There is something for everyone.

What’s inside?
A decision-making guide to help you get the lawn and yard you want while improving the water quality of Minnesota’s lakes, rivers, and streams.
Booklet developed by Maria Dahmus, Kristen C. Nelson, and Andrea Woodside of the University of Minnesota’s Twin Cities Household Ecosystem Project (www.tchep.umn.edu).

**Acknowledgements:**

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PART I: Imagine Your Ideal Yard

Your yard can provide different individual, social, and environmental benefits.

Individual and social benefits:
- Creates aesthetic appeal
- Provides places for solitude and socializing
- Provides spaces for kids and dogs to play
- Supports edible landscapes and gardens
- Reduces noise

Environmental benefits:
- Holds soil in place
- Improves soil structure
- Absorbs and filters water
- Moderates temperature
- Improves air quality
- Uses carbon dioxide, produces oxygen
- Provides wildlife habitat
- Supports biodiversity
Exceptional Lawn Quality:

Grow an attractive and well-kept green lawn through the optimal use of fertilizer, mowing, and water.

- *These lawns will typically have higher wear tolerance and usually need more sun. They also require attention and care.*

Low Input Lawn:

Maintain a healthy lawn with less time, fertilizer, mowing, and water. Save time, money, and reduce inputs. Spend your summer doing other things you enjoy.

- *These lawns may have lower wear tolerance but can often tolerate shade. Once established, they require little attention.*

Conversion of part or all of your lawn:

Create wildlife habitat, an edible landscape, a rain garden. Imagine an ecosystem in your yard.

- *Prairie plantings and rain gardens thrive in sun and woodland plants thrive in shaded areas. They can take time to establish and maintain.*

Consider a combination of these types for different parts of your yard.
Fertilize, mow, and water your lawn to:

- Maintain a healthy, attractive lawn
- Reduce time and cost of lawn maintenance
- Secure environmental benefits of lawns and reduce environmental costs

Lawns in Minnesota consist of cool-season grasses. These grasses grow in the spring and early fall.

Time your lawn care practices to support this growth cycle.

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Indicates **best times** for lawn care practice

Indicates **acceptable times** for lawn care practice

Modified chart from University of Minnesota Sustainable Urban Landscape Information Series (SULIS), www.sustland.umn.edu
Lawn fertilizer provides nutrients to support healthy lawns. It often contains the nutrients nitrogen (N), phosphorus (P), and potassium (K).

On a bag of synthetic lawn fertilizer, three numbers indicate the percentages of each of these nutrients.

**Synthetic lawn fertilizers** also have different mixes of “quick-release” and “slow-release” nitrogen (N). In general, use a fertilizer with 35-50% “slow-release” N.

**Organic fertilizers** include corn gluten meal, animal manures, and compost. Also, lawn clippings and mulched leaves return nutrients to your lawn.

Nutrients in lawn fertilizer support healthy lawns; however, too many nutrients can actually weaken your lawn. Also, rainwater or lawn irrigation may wash excess nutrients to streets and storm drains, which empty into lakes, streams, and rivers. Excess nutrients can also enter the groundwater.

If this happens, the fertilizer you applied to your lawn “fertilizes” algae in lakes and streams and contaminates wells.
Nitrogen (N) makes lawns green (chlorophyll production), promotes growth, and helps lawns recover from damage.

Too much nitrogen?

Too much nitrogen can make your lawn unhealthy and unattractive because shoots—the blades of grass—grow more than the roots. This causes shallow root systems relative to grass height, which makes grass weak. Too much nitrogen also increases a lawn’s need for water.

Excess nitrogen can travel with water through soil layers to groundwater and contaminate wells. Also, rainwater runoff can carry excess nitrogen to nearby lakes and streams; there, it contributes to algae growth.

Not enough nitrogen?

Insufficient nitrogen can make your lawn thin and patchy. Lawns with insufficient nitrogen are less competitive against weeds. Also, these lawns don’t absorb rainwater or hold soil in place well.

