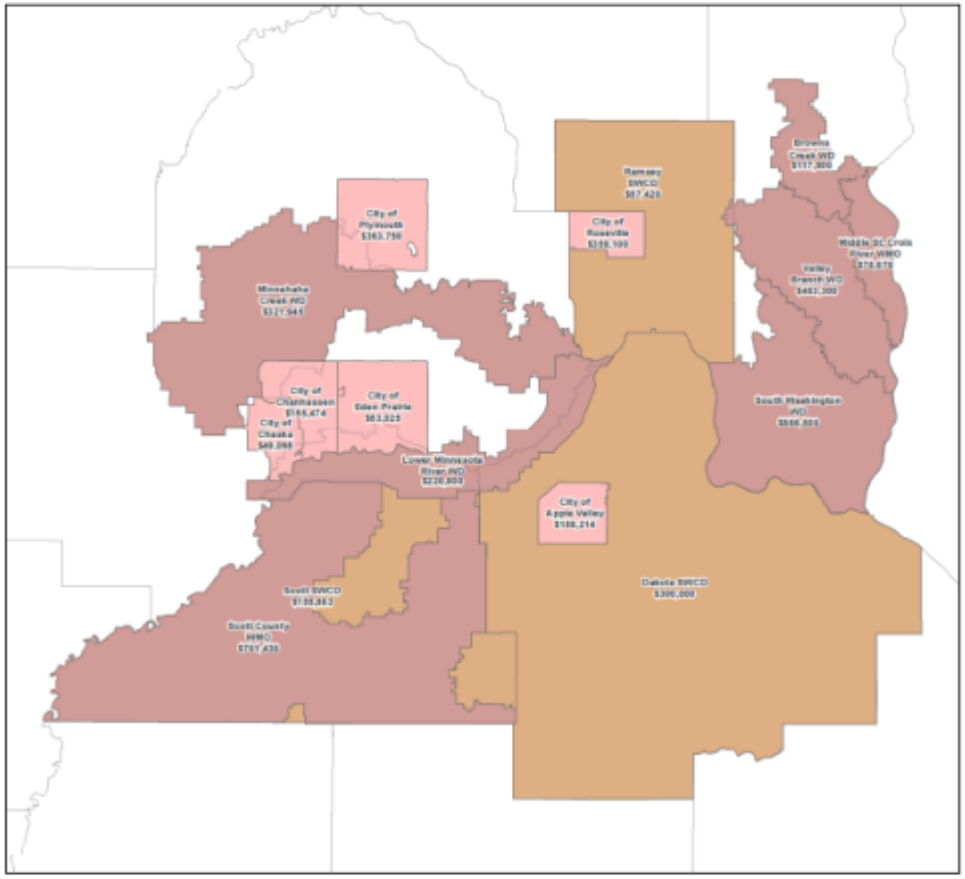
LID Installation Funding

2013 Clean Water Fund

Clean Water Assistance

Total Metro Funding: $4,109,109

Total Statewide Funding: $10,700,007



City
WD / WMO
SWCD
County
MASWCD Areas
JPB

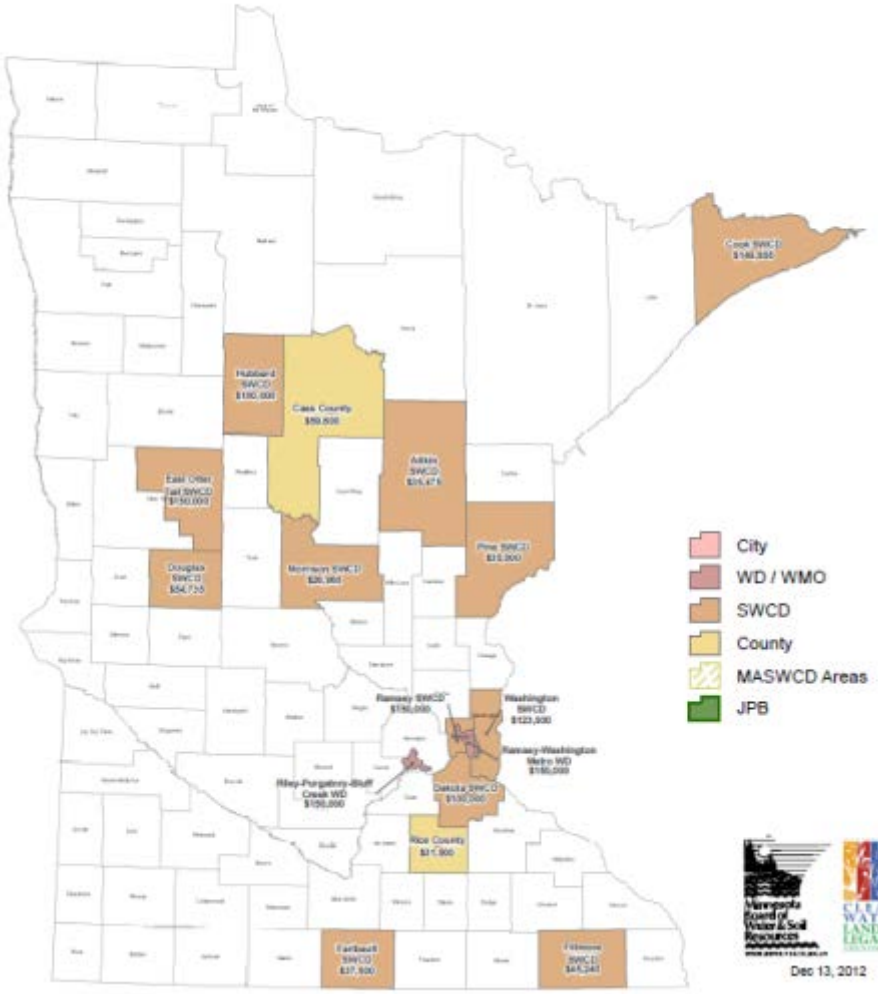
Dec 13, 2012

Path: P:\PROJECTS\SECTION\CWF\maps\2013\Applications\Clean Water Assistance Metro Awarded.mxd

2013 Clean Water Fund

Community Partners

Total Funding: $1,400,000



City
WD / WMO
SWCD
County
MASWCD Areas
JPB

Dec 13, 2012

LID Installation Funding

Lily Lake Stormwater Retrofit

Minnesota Board of Water & Soil Resources

CLEAN WATER LAND & LEGACY AMENDMENT

Clean Water Funds: 2011

Clean Water Grant	$43,400
Leveraged Funds*	$10,850
Total Project Budget	$54,250

*** Leveraged Funds include required 25% local match**

Targeted Water:
Lily Lake

Project Sponsor:
Middle St. Croix Watershed Management Organization

Partners:
MSCWMO, Washington Conservation District, City of Stillwater, East Metro Water Resource Education Program

Grant Period:
January 2011 - December 2012

Project Contact:
Amy L. Carolan
(651) 275-1136 x22
Acarolan@mnwcd.org
www.mscwmo.org

Project Narrative

Lily Lake, in Stillwater, is a popular recreational spot for residents with its swimming beach, fishing pier, and canoe/boat access. Lily Lake is impaired by excess nutrients, and restoring its water quality is a priority for the community. A recent assessment of the 22 catchments, or 590 acres, that drain to Lily Lake identified multiple locations where stormwater management features could be installed to help achieve the 145-pound phosphorus load reduction that is needed to help improve water quality.

The purpose of this project was to work with residents in two of the 22 catchments, located on the northeast side of Lily Lake. The MSCWMO kicked off the project by sending colorful flyers to all residents living within the two priority catchments. The flyer invited residents to an open house where they were educated about the current state of Lily Lake and what could and was being done to improve water quality. Of the forty residents to who signed up to work with the MSCWMO to install stormwater treatment features on their property, the top 15 locations were selected based on the sites ability to capture pollutants prior to reaching Lily Lake. The 15 selected residents worked with the MSCWMO to design their stormwater treatment feature and agreed to maintain the feature for up to ten years.

Actual Outcomes

A total of 15 raingardens resulting in 3000 square feet of treatment facilities were installed in the two target catchments as part of this project. According to as-built modeling information, the project resulted in the expected 9.5 lb/yr TP reduction.

Map shows land area included in the recently completed Lily Lake sub-watershed assessment. Catchments Lily-02 and Lily-03 on the northeast side of the lake were the focus of this project.

Lily Lake Stormwater Retrofit

One of the recently completed raingardens that captures runoff prior to its discharge into Lily Lake.

Notice the curb cut which allows runoff off of the street and into the raingarden to filter the runoff before it reaches Lily Lake.

