



# Lawns

guidelines for  
creating environmentally  
responsible landscapes



Association of Professional Landscape Designers®

**“Turf maintenance is unquestionably the single most labor and input intensive component of the constructed landscape. Approximately \$30 billion per year is currently spent on lawn installation, care products, equipment and the lawn service industry. The concept of the attainably perfect lawn remains sacrosanct—despite Americans’ increased environmental consciousness.”**

Martin F. Quigley, Ohio State University Ornamental Plants Annual Reports and Research Interviews.

## Introduction

A lush, weed free, emerald-green lawn has been the standard of beauty in many North American landscapes. From its beginnings as a sign of affluence in British society, through the invention of the mechanical mower, to the recent development of new grass varieties and blends that work in North America, the lawn has long been a symbol of public pride in the United States. The American lawn has also created a set of environmental problems we must begin to address.

**The goal of this brochure is to present options and alternatives for the lawn.**

As we think of the lawn in light of today’s global condition, we must consider our desire for a perfect lawn along with the environmental problems we all must face. Fossil fuel use, the spread of petrochemicals in the environment and water consumption are all issues that our tradition of lawns directly influence. By the end of the last decade, the USEPA estimated that 70 million pounds of chemicals were being applied annually to lawns, representing a higher concentration of chemical use than for any form of agriculture. Children in the United States now carry in their bodies close to 200 chlorinated hydrocarbon chemicals that did not exist a century ago. We have no clear idea what effect these chemicals have on our health.

By any definition, the traditional turfgrass lawn is an unsustainable, input-hungry landscape element that defies the natural ecology of our planet. It requires multiple periodic applications of petrochemicals ( fertilizers and pesticides ), regular water applications and regular mowings to keep it to the standards we've set. If we stop tending to the lawn, nature takes over: fertility drops to normal levels, other plants move in and the untended lawn slowly diversifies toward a stable plant community. We may call the 'weeds' or 'pests' undesirable, but they are all members of the ecosystem that comprise a balanced, diverse and healthy environment. Yet we continuously fight to keep them out of our lawns.

Let's help redefine the lawn into a more friendly element of our everyday landscape.

## Lawn options and alternatives

### Short growing groundcovers

The need for a low growing ground cover may be influenced by several factors: economy, steep slopes, rocky stretches, sandy soil, extensive tree roots at the surface, deep shade, speed of establishment, very heavy foot traffic, chronic allergies and so on. There are many choices of low growing ground covers available for most every condition. For instance, moss, a serious blight to a lawn enthusiast, is well suited to deep shade locations that are poorly drained and can withstand more foot traffic than is usually assumed. Clover, another bane to grass growers, can be a worthy substitute for turf too, but a sunny location is required. Again some foot traffic is possible. A number of thymes and chamomile — spreading, low-growing, mat-forming, aromatic herbs—can be practical in sunny areas with light traffic as well.

Wildflower meadow or prairie gardening is another alternative approach and, depending on the plant mix, can be attractive for large sunny properties or naturalistic woodland gardens. Neither can withstand much foot traffic and both establishing and maintaining this type of lawn takes considerable planning and effort. Sedges, genus *Carex*, close botanical cousins to the grasses, can function well as a traditional lawn and will require little or no mowing, fertilization or chemicals. Some require little water; others tolerate wet areas; many thrive in the shade.



The traditional spreading ground-covers—pachysandra, vinca, liriopse, creeping fig and the more invasive English ivy and euonymous continue to be intrepid alternatives to turf and are particularly effective in difficult planting situations such as steep hillsides, sites with competing tree roots, etc. Still other choices are the low-growing shrubs—hypericums, the rug-like junipers, cotoneasters—or perennials such as creeping phlox, dwarf asters, daylilies, veronicas, ferns, even hostas. Be aware that some vigorous groundcovers may be invasive in your area. Contact a landscape designer for choices best suited for your particular landscape site.

Non-grass groundcovers generally have a higher installation cost than lawns, but when you factor in lawn maintenance, ground covers can be much more economical in the long term.

### Non-plant options

A well-planned hardscape material may be a ground cover solution and can nicely extend the living space of the home. The range of materials is wide, from the high-end traditional stone or brick to timber decking to the concrete slab, which can be tinted or textured for added interest. Available now are recycled pavers of various types and colors. Children's play areas generally require a softer surface. These can be bark, shredded synthetics like rubber or other man-made materials like plastic or nylon. Other loose materials—mulch, wood chips, gravel, river stones or cobbles are additional alternatives. These materials are permeable, allowing water to soak through them instead of running off, as is the case with solid surfaces.

