
Photo courtesy of University of Minnesota Extension Services, Jonah Reyes

Ramsey Conservation District

Free Public Event!

Low Impact Landscaping and Green Cities

Wednesday May 18, 2016
2-4 PM

RSVP to Ashley Bennett at ashley.bennett@co.ramsey.mn.us or 651-266-7277

*Attendees will be entered to win a copy of Heather Holm's book *Pollinators of Native Plants,* which was donated by Heather Holm.

Speakers

I'm Tired of Mowing: Alternatives to High Maintenance Turfgrasses

Jonah Reyes, Turfgrass Research Scientist at the U of M

Capturing Water Quality Co-Benefits; Solar Energy Gardens in Your Community's Ordinances

Brian Ross, Senior Program Director at Great Plains Institute

GreenStep Cities: It's Getting Easier to be Green

Mayor Peter Lindstrom, City of Falcon Heights

Innovative Responses to Infrastructure Challenges

Mark Maloney, Director of Public Works at the City of Shoreview

Location

Marsden Room
Ramsey County Public Works
1425 Paul Kirkwold Drive
Arden Hills, MN 55112

Please park in the back of the building.

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MAKING A DIFFERENCE IN MINNESOTA: ENVIRONMENT + FOOD & AGRICULTURE + COMMUNITIES + FAMILIES + YOUTH

I'm Tired of Mowing!: Alternatives to High Maintenance Turfgrasses

SAM BAUER, UNIVERSITY OF MINNESOTA EXTENSION

2016 SHADE TREE SHORT COURSE

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ENVIRONMENTAL BENEFITS OF LAWNS

- Prevents soil erosion and stabilizes dust
- Filter contaminants from ground and surface water
- Releases oxygen to the atmosphere
- Sequesters carbon
- Moderates the air temperature
- Reduces noise

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CONSEQUENCES OF HIGH MAINTENANCE LAWNS (OR POOR MANAGEMENT)

- Pollute ground and surface waters
  - Over-fertilizing, pesticides
- Waste excessive amounts of clean water
  - Over-watering of lawns
- Deplete nutrient resources
  - Phosphorus
- Expend precious fossil fuels
  - Mowing/fertilizer production
- Negatively impact off-target species

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What Type of Lawn do You Desire

High input ⟷ Low input

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Characteristics of Various Lawn Maintenance Programs

Levels of Maintenance	Watering Practices	Mowing Heights	# of Fertilizer Applications	Weed Control	Best Adapted
V.Low	none	3"+, no mow	0	none	Fescues, natives
Low	little to none	3"+	1	Only as needed	Fescues, Common KBG
Medium	some	2.5-3.5"	2	Only as needed	Fescues, Imp. KBG
High	regularly	2-3"	3+	Controlled	Imp. KBG, perennial rye

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COOL-SEASON TURF SPECIES FOR MINNESOTA

HIGH MAINTENANCE

- Kentucky bluegrass
  - Best quality, good spreading ability, poor in shade, available as sod
- Perennial ryegrass
  - Quick germinating, poor tolerance to winter and summer stress, poor in shade

LOW MAINTENANCE

- Fine fescue species
  - Shade tolerant, slow growing, some salt tolerance
- Tall fescue
  - Best wear tolerance, heat and shade tolerant, coarse leaf texture

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STANDARD MIDWEST MIXTURE

4 **Midwest Mix**

The Scotts Company

Cultivar	Species	Percent
Jump Start	Kentucky Bluegrass	9.48
Wendy Jean	Creeping Red Fescue	8.50
Right	Kentucky Bluegrass	7.71
Silver Dollar	Perennial Ryegrass	7.55
Defender	Perennial Ryegrass	6.83
Treazure II	Chewing's Fescue	4.87
Midnight II	Kentucky Bluegrass	3.00
Other	Super Absorbent Coating	50.00

Product / 1000ft^2	Seed / 1000ft^2	$ / 1000 ft^2	$ / lb. of seed
2.31 lbs	**1.10 lbs**	**$11.53**	**$10.39**

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NON-TRADITIONAL TURFGRASS SPECIES (NATIVE)

- Buffalograss
- Blue grama
- Western wheatgrass
- Texas bluegrass
- Tufted hairgrass
- Prairie junegrass

- Costly, lower density, low public acceptance as “lawn”
- Potential options for ultra low maintenance sites

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GRASSES YOU SHOULD GENERALLY AVOID

- Annual ryegrass
  - Unsightly and annual
- Rough bluegrass (*Poa trivialis*)
  - Intolerant to heat
  - Doesn’t blend well
- Common creeper

- Certain varieties of the popular species
  - ‘Linn’ perennial rye, ‘Park’ Kentucky blue, ‘Kentucky-31’ tall fescue,
  - VNS…….

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LOW-INPUT CHARACTERISTICS

- Disease resistance
- Insect resistance
- Drought tolerance
- Slow vertical growth rate
- Low fertility needs

Photo credit: S. Andersen, SDSU

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CURRENT BREEDING EFFORTS

- Higher input
  - Kentucky bluegrass
  - Perennial ryegrass
- Lower input
  - Tall fescue
  - Hard fescue
  - Sheep fescue
- New species for turf
  - Tufted hairgrass
  - Prairie junegrass

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FINE FESCUES (*FESTUCA SP.)*

- Uses: home lawns, parks, golf course fairways
- Positives
  - Low fertility needs
  - Slow-growing
  - Shade or sun
  - Drought tolerance
  - Winter hardy
  - Quick germination
  - Allelopathy
- Negatives
  - Low traffic tolerance
  - Snow mold

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FINE FESCUES (*FESTUCA SP.)*

Bunch-type

- Hard fescue (*Festuca trachyphylla*)
  - Extensive root system, very drought tolerant, deep green color
- Chewings fescue (*Festuca rubra ssp. commutata*)
  - Excellent density, aggressive, tolerant of close mowing
- Sheep fescue (*Festuca ovina*)
  - Lowest maintenance, minor creeping, bluish-green color

Rhizomatous

- Strong creeping red fescue (*Festuca rubra ssp. rubra*)
  - Most common, good mixed with bluegrass, less aggressive
- Slender creeping red fescue (*Festuca litoralis*)
  - Compact growth, tolerant of close mowing, good salt tolerance

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SALT TOLERANT SPECIES

MNST-12™ Sod Seed Mixture		
Common name	**Approved Varieties** (use of certified seed is preferred)	**% in mix**
Creeping red fescue (slender)	Seabreeze GT[1,2], Shoreline[1], Sealink[1]	20
Creeping red fescue (strong)	Cardinal[1], Celestial, Epic, McAlpin[1], Navigator[1]	20
Kentucky bluegrass	Bedazzled, Diva[1], Moonlight SLT[1], Shiraz	20
Hard, Sheeps and/or Chewings fescue (minimum of two species, each making up at least 10% of the total mix)	Hard fescue: Beacon[1], Bighorn GT[1,2], Little Bighorn[1] Sheeps fescue: Marco Polo[1] Chewings fescue: Radar, SR5130[1]	40