LID Installation Funding

Lily Lake Phase I

LID Installation Funding

Lily Lake Phase I

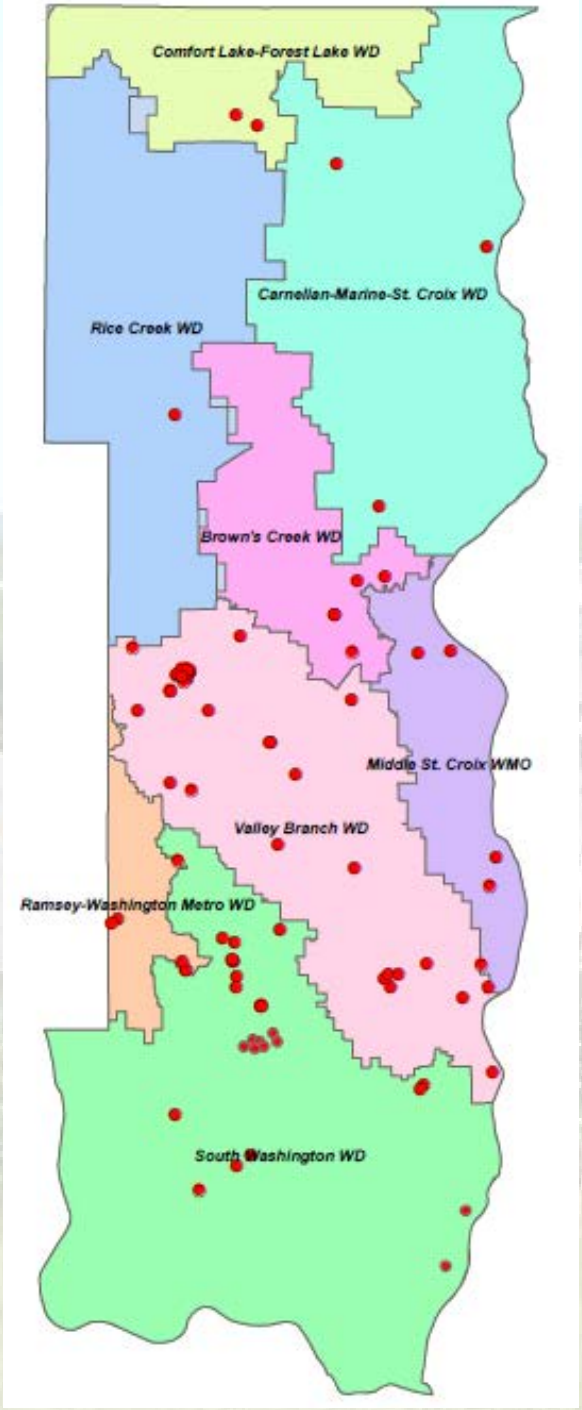
LID Installation Funding

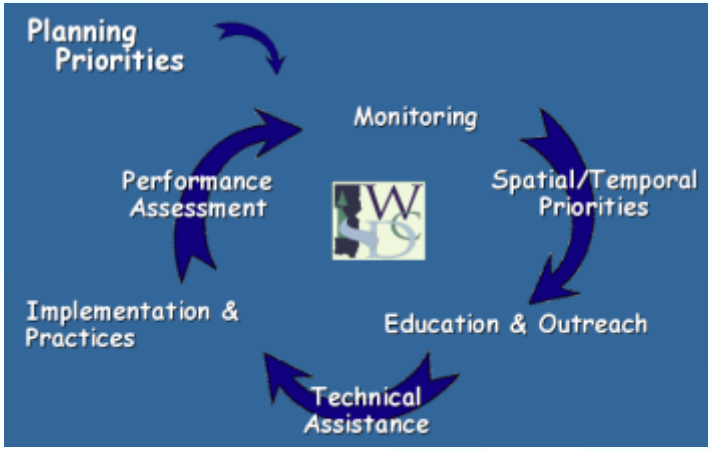
