Water-Wise Lawns: Low Input and Low Maintenance

SAM BAUER, EXTENSION EDUCATOR- TURFGRASS SCIENCE
BEYOND RAINGARDENS WORKSHOP, SEPTEMBER 10TH, 2014
Big water bills create waves in Rockford

Article by: Susan Feyder
Star Tribune
September 5, 2014 - 9:43 PM

Wayne Olfert knew his town of Rockford had boosted water and sewer rates, but he was shocked last week when he got his latest bill.

“I thought it had to be for three months,” said Olfert of the charges, which had more than tripled. “When my wife said, ‘No, that’s just for one month,’ I blew a gasket.”
We need to water our lawns every other day?

The council approved a 65 percent increase in the water rate and a 38 percent rise in the wastewater rate. It also OK’d a new method for determining people’s summertime sewer bills based on their summer water usage.

Rockford previously had averaged people’s water use in the winter and used that figure to calculate residents’ wastewater bills in the summer. But that method resulted in inequities, Madsen said. For example, people who left town for the winter would wind up having extremely low summertime sewer bills.

But the new method doesn’t separate indoor and outdoor water use. That means those who use more water sprinkling their yards can be unfairly charged for water that doesn’t go down sewer lines.

Formula jacks up bills

Mike Finger said the new calculation caused sewer usage on his bill to jump from 7,000 gallons in July 2013 to 33,000 gallons this year. The skewed figure, along with increased rates, triggered a $300 increase in his bill, to $440.

Finger said he typically sprinkles his yard every other day and his 10-year-old daughter uses water for her vegetable garden. “I’m proud of my property, and I want it to look nice,” Finger said. He said the city should be encouraging residents to improve their property values.

Madsen said the city didn’t do a good job of explaining that people could avoid inflated sewer bills by installing a separate “deduct meter” to record water usage not disposed of through the sewer system. In addition to modifying some of the rate increases, the city is considering offering the meters for sale for $150. Residents would have to hire plumbers to install them at a cost of $300 to $500.
Main cause(s) of excessive water use on lawns?:
Grass species?
Lawns constructed with poor soils?
Our misperception of how much water lawns need?
Irresponsibility?
Expectations are too high?
Main cause(s) of excessive water use on lawns:

- Grass species?
- Lawns constructed with poor soils?
- Our misperception of how much water lawns need?
- Irresponsibility?
- Expectations are too high?
Turfgrass species
HOW IMPORTANT IS SELECTING THE PROPER GRASS SPECIES?
COOL-SEASON TURF SPECIES THAT MEET PUBLIC EXPECTATIONS IN MN

- Kentucky bluegrass
  - Most common species in MN, high quality, high maintenance

- Perennial ryegrass
  - Included in many seed mixtures, quick establishment, high maintenance, poor winter hardiness

- Fine fescue species
  - Fine texture, low maintenance, component of no-mow mixtures

- Tall fescue
  - Coarser texture, low maintenance, drought avoidant

- Bentgrasses
  - Used mostly on golf courses, generally higher maintenance
DROUGHT RESISTANCE OF TURFGRASSES

- Tall fescue
- Fine fescue
- Kentucky bluegrass
- Perennial ryegrass
- Bentgrasses

Best recommendation for balancing low maintenance with average expectations

Turgeon, 2005
DROUGHT RESISTANCE

Drought resistance = avoidance + tolerance

1. Drought avoidance
   - Deep/extensive root system, thick cuticle, small stomata openings, dormancy, escape
   - Tall fescue (deep roots), Kentucky bluegrass (dormancy)

2. Drought tolerance
   - Ability to tolerate drought and survive desiccation, low water users
   - Fine fescues (low water use)
The Major Cool Season Lawn Grasses

- **Fine fescues** (*Festuca* spp.)
  - Known for their fine leaf texture
  - Great for shaded areas
  - Lower nitrogen and water requirements
  - Very low to medium care