- Tall fescue also has good level of tolerance to salts

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SOD QUALITY ASSURANCE

COUNTY	SOD TYPE*	PRODUCER & ADDRESS	PHONE
Anoka	MNST-12	Anoka Turf Farms, Inc., Tom Elwell 4611 - 139th Lane NE, Ham Lake, MN 55304	763-784-1941
Chisago	MNST-12	Central Turf Farms, Earl Haley Sr. or Earl Haley Jr. (Duke) 13655 Lake Dr. NE, Forest Lake, MN 55025	651-464-2130
Rice	MNST-12	Leon Dahle 407 - 4th St. NW, Morristown, MN 55052	507-685-2245
Dakota	MNST-12	Jirik Sod Farm, Inc., Pete Jirik 20530 Blaine Ave., Farmington, MN 55024	651-460-6555
Anoka	MNST-12	Ray Jordan & Sons, Inc., Ray Jordan 1901 Klondike Dr. NE, East Bethel, MN 55011	763-434-1644
Steele	MNST-2 & MNST-12	Helen M. Nagel, Inc. dba Nagel Sod, Helen Nagel 6119 - 66th St. NW, Medford, MN 55049	507-451-9605

***All the above sod types are approved for use on Mn/DOT projects requiring Salt Tolerant Sod.**

This listing is current as of October 1, 2015.

This listing will be periodically updated on our website - http://www.mncia.org/pages/sod-quality-assurance

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NO MOW MIXTURES

Mix of fine fescues

Reasonable to only mow 1x per year

No ryegrass

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LOW-GROW AND NO-MOW MIXTURES

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Low Grow

Cultivar	Species	Percent
V.N.S.	Sheep Fescue	20.00
Minatour	Hard Fescue	20.00
Intrigue	Chewing's Fescue	25.00
Celestial	Red Fescue	25.00
V.N.S.	Annual Ryegrass	10.00

Other

Product / 1000ft^2	Seed / 1000ft^2	$ / 1000 ft^2	$ / lb. of seed
6.67 lbs	**6.67 lbs**	**$46.66**	**$6.99**

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TURF-TYPE TALL FESCUE
FESTUCA ARUNDINACEA

- Uses: Home lawns, athletic fields, golf roughs, parks
- Positives
  - Drought avoidant
  - Wear tolerant
  - Disease resistant
  - Shade tolerant
  - Quick establishment
  - Heat and salt tolerant
- Negatives
  - Not winter hardy under ice cover
  - Spring seeding

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TURF-TYPE TALL FESCUE

- Bunch-type grass
  - Improved varieties form smaller clumps and possibly some spreading capacity
- Comparable textures to Kentucky bluegrass
- Deep green color
- Best if TF consists of 75% or more of a stand

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TALL FESCUE BLENDS ARE BECOMING MORE COMMON

10 **Tall Fescue**

The Scotts Company

Cultivar	Species	Percent
Dynamic II	Tall Fescue	17.08
Gazelle II	Tall Fescue	17.00
Faith	Tall Fescue	14.88
Other	Super Absorbent Coating	50.00

Product / 1000ft^2	Seed / 1000ft^2	$ / 1000 ft^2	$ / lb. of seed
4.00 lbs	**1.96 lbs**	**$10.29**	**$5.25**

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PRAIRIE JUNEGRASS
KOELERIA MACRANTHA

- North American prairie
- Very good low-input **potential**
- *Positives*
  - Heat stress tolerance
  - Reduced water needs
  - Reduced fertility
  - Slow vertical growth rate
- *Negatives*
  - Establishment
  - Seed availability and cost
  - Leaf spot susceptibility

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Prairie Junegrass Turf Evaluation

TUFTED HAIRGRASS (*DESCHAMPSIA CESPITOSA*)

- Low-input turfgrass
- Used in Europe
- *Positives*
  - Heavy metal tolerance
  - Shade grass
  - Reduced fertility needs
- *Negatives*
  - Heat and drought problems
  - Poor seed production
  - Billbug damage
  - Rust disease

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Tufted Hairgrass Turf Evaluation

WHERE TO FIND VARIETY DATA

WHAT'S INSIDE

- Home
- Education
- Research
  - Cultivar Evaluation Results
  - Recent Publications
  - Research Center
- People
- Home Lawn Information
- Upcoming Events
- Giving to Turfgrass Science

www.turf.umn.edu

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WHERE TO PURCHASE SEED?

http://turf.umn.edu/purchasing-turfgrass-seed/

- Professional distributors
- Online sources
- Local garden centers- specifically ask what you are looking for
- Big box stores- look at the fine print

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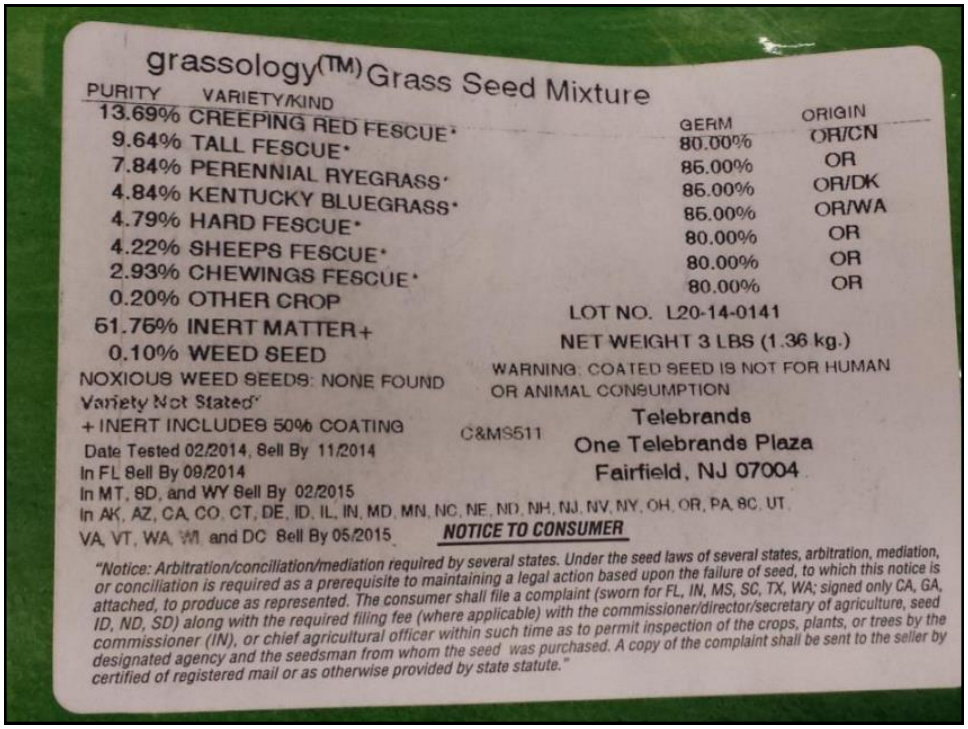