Lily Lake Phase II

LID Installation Funding

Green Churches


SINGLE VEHICLE PARKING ONLY
NO TRAILERS
LAKE DEMONTREVILLE
PUBLIC WATER ACCESS

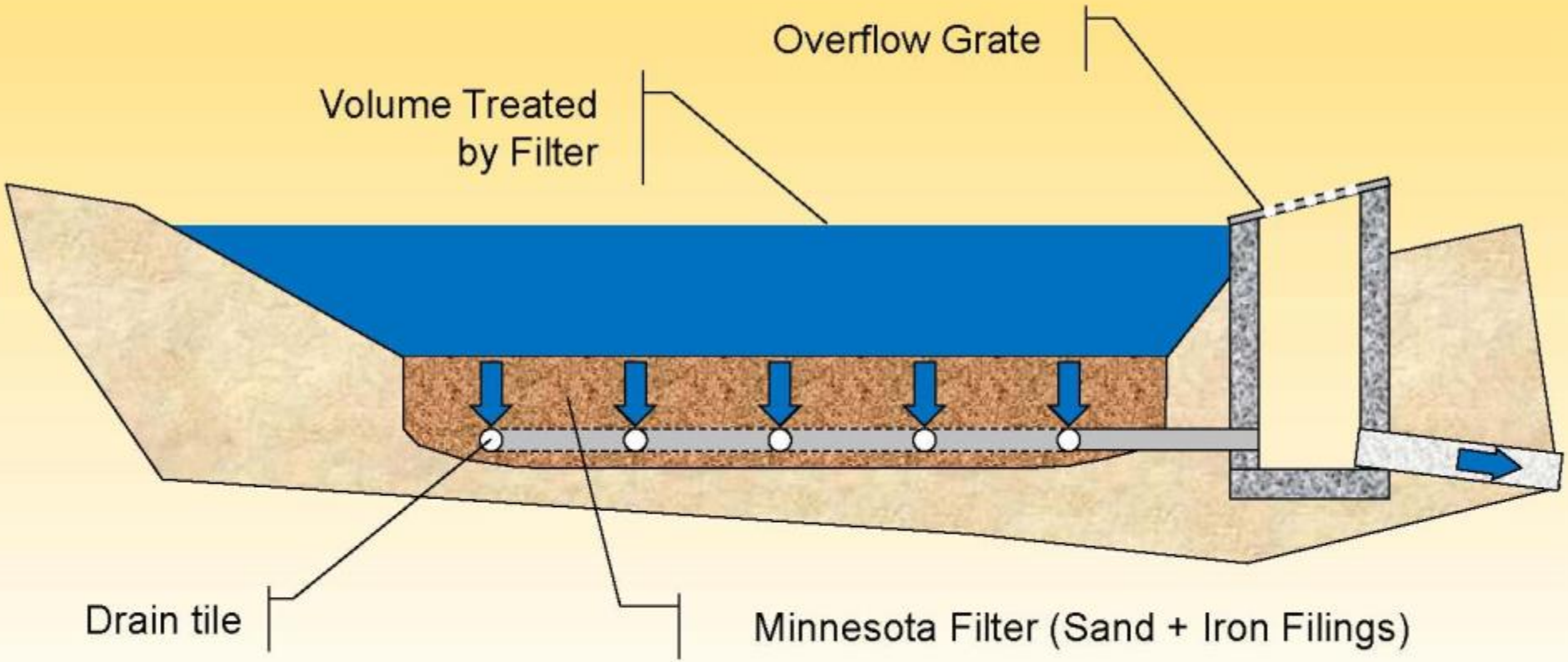