*Photo: Andrew Hollman, U of MN*
HARD FESCUE
*FESTUCA TRACHEPHYLLA*

- **Uses**: home lawns, parks, golf course fairways

- **Positives**
  - Low fertility needs
  - Slow-growing
  - Shade or sun
  - Drought tolerance

- **Negatives**
  - Disease under wear
  - Snow mold
### OTHER FINE FESCUE SPECIES

<table>
<thead>
<tr>
<th>Strong creeping red fescue</th>
<th>Chewings fescue</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Often mixed with Kentucky bluegrass for partial shade</td>
<td>• Excellent density</td>
</tr>
<tr>
<td>• Rhizomatous growth</td>
<td>• Very aggressive</td>
</tr>
<tr>
<td>• Disease problems</td>
<td>• Summer-stress tolerance</td>
</tr>
<tr>
<td>• Not as good in heat/drought</td>
<td>• Snow-mold susceptibility</td>
</tr>
<tr>
<td></td>
<td>• Bunch-type</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Slender creeping red fescue</th>
<th>Sheep fescue</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Similar to strong creeping red fescue</td>
<td>• Slow vertical growth</td>
</tr>
<tr>
<td>• Salt-tolerance</td>
<td>• Grayish-green color</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TALL FESCUE
FESTUCA ARUNDINACEA

- Introduced in United States as a forage grass
- First used as turf in 1940s and 1950s

**Uses**
- Home lawns
- Athletic fields
- Golf course roughs
- Parks
TALL FESCUE

- **Positives**
  - Drought avoidant
  - Wear tolerant
  - Disease resistant

- **Negatives**
  - Not winter hardy under ice cover
  - Spring seeding
  - Some varieties have a coarse leaf texture
CONSUMER SEED MIXTURES

Are the right species mixtures available to you on the marketplace?

Yes and no
Limited Time Offer: DOUBLE THE SIZE!
PEBBLE BEACH FAIRWAY GRASS SEED MIXTURE

PURE SEED
39.56% BARVERDI ANNUAL RYEGRASS
19.58% BOREAL CREEPING RED FESCUE
09.73% ADELINE PERENNIAL RYEGRASS *
09.63% KENBLUE KENTUCKY BLUEGRASS
04.72% OXFORD HARD FESCUE *
00.50% OTHER CROP SEED
01.18% INERT MATTER
00.10% WEED SEED
15.00% WATER SAVER SEED COATING *

GERMINATION ORIGIN
90% OR
85% CAN
85% DENMARK
85% WA

IN MN, IN, IL SELL BY: 8/15
TEST DATE: 5/14

NET WT.: 20 LBS
LOT: 63572
BARENBURG USA
P.O. BOX 239
TANGENT, OR 97389

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## Standard Minnesota Mixture

### Midwest Mix

*The Scotts Company*

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Species</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jump Start</td>
<td>Kentucky Bluegrass</td>
<td>9.48</td>
</tr>
<tr>
<td>Wendy Jean</td>
<td>Creeping Red Fescue</td>
<td>8.50</td>
</tr>
<tr>
<td>Right</td>
<td>Kentucky Bluegrass</td>
<td>7.71</td>
</tr>
<tr>
<td>Silver Dollar</td>
<td>Perennial Ryegrass</td>
<td>7.55</td>
</tr>
<tr>
<td>Defender</td>
<td>Perennial Ryegrass</td>
<td>6.83</td>
</tr>
<tr>
<td>Treasure II</td>
<td>Chewing's Fescue</td>
<td>4.87</td>
</tr>
<tr>
<td>Midnight II</td>
<td>Kentucky Bluegrass</td>
<td>3.00</td>
</tr>
</tbody>
</table>

**Other**

| Super Absorbent Coating | 50.00 |

<table>
<thead>
<tr>
<th>Product / 1000ft²</th>
<th>Seed / 1000ft²</th>
<th>$ / 1000 ft²</th>
<th>$ / lb. of seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.31 lbs</td>
<td>1.10 lbs</td>
<td>$11.53</td>
<td>$10.39</td>
</tr>
</tbody>
</table>
TALL FESCUE BLENDS ARE BECOMING MORE COMMON