Therefore, neglected lawns can contribute to soil erosion: rainwater runoff from these lawns can carry soil particles to lakes and streams. This causes sedimentation in lakes and streams. It also contributes to algae growth because eroded soil particles carry phosphorus, another nutrient that promotes algae growth, with them.
Phosphorus (P) promotes root development. In Minnesota, most soils have plenty of phosphorus and do not need supplements. Minnesota law prohibits the application of fertilizer that contains phosphorus to lawns unless a soil test indicates phosphorus deficiency or you are establishing a new lawn.

Why do we need the law?
Rainwater runoff carries excess phosphorus to storm drains, which empty into your nearby lakes and streams. There, phosphorus encourages accelerated algae growth, which, in turn, depletes dissolved oxygen aquatic life needs to survive. Algae growth also causes a bad smell and poor recreational conditions.

Your fertilizer bag should indicate 0 for P.

If you prefer organic fertilizer, corn gluten meal is an example of a phosphorus-free organic fertilizer.

Potassium (K) supports plants’ physiological processes.
Insufficient potassium can contribute to increased grass stress.

Excess potassium is not known to have the same detrimental environmental effects as nitrogen and phosphorus.

See page 20 for fertilizing guidelines. Test your soil to know exactly what nutrients your lawn needs.
Information about soil tests is available at soiltest.cfans.umn.edu
Mow your lawn to a height of 3 inches or taller to help your grass grow deeper roots and increase shoot density.

Deep roots make grass healthier and more attractive because they can reach more nutrients and water deeper in the soil. This reduces the need for supplemental water and fertilizer. Taller grass also acts as natural weed control.

3 inches

Leave grass clippings on your lawn. This returns the nutrients they contain to your lawn and reduces the need for supplemental fertilizer.

Root depth increases with grass height. Deep roots = healthy lawns.

Source: University of Minnesota Extension, Robert Mugaas, Extension Horticulturalist. www.extension.umn.edu
Plants need water for photosynthesis (a plant’s production of food) and to absorb nutrients.

Too much water?
Too much water can make your lawn unhealthy and unattractive. Healthy roots and root growth require about equal amounts of oxygen and moisture in the soil. Excess water takes up soil air space and causes shallow root growth. Also, excess water may run off your yard to gutters and storm drains, taking nutrients and soil with it. And, it can cause nutrient loss by carrying nutrients through the soil to groundwater. Finally, too much water creates favorable conditions for insect infestations and disease infections.

Not enough water?
Water deficiency limits nutrient uptake, photosynthesis, and ability to recover from wear.

Summer Dormancy:
During hot summer months, grasses can temporarily turn brown. This is known as summer dormancy.

In most cases, rain will allow grasses to recover on their own.

If temperatures exceed 90°F for several days, give your grass some water.
The soil system beneath your yard is essential for vegetation growth, and your yard care practices influence soil system health. Your watershed system connects your yard to nearby lakes, streams, and rivers, and your yard care decisions influence water quality.

Evaluate your choices to improve system health.
Soil systems contain organisms, organic matter, air, water, minerals, and nutrients. Soils have texture and structure.

Soil texture and structure affect the storage and movement of water and nutrients. As a result, soil texture and structure influence the outcomes of your yard care practices.

*Soil texture describes the size of particles.*

Particles range in size from large sand particles, to small silt particles, to very small clay particles. Soils often contain a mixture of particle sizes. The percentages of different sized particles in the mixture determine texture.

A soil test will tell you your soil’s texture. Information about soil tests is available at soiltest.cfans.umn.edu.

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**QUICK TEST**

You can determine your soil’s texture simply by feeling it. To do so, follow these steps:

1. Moisten the soil.
2. Move the soil between your thumb and forefinger.
   - Sand will feel gritty, silt will feel smooth, and clay will feel sticky.
3. Try to form the soil into a flat ribbon.
   - Sandy soils will fall apart and clayey soils will form a long ribbon.
Organisms, such as microbes and earthworms, eat and excrete organic matter. Their waste is like a glue that binds particles together into aggregates.

Dead plants and organisms decompose and become organic matter. This process releases nutrients and improves soil structure.

Soil structure describes the clumping of particles. Structured particles have spaces between them where air and water circulate, roots grow, and organisms live.

Without organic matter and living organisms, particles in soil remain separate.