191 Practices Installed in 2012

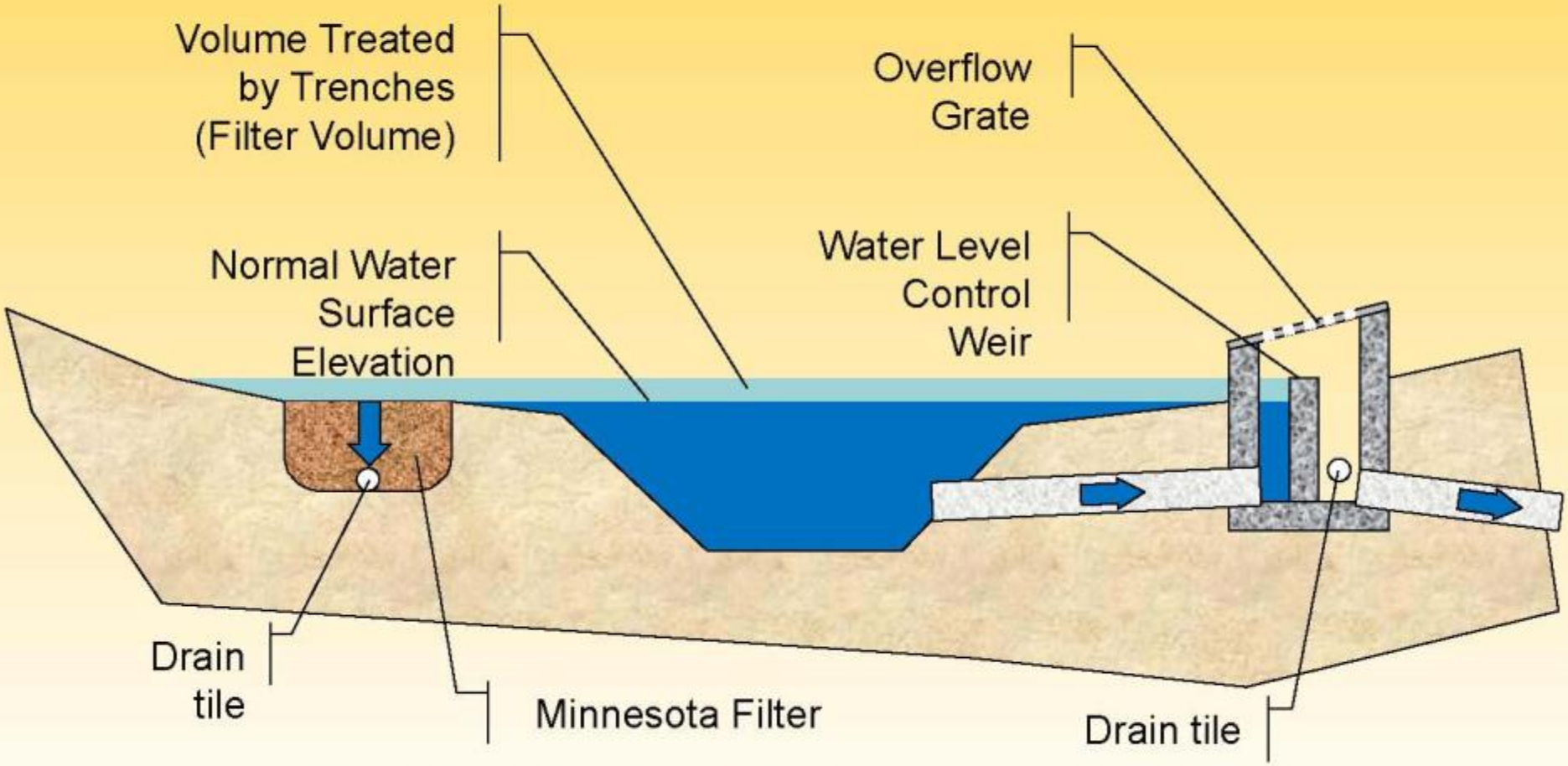
Research: Constructed Filter Systems

"Minnesota Filter" (sand with 5% iron filings, Maplewood, MN)