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Species</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic II</td>
<td>Tall Fescue</td>
<td>17.08</td>
</tr>
<tr>
<td>Gazelle II</td>
<td>Tall Fescue</td>
<td>17.00</td>
</tr>
<tr>
<td>Faith</td>
<td>Tall Fescue</td>
<td>14.88</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other</th>
<th>Super Absorbent Coating</th>
<th>50.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product / 1000ft²</td>
<td>Seed / 1000ft²</td>
<td></td>
</tr>
<tr>
<td>4.00 lbs</td>
<td>1.96 lbs</td>
<td></td>
</tr>
<tr>
<td>$ / 1000 ft²</td>
<td>$ / lb. of seed</td>
<td></td>
</tr>
<tr>
<td>$10.29</td>
<td>$5.25</td>
<td></td>
</tr>
</tbody>
</table>
## LOW-GROW AND NO-MOW MIXTURES

### Low Grow

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Species</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>V.N.S.</td>
<td>Sheep Fescue</td>
<td>20.00</td>
</tr>
<tr>
<td>Minatour</td>
<td>Hard Fescue</td>
<td>20.00</td>
</tr>
<tr>
<td>Intrigue</td>
<td>Chewing’s Fescue</td>
<td>25.00</td>
</tr>
<tr>
<td>Celestial</td>
<td>Red Fescue</td>
<td>25.00</td>
</tr>
<tr>
<td>V.N.S.</td>
<td>Annual Ryegrass</td>
<td>10.00</td>
</tr>
</tbody>
</table>

### Other

<table>
<thead>
<tr>
<th>Product / 1000 ft²</th>
<th>Seed / 1000 ft²</th>
<th>$ / 1000 ft²</th>
<th>$ / lb. of seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.67 lbs</td>
<td>6.67 lbs</td>
<td>$46.66</td>
<td>$6.99</td>
</tr>
</tbody>
</table>
WHERE TO FIND THE BEST VARIETIES?

- Local unbiased source
  - www.turf.umn.edu
- National Turfgrass Evaluation Program
  - www.ntep.org
- Other public turfgrass research programs
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
The importance of soil
SOIL IS THE FOUNDATION FOR LAWNS

- Moisture holding
- Nutrient retention
- Aeration
- Stability
- Rooting
- Biological activity

healthy soil = healthy lawn
Clay soil

property line

Photo: Dr. Kevin Frank, Michigan State
SOIL TEST

- pH: 5.5-8.0
- Organic matter: 3-15%
- Soil texture: medium to coarse
- Phosphorus: 25ppm+(Bray), 15ppm+(Olsen)
- Potassium: 100ppm+

Basic soil tests are $17.00 from the U of M Soil Testing Lab: http://soiltest.cfans.umn.edu/
## SOIL TEST REPORT

### Soil Testing Laboratory

**Client Copy**

Department of Soil, Water, and Climate
Minnesota Extension Service
Agricultural Experiment Station

**Sample/Field Number: 1330**

**SOIL TEST RESULTS**

<table>
<thead>
<tr>
<th>Estimated Soil Texture</th>
<th>Organic Matter %</th>
<th>Soluble Salts mmhos/cm</th>
<th>pH</th>
<th>Buffer Index</th>
<th>Nitrate NO3-N ppm</th>
<th>Olsen Phosphorus ppm</th>
<th>Bray 1 Phosphorus ppm</th>
<th>Potassium ppm K</th>
<th>Sulfur SO4-S ppm</th>
<th>Zinc ppm</th>
<th>Iron ppm</th>
<th>Manganese ppm</th>
<th>Copper ppm</th>
<th>Boron ppm</th>
<th>Calcium ppm</th>
<th>Magnesium ppm</th>
<th>Lead ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse</td>
<td>4.1</td>
<td>0.3</td>
<td>7.6</td>
<td></td>
<td>5</td>
<td>6</td>
<td>132</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### INTERPRETATION OF SOIL TEST RESULTS