Organisms, such as microbes and earthworms, eat and excrete organic matter. Their waste is like a glue that binds particles together into aggregates.

Dead plants and organisms decompose and become organic matter. This process releases nutrients and improves soil structure.

Sandy soils do not easily clump together into aggregates. Therefore, nutrients and water move quickly through sandy soils, beyond the root zone.

In contrast, silty and clayey soils may become compacted, with tightly packed particles. This poor soil structure restricts air and water circulation and root growth.
SOILS AND YOUR YARD PRACTICES

- Your soil texture and structure influence the outcomes of yard care practices.
- Compacted soils and sandy soils need different management practices.

QUICK TEST

Determine whether your soil is compacted with two simple tests:

Test 1:
1. Push a screwdriver or metal rod into the soil (avoid tree roots).
2. If you are unable to push the rod at least 6 inches into the ground, then your soil may be compacted.

Test 2:
1. Dig up a very small section of grass to look at root depth.
2. If roots extend less than 2 inches below the surface of the ground, then your soil may be compacted.

Compacted Soils and Yard Practices:
- Water cannot easily infiltrate compacted soils. It may run off lawns and yards, taking nutrients and soil particles with it.
- Plant roots cannot easily grow through compacted soils. As a result, roots don’t access water and nutrients deeper in soil layers. This makes grass and other vegetation thin and patchy, and they require more supplemental fertilizer and water.

If your soil is compacted, aerate it. This removes plugs of soil to increase air and water circulation throughout soil. September is the best time to aerate.

Sandy Soils and Yard Practices:
- If you water your yard, water lightly and more frequently to minimize water loss below the root zone.
- If your fertilize your lawn, use a slow-release fertilizer and less fertilizer per application to minimize nutrient loss below root zone.
A watershed is an area in which all water drains to the same lake, stream, or river.

Sidewalks, driveways, streets, and storm drains can connect your yard to your watershed.

**WHEN YOU KEEP NUTRIENTS AND SOIL IN YOUR YARD, YOU SUPPORT HEALTHY WATERSHEDS.**

Most storm drains flow into nearby lakes, streams, and rivers.
Among yard choices, your fertilizing, mowing, and water management practices can improve watershed health.

**FERTILIZING**

- Sweep up fertilizer from driveways, sidewalks, and gutters to prevent it from entering lakes and streams.

**MOWING**

- Sweep up lawn clippings from impervious surfaces such as driveways, sidewalks, and gutters. This prevents grass clippings, and the nutrients they contain, from entering lakes and streams.
- Mow grass taller to increase root depth. Deeper roots absorb more water, reducing runoff.

*When grass clippings and fertilizer enter storm drains, the nutrients they contain flow directly into nearby lakes, streams, and rivers, accelerating algae growth.*
Watering

- Make sure your yard absorbs all the water you give it.
  Position sprinklers and hoses to prevent water from running off your yard or landing on sidewalks, driveways, and streets. Runoff takes organic matter to storm drains and then your lake or stream.
- Water in the morning to maximize absorption.

Managing Rainwater

- During a rainfall, your downspouts release a lot of water in one spot at one time. Direct your downspouts away from impervious surfaces and towards vegetation to minimize water and nutrient loss and soil erosion.
- Consider using a barrel to collect and store rainwater from your downspouts to water your lawn and yard.
- Plant or mulch bare ground to prevent soil erosion when it rains. Soil particles contain nutrients. Don’t let them wash away.
- Plant a rain garden to absorb rainwater.
PART IV: Plan for Your Yard

Whether you choose an exceptional lawn, low input lawn, conversion of lawn, or a combination of types—

You can use your understanding of lawn biology, soil systems, and watersheds to maintain your desired yard qualities and improve soil and watershed system health.
If you selected exceptional lawn quality or a low input lawn, follow these guidelines:

<table>
<thead>
<tr>
<th></th>
<th>Exceptional Lawn Quality</th>
<th>Low Input Lawn</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Suitable Grass Types</strong></td>
<td>Kentucky Bluegrass or Fine Fescues/Kentucky Bluegrass mix</td>
<td>Fine Fescues/Kentucky Bluegrass mix</td>
</tr>
<tr>
<td><strong>Use</strong></td>
<td>Higher wear tolerance</td>
<td>Lower wear tolerance</td>
</tr>
<tr>
<td><strong>Sunlight</strong></td>
<td>Lower shade tolerance</td>
<td>Higher shade tolerance</td>
</tr>
<tr>
<td><strong>Fertilizer</strong></td>
<td>2 to 2.5 lbs N per 1,000 square feet per year</td>
<td>1 lb N per 1,000 square feet, every other year, around Labor Day Leave grass clippings on lawn</td>
</tr>
<tr>
<td></td>
<td>Example: 0.5 lbs N at first spring mowing; 0.5 lbs N around Memorial Day; 0-0.5 lbs N first week of August; 1 lb N around Labor Day Leave grass clippings on lawn</td>
<td></td>
</tr>
<tr>
<td><strong>Mowing</strong></td>
<td>Mow 2.5 inches or greater Mow less than 1/3 of grass blade height each time</td>
<td>Mow 3 inches or greater Mow less than 1/3 of grass blade height each time</td>
</tr>
<tr>
<td><strong>Watering</strong></td>
<td>1 inch per week, including rainfall Gradually decrease water approaching dry months to increase drought tolerance</td>
<td>Little to none May need water if temperatures exceed 90°F for several days or if there are several weeks without rainfall</td>
</tr>
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* For more information and grass identification see www.sustland.umn.edu/maint/maint.htm

** For more information on specific varieties and their performance in Minnesota, go to www.turf.umn.edu

*** Do not exceed 1 lb N per 1,000 square feet in a single application.

To determine how many lbs of fertilizer to use to apply desired amount of N, use this calculator: aggieturf.tamu.edu/aggieturf2/calculators/fertsheet.html
Imagine an ecosystem in your yard.
Create beautiful landscapes.

Sunny areas
- Try prairie plants, rain gardens, edible landscapes.

Shaded areas
- Try woodland and shade tolerant plants.

Prevent soil erosion during lawn conversion:
- Convert in stages to minimize bare soil.
- Use mulch to cover bare soil.

Use plant selector tools to help find plants suitable for your yard’s conditions. Possible information sources include: www.sustland.umn.edu/plant/search.asp
Prioritize practices based on your yard.

Your yard has unique characteristics that contribute to its interactions with soil and watershed systems. Based on your yard’s characteristics, prioritize management practices to prevent soil, nutrients, and water from flowing out of your yard.

To begin, select a troublesome area in your yard for improvement:

If you have a sloped area, runoff and erosion are likely.

- Plant a rain garden at the base of the slope to absorb water and minimize runoff and erosion.
- Install physical structures such as a retaining wall to contain erosion.
- Plant groundcover to absorb water and hold soil in place.

If you have shady areas, bare soil patches and erosion are likely.

- Plant shade tolerant vegetation to hold soil in place.
- Cover bare ground with mulch to prevent erosion.
If you found that you have silt or clay soil, be aware of potential soil **compaction**. Compacted soil leads to runoff and poor vegetation growth.  
▶ Aerate your lawn to improve soil structure.

If you found that you have sandy soil, **evaluate your watering and fertilizing practices**. Nutrients and water can move quickly beyond the root zone and potentially into groundwater.  
▶ Water lightly and more frequently to minimize water loss below the root zone.  
▶ Use slow-release fertilizer and less fertilizer per application to minimize nutrient loss below the root zone.  
▶ Select plants that thrive in well-drained, sandy soil.  
  *Consult a plant selector tool for ideas:*  
  www.sustland.umn.edu/plant/plantdata.asp

If you live near a water body, **consider a buffer area between fertilized areas and the water body**.  
▶ Avoid fertilizing along the shoreline.  
▶ Plant native vegetation to hold the shoreline in place and absorb runoff.  
▶ For more information and ideas on designing buffer areas, see [www.sustland.umn.edu/design/water.html](http://www.sustland.umn.edu/design/water.html)
Additional Resources:

Blue Thumb:  www.bluethumb.org

Sustainable Urban Landscape Information Series:  www.sustland.umn.edu

University of Minnesota Extension:  www.extension.umn.edu/garden

University of Minnesota Turf Grass Science:  www.turf.umn.edu