grassology(TM) Grass Seed Mixture

PURITY	VARIETY/KIND	GERM	ORIGIN
13.69%	CREEPING RED FESCUE*	80.00%	OR/CN
9.64%	TALL FESCUE*	85.00%	OR
7.84%	PERENNIAL RYEGRASS*	85.00%	OR/DK
4.84%	KENTUCKY BLUEGRASS*	85.00%	OR/WA
4.79%	HARD FESCUE*	80.00%	OR
4.22%	SHEEPS FESCUE*	80.00%	OR
2.93%	CHEWINGS FESCUE*	80.00%	OR
0.20%	OTHER CROP		
51.76%	INERT MATTER+		
0.10%	WEED SEED		

NOXIOUS WEED SEEDS: NONE FOUND
Variety Not Stated*
+ INERT INCLUDES 50% COATING
Date Tested 02/2014, Sell By 11/2014
In FL Sell By 09/2014
In MT, SD, and WY Sell By 02/2015
In AK, AZ, CA, CO, CT, DE, ID, IL, IN, MD, MN, NC, NE, ND, NH, NJ, NV, NY, OH, OR, PA, SC, UT, VA, VT, WA, WI and DC Sell By 05/2015

LOT NO. L20-14-0141
NET WEIGHT 3 LBS (1.36 kg.)
WARNING: COATED SEED IS NOT FOR HUMAN OR ANIMAL CONSUMPTION
C&MS511
Telebrands
One Telebrands Plaza
Fairfield, NJ 07004

NOTICE TO CONSUMER

"Notice: Arbitration/conciliation/mediation required by several states. Under the seed laws of several states, arbitration, mediation, or conciliation is required as a prerequisite to maintaining a legal action based upon the failure of seed, to which this notice is attached, to produce as represented. The consumer shall file a complaint (sworn for FL, IN, MS, SC, TX, WA; signed only CA, GA, ID, ND, SD) along with the required filing fee (where applicable) with the commissioner/director/secretary of agriculture, seed commissioner (IN), or chief agricultural officer within such time as to permit inspection of the crops, plants, or trees by the designated agency and the seedsman from whom the seed was purchased. A copy of the complaint shall be sent to the seller by certified of registered mail or as otherwise provided by state statute."

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SPECIES DEMONSTRATIONS ON 3-MILE DRIVE AT THE ARBORETUM IN CHASKA

- Tall fescue
- Hard fescue
- Slender creeping red fescue
- Strong creeping red fescue
- Sheep fescue
- Chewings fescue
- Kentucky bluegrass
- Perennial ryegrass
- Annual ryegrass
- Creeping bentgrass
- Colonial bentgrass
- Annual bluegrass
- Rough bluegrass
- Buffalograss

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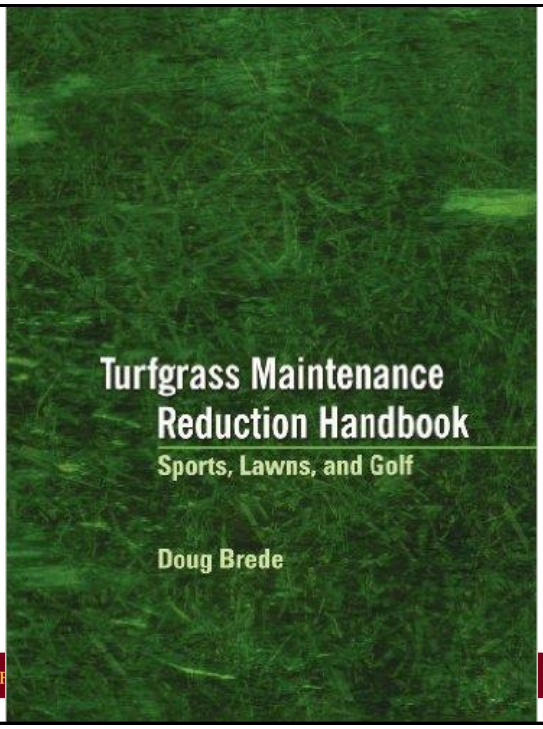

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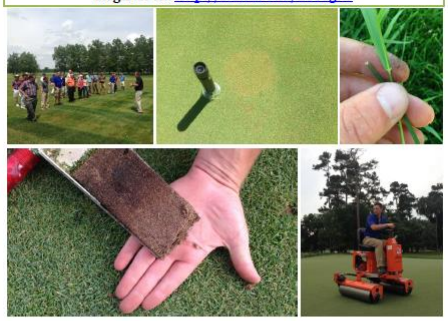
Register at: http://z.umn.edu/2016glts



2016 Great Lakes School of Turfgrass Science Online (For Professionals)

Online Program (Jan. 6th –Mar. 23th 2016)

- Live Wednesday night online sessions from 6-8pm (CST)
- 12 internationally renowned turfgrass science faculty from across the Great Lakes Region
- 24 hrs of in-depth training in turfgrass science and management

Questions about the class?
Contact: Sam Bauer (sjbauer@umn.edu, 763-767-3518)

Class fee: $495.00/person

Registration deadline: Thurs. Dec 31st, 2015

Register at: http://z.umn.edu/2016glts

Register at: http://z.umn.edu/2016glts

2016 Great Lakes School of Turfgrass Science Instructors

Without question, the strength of this new online school lies within the depth and experience of the turfgrass faculty. This program allows for extensive interaction with researchers and educators having national and international recognition.