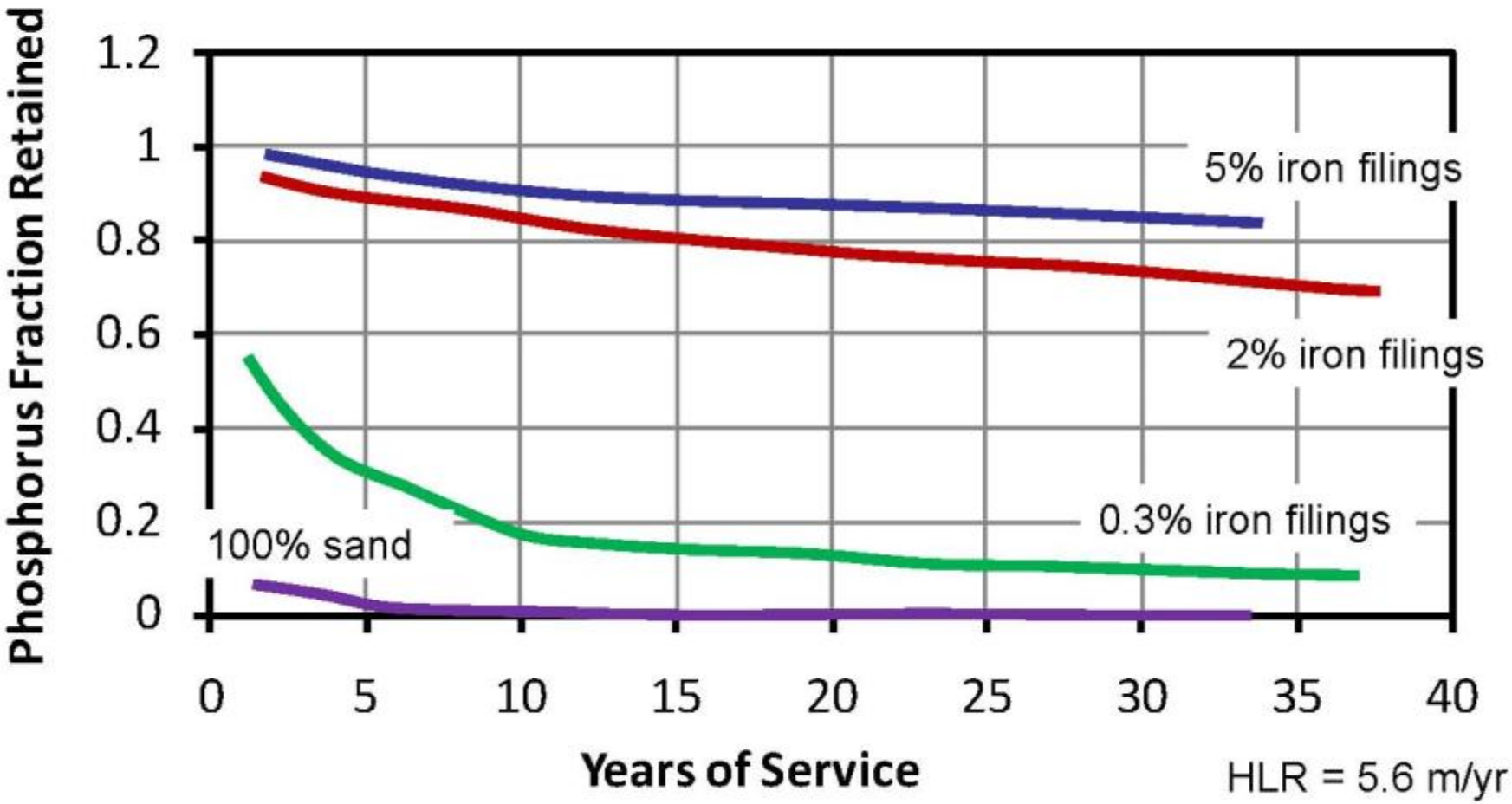


Filter Trenches around wet detention ponds (Prior Lake, MN)

Filter Trenches around wet detention ponds (Prior Lake, MN)



Experimental Results (iron)



2013 INTERNATIONAL LOW IMPACT DEVELOPMENT SYMPOSIUM

August 18-21, 2013
Saint Paul RiverCentre, Saint Paul Minnesota

- Online registration is now available.

~ Update ~

View a PDF copy of the Program at a Glance. (updated 6-28-13)

View a PDF copy of the Draft Program. (updated 5-23-13)

The 2013 International Low Impact Development (LID) Symposium is being hosted in the Midwestern United States through a collaborative effort between many states, universities, and organizations. From the Great Lakes to the Mississippi Watershed, every state in the Midwestern United States is addressing urban water quality issues from combined sewer overflows to stormwater runoff. The 2013 International LID Symposium will bring together over 1,000 professionals to share their research, implementation, policy, financing, and education strategies to build and restore cities while protecting our environment.

Featured Plenary and Luncheon Speakers

Welcome to Minnesota
John Linc Stine, Commissioner, Minnesota Pollution Control Agency

Low Impact Development: Retooling Communities for the 21st Century
Avi Friedman, Ph.D., Professor of Architecture and Director, Affordable Homes

PARTNERS

VUSP
VILLANOVA URBAN STORMWATER PARTNERSHIP

AT A GLANCE

REGISTRATION & CONFERENCE QUESTIONS

Heather Dorr or Nicole Freese
College of Continuing Education, University of Minnesota
612-624-3708
cceconf5@umn.edu

IMPORTANT DEADLINES

6/15/13 - Presenters Registration Deadline (to be

LOW IMPACT DEVELOPMENT IN THE TWIN CITIES, MINNESOTA

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