<table>
<thead>
<tr>
<th>Phosphorus (P)</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPPPPP</td>
<td>3.0 Acid</td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>4.0 Optimum</td>
</tr>
<tr>
<td>15</td>
<td>5.0</td>
</tr>
<tr>
<td>20</td>
<td>6.0</td>
</tr>
<tr>
<td>25</td>
<td>7.0</td>
</tr>
<tr>
<td>10 Medium</td>
<td>8.0</td>
</tr>
<tr>
<td>15 Medium</td>
<td>9.0</td>
</tr>
<tr>
<td>20 High</td>
<td></td>
</tr>
<tr>
<td>25 V. High</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Potassium (K)</th>
<th>Soluble Salts ***</th>
</tr>
</thead>
<tbody>
<tr>
<td>KKKKKKKKKKKKKKK</td>
<td>0.0 Satisfactory</td>
</tr>
<tr>
<td>25 Low</td>
<td>1.0</td>
</tr>
<tr>
<td>75 Low</td>
<td>2.0</td>
</tr>
<tr>
<td>125 Medium</td>
<td>3.0</td>
</tr>
<tr>
<td>175 Medium</td>
<td>4.0</td>
</tr>
<tr>
<td>225 High</td>
<td>5.0</td>
</tr>
<tr>
<td>250 V. High</td>
<td>6.0</td>
</tr>
</tbody>
</table>

### RECOMMENDATIONS FOR: Home Lawn

- Lime Recommendation: 0 LBS/1,000 SQ.FT.
- Total Amount of each nutrient to apply per year:
  - Nitrogen: 2 LBS/1,000 SQ.FT.
  - Phosphate: 1 LBS/1,000 SQ.FT.
  - Potash: 1 LBS/1,000 SQ.FT.

The approximate ratio or proportion of these nutrients is: 20-10-10

Use a fertilizer with the percentage of nutrients closest to the above ratio. Apply according to the instructions on the fertilizer bag or container, or determine the amount required from the instructions given on the back side of this report. Since meeting the exact amount required for each nutrient will not be possible in most cases, it is more important to apply the amount of nitrogen required and compromise some for phosphate and potash.

*CAUTION! Do not apply more that 1 lb. nitrogen per 1000 sq. ft. in one application to avoid burning the grass, unless a slow release form or organic fertilizer is used. It is recommended that up to 50 percent of the nitrogen be of the slow release form.

- Apply 1/2 of the above total late spring.
- Apply the other 1/2 of the above total late summer.

Grass clippings left on the lawn is a sound practice. They recycle nutrients and conserve moisture. The above recommendations reflect this contribution.

County: HENNEPIN. Additional information on the website [http://soiltest.cfans.umn.edu/intro.htm](http://soiltest.cfans.umn.edu/intro.htm) or call Yard & Garden Desk 952-443-1426
LOW-INPUT LAWN FERTILITY PROGRAMS

- All fertility programs are based on nitrogen
- Additional nutrients are supplied based on a soil test

www.ecgrowproducts.com
www.adage.com
## Annual Nitrogen Needs for Cool Season Species

<table>
<thead>
<tr>
<th>Grass Type</th>
<th>Nitrogen Needs (lbs. N/1000 ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kentucky bluegrass</td>
<td>2.0 – 5.0 lbs. N/1000 ft.$^2$</td>
</tr>
<tr>
<td>Perennial ryegrass</td>
<td>3.0 – 5.0 lbs. N/1000 ft.$^2$</td>
</tr>
<tr>
<td>Fine fescue</td>
<td>1.0 – 3.0 lbs. N/1000 ft.$^2$</td>
</tr>
<tr>
<td>Tall fescue</td>
<td>1.0 – 3.0 lbs. N/1000 ft.$^2$</td>
</tr>
<tr>
<td>Colonial bentgrass</td>
<td>1.0 – 2.0 lbs. N/1000 ft.$^2$</td>
</tr>
<tr>
<td>Fescue/Clover mixture</td>
<td>0.0 – 1.0 lbs. N/1000 ft.$^2$</td>
</tr>
</tbody>
</table>
Example: Low-Input lawn nitrogen program