Sam Bauer, M.Sc.
Assistant Extension Professor Extension Agriculture, Food and Natural Resources
University of Minnesota-Twin Cities

Paul Koch, Ph.D.
Assistant Professor
Department of Plant Pathology
University of Wisconsin-Madison

Dave Chalmers, Ph.D.
Professor and Extension Specialist Emeritus
Department of Soil and Crop Science
Texas A&M AgriLife Extension

Aaron Patton, Ph.D.
Associate Professor and Extension Turfgrass Specialist
Department of Agronomy
Purdue University

Kevin Frank, Ph.D.
Associate Professor and Extension Turfgrass Specialist
Department of Crop and Soil Sciences
Michigan State University

Frank Rossi, Ph.D.
Associate Professor and Extension Turfgrass Specialist
Department of Horticulture
Cornell University

David Gardner, Ph.D.
Associate Professor
Department of Horticulture and Crop Science
The Ohio State University

Doug Soldat, Ph.D.
Associate Professor and Extension Turfgrass Specialist
Department of Soil Science
University of Wisconsin-Madison

Brian Horgan, Ph.D.
Professor and Extension Turfgrass Specialist
Department of Horticultural Science
University of Minnesota-Twin Cities

Chris Williamson, Ph.D.
Professor and Extension Specialist
Department of Entomology
University of Wisconsin-Madison

Ed Nangle, Ph.D.
Director of Turfgrass Programs
Chicago District Golf Association

Eric Watkins, Ph.D.
Associate Professor
Department of Horticultural Science
University of Minnesota-Twin Cities

Register at: http://z.umn.edu/2016glts

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ADDITIONAL INFORMATION

Extension
Turfgrass Science

- UMN Turfgrass Science Website: www.turf.umn.edu
- UMN Extension Turfgrass Management Website: www.extension.umn.edu/turfgrass
- Sustainable Urban Landscape Information Series: www.sustland.umn.edu

Yard and Garden Info:

- Facebook: "University of Minnesota Yard and Garden"
- Twitter: @urbanturfmn and @UMNyardgarden
- Blog: http://blog.lib.umn.edu/efans/ygnews/

Smart Gardens Radio Show WCCO AM830, Saturdays 8-9am

Sam contact: 763-767-3518, sjbauer@umn.edu, twitter = @urbanturfmn

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CAPTURING WATER QUALITY CO-BENEFITS: SOLAR ENERGY GARDENS

RAMSEY COUNTY CONSERVATION
MAY 18, 2016

Brian Ross, AICP, LEED GA
Senior Program Director

GREAT PLAINS INSTITUTE Better Energy. Better World.

Our Mission . . .

Transforming the way we produce, distribute and consume energy to be both economically and environmentally sustainable.

GREAT PLAINS INSTITUTE Better Energy. Better World.

Achieving our Mission by:

1. Developing better energy policy via consensus decision-making.
2. Working with communities to identify and implement local and regional sustainability priorities.
3. Providing local, state, and federal policy-makers with reliable analysis & decision tools.

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Sustainable Communities

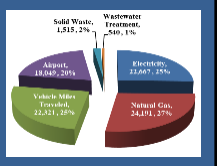
Transforming the world through community action

1. Grow Solar Partnership
2. GreenStep Cities
3. Metro Clean Energy Resource Team (CERT)
4. Sustainability Planning and Technical Assistance

CLEAN ENERGY RESOURCE TEAMS

Minnesota GreenStep Cities

Grow Solar



GREAT PLAINS INSTITUTE Better Energy. Better World.

Conclusions

1. Solar development can, with proper siting, design and maintenance, serve as a water quality and habitat amenity to the community.
2. Co-benefits are unlikely to be realized unless the community takes proactive planning or regulatory action.

Source: Thomas Kohler, Creative Commons

Solar development, water quality and habitat?

Photo Credit: *Buffalo Township, Midwest Energy New, 5/9/16*

Photo Credit: https://www.youtube.com/watch?t=78&v=EdeVaT-zZt4, Fresh Energy Presentation on Biodiverse Habitat on Solar Sites

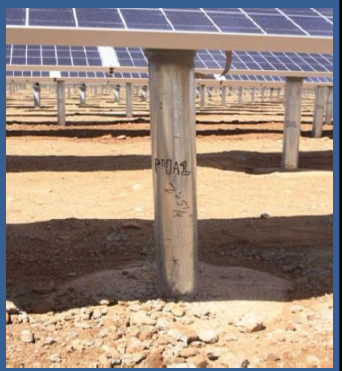


Photo Credit: *Brenda Beatty, NREL, Overview of Opportunities for Co-Location of Solar Energy Technologies and Vegetation*

Are Solar Panels Impervious Surfaces?

Image credit: Paul Giamou via Getty Images

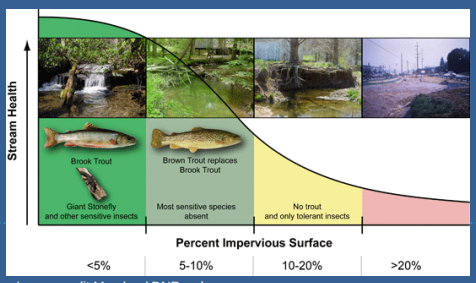
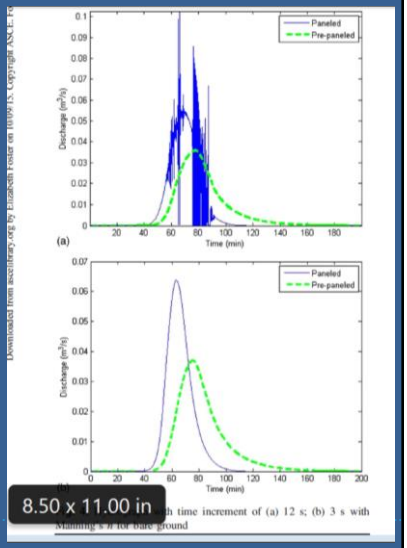


Image credit Maryland DNR webpage



8.50 x 11.00 in

Image credit: Hydrologic Response of Solar Farms, Journal of Hydrologic Engineering, May, 2013

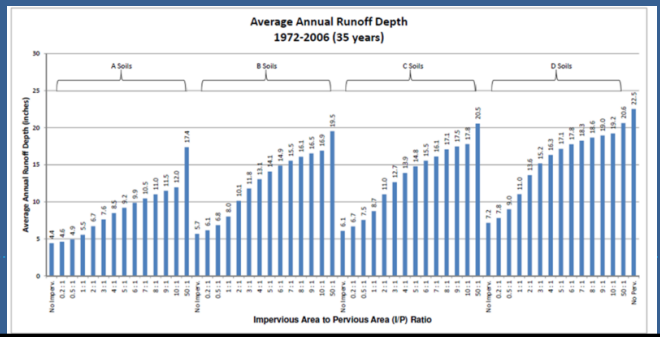
Development and Operator Benefits

for vegetated ground cover

- ✓ National Renewable Energy Laboratory (NREL) is studying how vegetated ground cover affects solar production.
- ✓ Costs to developers and operators are frequently lower with vegetated ground cover, compared with typical practices

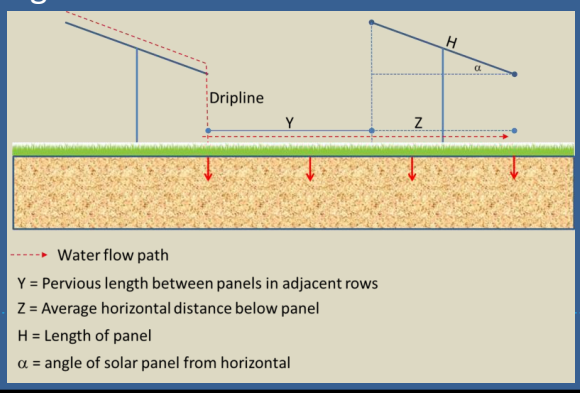
Is Vegetated Ground Cover Enough?

- ✓ Hydrologic modeling conducted by the Pollution Control Agency (MPCA)
- ✓ Assumes a managed grass ground cover
- ✓ Even with pervious soils, additional mitigation would be needed



Is Vegetated Ground Cover Enough?

- ✓ Does not consider variation in ground cover types
- ✓ Does not consider what the solar farm is replacing
- ✓ Guidance, not requirement; local jurisdiction has the final judgement



Protecting Water Quality?

Photo credit: Lafayette Parish Guide to Understanding Stormwater
www.lafayettela.gov/stormwater/pages/default.aspx

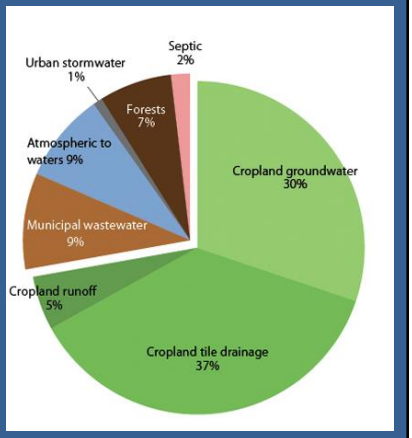


Image credit: Nitrogen in Minnesota Surface Waters, MnPCA

Creating and Protecting Pollinator Habitat

- ✓ Protecting and restoring pollinator habitat (bees, butterflies, insects) is a national movement recognizing dramatically reduced habitat is diminishing a vital part of our eco-system.
- ✓ Pollinators support a variety of other habitats, including agricultural habitats
- ✓ Minnesota is actively working to restore pollinator habitat

Minnesota Board of Water & Soil Resources

Pollinator Habitat

Each year native and domesticated bees pollinate around 30% of crops in the United States with a value of approximately $23 billion. They also pollinate around 70-80 percent of flowering plants in the Midwest, playing a key role in their seed production. Native bee populations that include more than 4,000 species in North America have declined in recent years due to habitat loss and pesticides use among other factors. At the same time, managed colonies of European honey bees have suffered a 50% decline in recent decades.

While Honey Bees and Bumble Bees are the most commonly known pollinators, they only make up about 2% of bee species in Minnesota. The remaining species are solitary bees that do not live in colony systems like Honey or Bumble bees (with division of labor and cooperative rearing of young). Supporting native solitary bee habitat is important, as like honey bees, their populations are also in decline. Pay attention to the various pollinators and their habitat needs in the landscape to help protect and enhance their existing habitat.

Other pollinators of concern include beetles such as the Longhorned beetle, flies such as the Syrphid fly, moths and butterflies. Many of these pollinators have their own unique habits and needs, for example, many moths tend to pollinate white or dull colored blossoms that flower at night. Some plant species are dependent on others for the completion of their lifecycle, such as the Monarch butterflies dependence on milkweed, and the endangered Karner Blue butterflies need for Wild Lupine. By establishing native vegetation, one can support the intricate relationships foraged between native pollinators and native vegetation that keep both populations healthy.

Site Selection

Adequate food, shelter, and nesting sites are all needed to support healthy pollinator populations. The following are key considerations for selecting areas for pollinators:

1) Look for areas away from pesticide and fungicide use, as well as areas that lack widespread disturbances that may impact pollinators.

2) Habitat complexes and corridors provide "safe zones" and natural passageways for pollinators, as well as nesting and forage sites, and sources of water.

3) Some bees have a relatively small flight distance and benefit from having water and food sources within 200 feet of nesting sites.

Habitat complexes and corridors are important nesting and food sources for pollinators

Bees pollinating marsh Milkweed.

A mason bee home made by drilling holes into layered 2 x 4s.

The Community's Choice: Just Solar Development, or Habitat Opportunity?

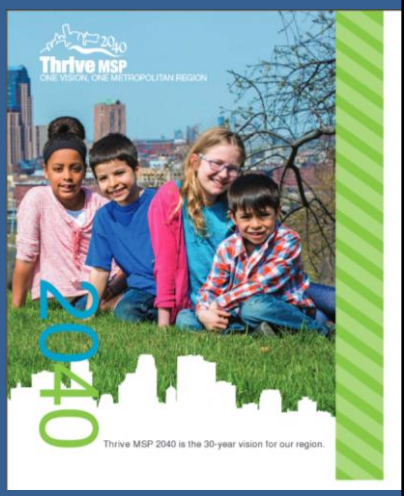
Image credit: Paul Giamou via Getty Images

Photo Credit: Guy Parker

Metro Area Comprehensive Plan Solar Requirement

Metropolitan Land Planning Act

Subd. 2. Land use plan. (b) A land use plan shall contain a protection element, as appropriate, for historic sites, the matters listed in the water management plan required by section 103B.235, **and an element for protection and development of access to direct sunlight for solar energy systems.**



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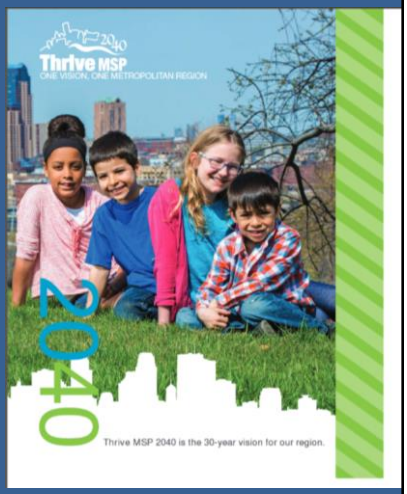
Regional Plan – Resiliency Element

Community's Role

- ✓ Ensure that local comprehensive plans and ordinances **protect and enable the development of solar resources, as required by the Metropolitan Land Planning Act,** and consider the use of other alternative energy sources as part of the planning process. (P. 136)

- ✓ **Consider the development or use of community solar gardens (CSGs**) by public and private entities to enable fuller and more economic use of the community's solar resource, including participating as subscribers, assisting in marketing community solar garden opportunities for economic development, and providing sites for gardens to be developed.