Program

• Total yearly nitrogen required = 2lbs N / 1000ft$^2$
• Clippings returned = 0.5 – 1.0lb credit
• Amount to apply yearly = 1.0 – 1.5lbs N

• Application #1- Labor Day (1lb N, 50% slow release)

• Application #2- Memorial Day (0.5lb N, 50% slow release)
  *not a required application

N recommendation would increase with: low organic matter, coarse soil texture, adequate irrigation, clippings removed
SOIL AERIFICATION

Why?
- Soil compaction*
- Soil layering*
- Thatch buildup*
- Prepare for renovation

*These conditions can interfere with adequate water movement into the soil, drainage of water through the soil profile, adequate oxygen in the soil, and root growth
How much water do lawns actually need?
VARIABLES TO CONSIDER FOR IRRIGATION

- Grass species and variety
- Soil type and organic matter
  - Sand = less water holding, high infiltration
  - Clay = greater water holding, low infiltration
- Present lawn conditions
  - Compacted
  - Seasonal weather fluctuations
- Environmental conditions
  - Temperature, wind speed, rainfall, humidity, etc.
- Function and expectations
DRIVING FORCE FOR WATER LOSS

- Transpiration + evaporation = EVAPOTRANSPIRATION (ET)

- Factors affecting ET
  - Grass species
  - Humidity
  - Temperature
  - Wind
  - Light duration
Irrigation

Deep & infrequent watering encourages root growth.

Shallow & frequent watering trains the grass to require just that.

Root Training

Dr. Van Cline, The Toro Co.
STRATEGIES TO REDUCE WATER USE

- Drought tolerant species and varieties
- Deep and infrequent watering
- Raise mowing heights
- Reduce mowing frequency
- Soil aerification
- Maintain balanced fertility levels
- Install rain sensors on automated systems, better yet- turn it off
Average Precipitation vs. Potential Evapotranspiration (ET)

Minneapolis, St. Paul

Slide: Dr. Van Cline, The Toro Co.
Minneapolis/St. Paul Rainfall

Precipitation (inches)

Average

March April May June July August September October November
Minneapolis/St. Paul Rainfall

Precipitation (inches)

- 2011
- Average

March
April
May
June
July
August
September
October
November
The responsibility that goes with having an irrigation system
Woodbury issues plea to limit lawn watering

By Bob Shaw
bshaw@pioneerpress.com

Woodbury residents and businesses are probably overwatering their lawns.

The city pumped 9.3 million gallons of water to its customers Saturday, which is more than twice as much as is pumped on a typical winter day, according to a news release.

But it rained about 2 inches that day.

Officials suspect that automatic irrigation systems are to blame.

The city is recommending that homeowners make sure their sprinkler systems have working rain sensors. An alternative is to turn off the timer and start the system manually only when the lawn is dry.

The city’s rules call for odd-numbered addresses to water lawns only on odd-numbered days and even-numbered addresses on even-numbered days. Watering is allowed before noon and after 5 p.m.
CHAPTER 44-H.F.No. 335
An act relating to water; requiring new landscape irrigation systems to have furnished and installed moisture or rainfall sensing equipment; proposing coding for new law in Minnesota Statutes, chapter 103G.
BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MINNESOTA:
Section 1. [103G.298] [LANDSCAPE IRRIGATION SYSTEMS.]
All automatically operated landscape irrigation systems shall have furnished and installed technology that inhibits or interrupts operation of the landscape irrigation system during periods of sufficient moisture. The technology must be adjustable either by the end user or the professional practitioner of landscape irrigation services.
[EFFECTIVE DATE.] This section is effective July 1, 2003, for all landscape irrigation systems installed after that date.
Presented to the governor May 12, 2003
Signed by the governor May 14, 2003, 4:35 p.m.
Lowering expectations
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
ADDITIONAL INFORMATION

- 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