Source: Thrive MSP 2040, P. 136

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Planning Best Practices

Conflicts and Co-benefits

Acknowledging potential conflicts and synergies between solar development and other resources;

- ✓ Agricultural practices and ag resources
- ✓ Urban forests
- ✓ Historic resources
- ✓ Airport facilities and safety
- ✓ Natural areas and habitat
- ✓ Water quality
- ✓ Resiliency

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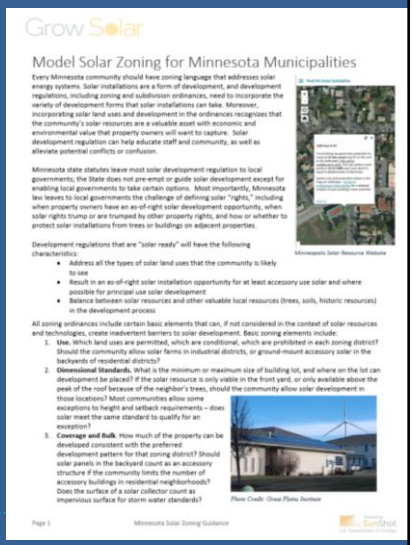
Planning Best Practices

Development Regulations that:

- ✓ explicitly address solar development in its varied forms,
- ✓ create as-of-right installation opportunities, and
- ✓ set clear and predictable standards for balancing solar resources with other resources and capturing co-benefits.


Grow Solar

Model Solar Zoning for Minnesota Municipalities

Every Minnesota community should have zoning language that addresses solar energy systems. Solar installations are a form of development, and development regulations, including zoning and subdivision ordinances, need to incorporate the variety of development forms that solar installations can take. Moreover, incorporating solar land uses and development in the ordinances recognizes that the community's solar resources are a valuable asset with economic and environmental value that property owners will want to capture. Solar development regulation can help educate staff and community, as well as alleviate potential conflicts or confusion.

Minnesota state statutes leave most solar development regulation to local governments; the State does not pre-empt or guide solar development except for enabling local governments to take certain options. Most importantly, Minnesota law leaves to local governments the challenge of defining solar "rights," including when property owners have an as-of-right solar development opportunity, when solar rights trump or are trumped by other property rights, and how or whether to protect solar installations from trees or buildings on adjacent properties.

Development regulations that are "solar ready" will have the following characteristics:

- Address all the types of solar land uses that the community is likely to see
- Result in an as-of-right solar installation opportunity for at least accessory use solar and where possible for principal use solar development
- Balance between solar resources and other valuable local resources (trees, soils, historic resources) in the development process

All zoning ordinances include certain basic elements that can, if not considered in the context of solar resources and technologies, create inadvertent barriers to solar development. Basic zoning elements include:

1. **Use.** Which land uses are permitted, which are conditional, which are prohibited in each zoning district? Should the community allow solar farms in industrial districts, or ground-mount accessory solar in the backyards of residential districts?
2. **Dimensional Standards.** What is the minimum or maximum size of building lot, and where on the lot can development be placed? If the solar resource is only viable in the front yard, or only available above the peak of the roof because of the neighbor's trees, should the community allow solar development in those locations? Most communities allow some exceptions to height and setback requirements – does solar meet the same standard to qualify for an exception?
3. **Coverage and Bulk.** How much of the property can be developed consistent with the preferred development pattern for that zoning district? Should solar panels in the backyard count as an accessory structure if the community limits the number of accessory buildings in residential neighborhoods? Does the surface of a solar collector count as impervious surface for storm water standards?

Photo Credit: Great Plains Institute

Page 1 Minnesota Solar Zoning Guidance

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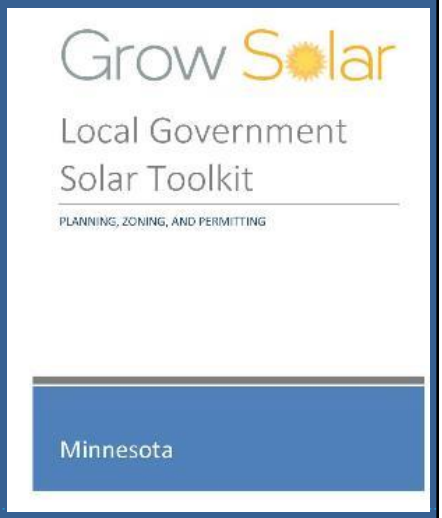
Planning Best Practices

Model Ordinance:

1. **Language addressing solar as accessory uses**
2. **Language addressing solar as a principle use (solar farms, solar gardens)**



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Advanced Zoning Concepts

Advanced regulation affecting solar development

- ✓ **Integrating solar regulation with other processes**
  - planned unit development
  - subdivision standards
  - environmental regulations
  - agricultural protection
  - conservation development
  - utility infrastructure
  - historic preservation
  - resiliency

Photo credit: 8minuteenergy

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Model Ordinance - Agricultural Protection

(7) Agricultural Protection - Solar farms must comply with site assessment or soil identification standards that are intended to protect agricultural soils.

Agricultural Protection

If the county has ordinances that protect agricultural soils, this provision applies those same standards to solar development. Counties should understand, however, that solar farms do not pose the same level or type of risk to agricultural practices as does housing or commercial development.

20

Ground Cover/Pollinator Standards

Ground around and under solar arrays and in project site buffer areas shall be planted and maintained in perennial vegetated ground cover, and meet the following standards:

Conclusions

1. **Solar development can, with proper siting, design and maintenance, serve as a water quality and habitat amenity to the community.**
2. **Co-benefits are unlikely to be realized unless the community takes proactive planning or regulatory action.**

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THANK YOU!

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Senior Program Director
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State Protection - Agricultural Lands

Environmental Review Standards

Subp. 2. Agricultural land. "Agricultural land" means land that is or has, within the last five years, been devoted to the production of livestock, dairy animals, dairy products, poultry and poultry products, fur bearing animals, horticultural and nursery stock, fruit, vegetables, forage, grains, or bees and apiary products. Wetlands, naturally vegetated lands, and woodlands contiguous to or surrounded by agricultural land shall be considered agricultural lands if under the same ownership or management as that of the agricultural land during the period of agricultural use.

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State Protection - Agricultural Lands

Environmental Review Standards

Subp. 36. Land use conversion, including golf courses. . .

A. For golf courses, residential development where the lot size is less than five acres, and other projects resulting in the permanent conversion of 80 or more acres of agricultural, native prairie, forest, or naturally vegetated land, the local government unit shall be the RGU, except that this subpart does not apply to agricultural land inside the boundary of the Metropolitan Urban Service Area established by the Metropolitan Council.

Subp. 57. Permanent conversion. "Permanent conversion" means a change in use of agricultural, naturally vegetated, or forest lands that impairs the ability to convert the land back to its agricultural, natural, or forest capacity in the future. It does not include changes in management practices, such as conversion to parklands, open space, or natural areas.

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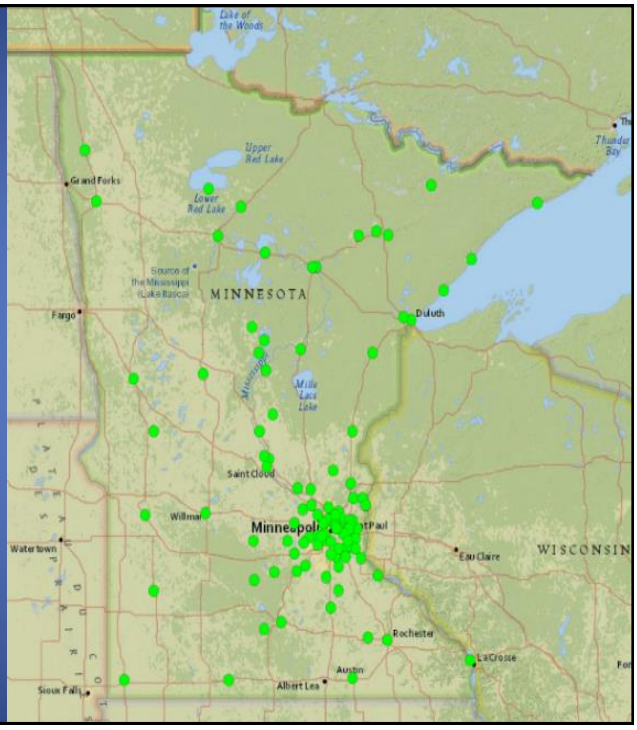
Sustainability
Solutions are
Looking Up


Cities…
Part of the Problem… AND SOLUTION

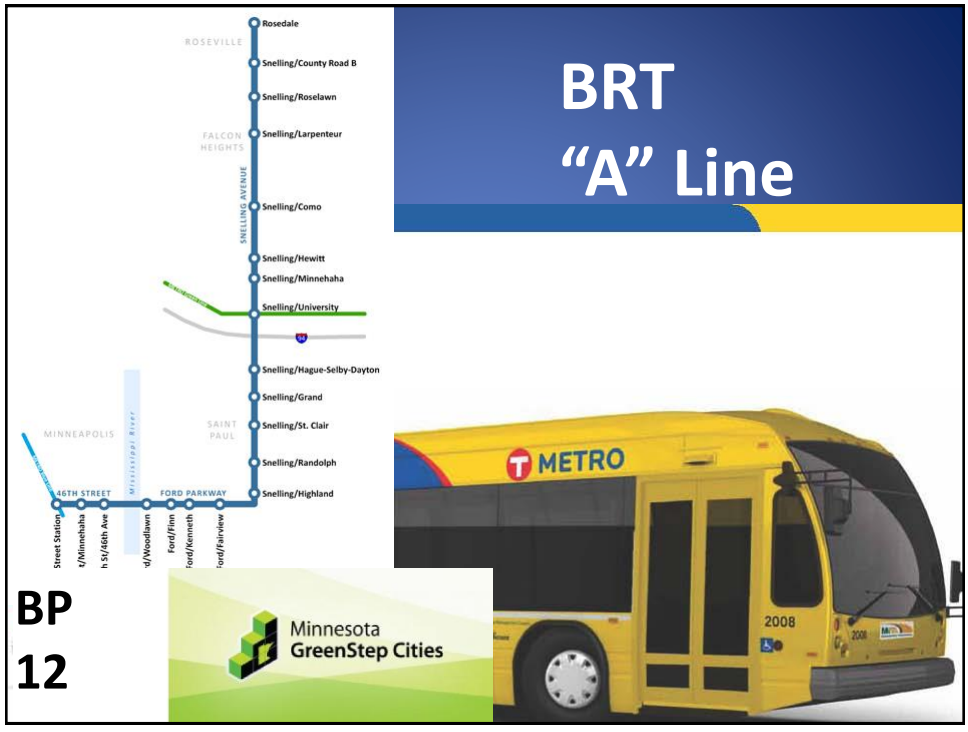

Minnesota
GreenStep Cities

41% of the State's population lives in a GreenStep City



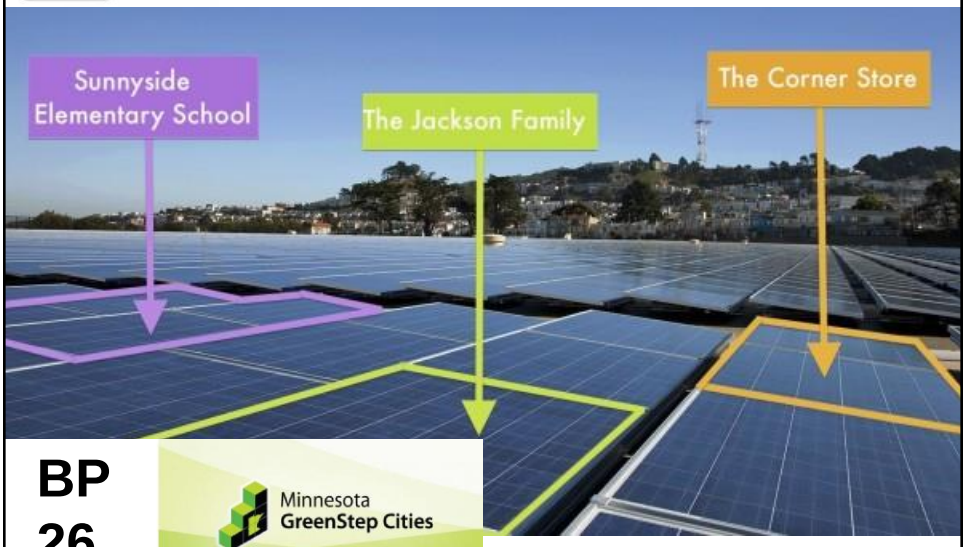

Urban Agriculture
On the Rise
BP 27
Minnesota GreenStep Cities


Working Together to Lower GHG & Promote Healthy Living
BP 11
Minnesota GreenStep Cities


Rosedale
Snelling/County Road B
Snelling/Roselawn
Snelling/Larpenteur
Snelling/Como
Snelling/Hewitt
Snelling/Minnehaha
Snelling/University
Snelling/Hague-Selby-Dayton
Snelling/Grand
Snelling/St. Clair
Snelling/Randolph
Snelling/Highland
ROSEVILLE
FALCON HEIGHTS
SNELLING AVENUE
MINNEAPOLIS
SAINT PAUL
Mississippi River
46TH STREET
FORD PARKWAY
BRT
"A" Line
METRO
2008
BP
12
Minnesota
GreenStep Cities


2/3rds of
City Hall's Power
Is Offset by
SOLAR
BP
26
Minnesota
GreenStep Cities

COMMUNITY SOLAR GARDENS



BP 26

Minnesota GreenStep Cities

BP 26

Minnesota GreenStep Cities

SAVES OVER 20%


Resilience Analysis:
Vulnerabilities, Strengths & Solutions
Rain Gardens
Shared Services
Solar Energy
Porous Pavers
Green Space
Community Gardens
Bike Infrastructure
CERT
Responsible Budget
GreenStep Cities
Energy Efficiency
Tree Planting
Complete Streets
Housing Density
BP 29
Minnesota GreenStep Cities


Adapting to Stronger Storms by Lowering Storm Ponds…Automatically
BP 29
Minnesota GreenStep Cities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SUSTAINABLY
AND
PROSPER
@GREENSMITH

Innovative Responses to Infrastructure Challenges

Ramsey Conservation District

May 18, 2016

Shoreview

Mark Maloney, Director of Public Works

Shoreview, Minnesota

- 27,000 Pop.
- Rapid Growth 1970/80's
- 33% Parks, Open Space & Water Bodies
- Quality of Life Indicators

Shoreview

Surface Water - Changing Regulations

1970's (Focus - Flooding)
- Leverage natural water bodies
- Drain surface water ASAP

1980-90's (NURP, Protect Wetlands)
- Treat surface water runoff prior to discharge into natural water bodies
- Constructed ponds and converted low areas

2003-current (Water Quality)
- Reduce runoff. Period.
- Favor reuse, infiltration, filtration, bio-filtration
- Combine ponds with other treatment options

Future - ?

Shoreview

Improved Storm Water Retrofits

Con Tech Filters
- Removable/replaceable
- 5-10 yr life?

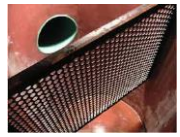
Improved Storm Water Retrofits

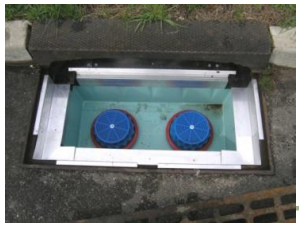
SAFL Baffle

Reduce sediment transport

CB Filter Insert

Filtration near source





Improved Storm Water Retrofits

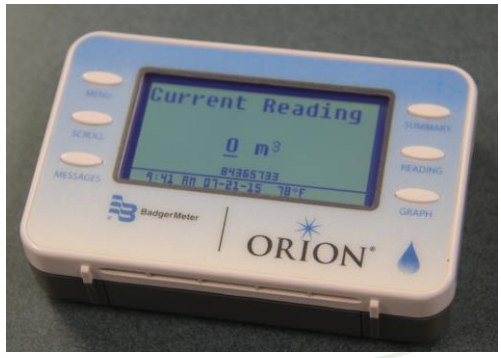
- 1980's NURP detention Pond

- 2013 Rebuilt as multi-cell Sand Filter

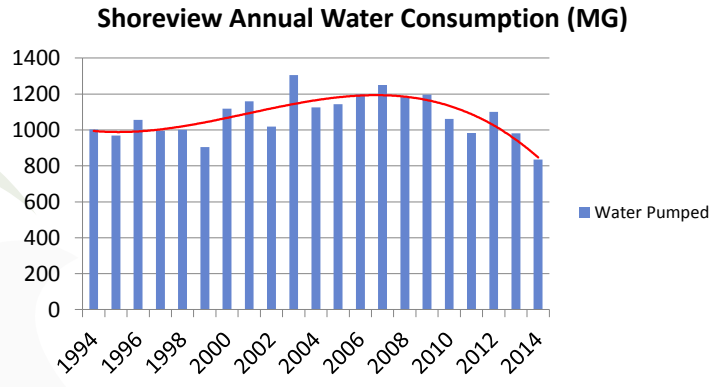
Shoreview

Water Conservation Project

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

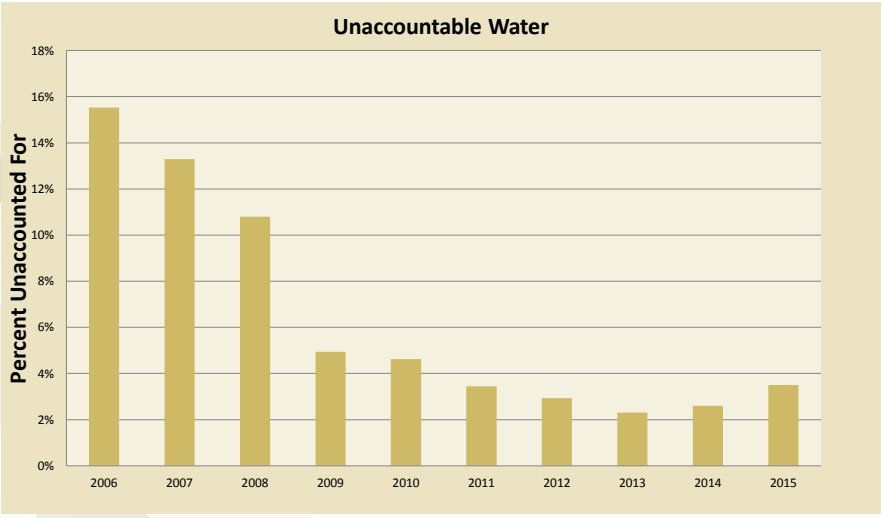


Water Fact: Water Use In Shoreview Is Actually Trending Downward.



Shoreview

Leak Detection/Metering



LED Street Lighting

Permeable Pavements

- Storm Water Management Drives Innovation
- Address Pavement & Water Quality Issues Simultaneously
- Reduce Traditional/NURP Infrastructure?
- Possible to Reduce Winter Maintenance?

Shoreview

Woodbridge Neighborhood (2009)

25’ Wide Residential Streets (8,600 SY)
7” Pervious Concrete, 18”-30” CA Filter
No Storm Sewer or Sub drains (high infiltration soils)
Saw Joints, Curing Fabric

Shoreview

Shoreview

Shoreview


WATER

Shoreview Maintenance Building (2011)

20 Vehicle Parking Lot (800 SY)
6" Pervious Concrete, 30" CA Filter Aggregate
Subgrade Drainage (low infiltration soils)
Saw Joints, Curing Fabric

Shoreview


10/30/2014


10/30/2014

We Do Things Differently……

Forward Thinking City Leaders

Long-Range Infrastructure Policies

Atmosphere of Trust = Innovative Environment

Community Surveys as Reality Check

The World Notices

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