### PLAN FOR ACTION:

Choose less environmentally costly alternatives to turfgrass  
Consider non-plant hardscapes for covering surfaces

**Resources:**

Johnson, Lorraine. Grow Wild! Low-maintenance, Sure-success, Distinctive Gardening with Native Plants. Fulcrum, 1998.

Marinelli, Janet, ed. Going Native: Biodiversity in our own Backyards. Brooklyn Botanic Garden, 1994, 1996.

Roach, Margaret. The Natural Lawn and Alternatives. Brooklyn Botanic Garden, 1993.

Stebbins, Geoff. Lawns and Groundcovers. (American Horticultural Society Practical Guides.) DK 1999.

Middlebrook, Alrie. Lose the Lawn, Home Improvement and Remodeling. Oct-Nov, 2001, pg. 24-31.

High Country Gardens. Santa Fe Greenhouse—Plant Catalog. 2904 Rufina Street, Santa Fe, NM 87507. [www.highcountrygardens.com](http://www.highcountrygardens.com).

# Turfgrass Selection

If, after looking at all your options, a turfgrass lawn is your choice, there are many turfgrass options available. The choices you make are determined by many factors, including climate, lawn expectations, site, soil type and more.

While there are hundreds of plants in the grass family, turf grasses are a select group generally viewed as perennials, returning year after year, regrowing from their roots. Such grasses must be able to withstand both mowing to heights of four inches or less and surviving a reasonable degree of foot traffic.

Climate will dictate the choice of lawn grass in two ways—temperature tolerance and water requirements. Cool-season grasses resist winter-cold, but stress in hot, dry summer weather. Such grasses are well suited to the Northeast, Northwest, Midwest and areas of high elevation. These grasses are sold either in blends of several grasses or as individual types of grass. Bluegrass is the most common cool-season variety.

Warm-season grasses grow vigorously during hot weather and then go dormant with cooler temperatures. The better grasses of this type are grown from stolons, sprigs, plugs or sod itself. ‘Water-conserving’ grasses are represented by the tall fescues, cool-season grasses; several natives of the high-plains—wheatgrass (*Agropyron*), blue grama grass (*Bouteloua*) and buffalo grass (*Buchloe*); or warm-season type hybrid Bermuda grass.

**Lawn appearance:** Healthy lawns are a medium green, not the deep green many strive for. These lawns are overfertilized and are prone to disease, thatch build-up and drought damage. Lawns mowed to a taller height are softer and less detailed in appearance, but are stronger in stressful periods and require less water and fertility to recover from being cut so close.

**Lawn Size:** Consider keeping the lawn area as small as possible, while still meeting your practical needs. The smaller the lawn you create, the less is required to support it. Generally, the size of a lawn is determined by the largest potential area of recreational foot traffic you’d expect. Low-growing areas larger than what you may need for a lawn can utilize other low plantings and hardscape surface options.



**Site selection and preparation:** A proper site has a slope of at least 1% to 6% for good surface drainage. The site orientation should have full sun to medium shade. Get a soil test to find out what's missing in your soil fertility. Spread a minimum of 2 inches of a top quality compost and till in to a depth of 6-8", rake, roll to establish a final grade.

**Lawn Installation: seed, sod or plugs.** There are several ways to establish a new lawn. Each grass variety or blend has a recommended method, though there can be several choices with each grass type. Generally, lawns can be established by seed, plugs, or sod. Grass seeding is the most economical approach, but can take several seasons to fill out into a mature lawn. Sod is a mat-like segment of established turfgrass that has been cut, shipped and re-assembled into a mature new lawn. Plugs are small portions of a spreading type turfgrass that are re-planted at a given spacing, allowing them to slowly grow together. All of these methods are sensitive to temperature, moisture, soil type and fertility. Timing is important. Water is critical for the establishment of any new lawn, and temporary irrigation may be required until the turfgrass has sufficiently rooted into the soil.

## PLAN FOR ACTION:

- Minimize the area needed for a turfgrass lawn
- Choose turfgrass varieties suited for your conditions
- Choose a blended turfgrass mix for a stronger lawn

## Regional Notes - Northwest

The suggested lawn seed mix west of the Cascades is perennial rye grass and the fescues such as chewings, creeping red and hard fescue. A mixture of species and varieties will withstand diseases and adapt to various sites much better than a monoculture. Rye grasses like full sun but are also shade-tolerant and drought-tolerant. They stand up better to foot traffic than the fescues but have higher nitrogen requirements. Rye grass sprouts and grows quickly, helping to close the turf canopy and prevent weed invasion. Kentucky bluegrass does not do well west of the Cascades, although 10% in a mix can perform the same function as rye does in closing the canopy quickly before it dies out. Clover in the seed mix will fix nitrogen from the air and reduce the need for fertilizer.

## Regional Notes - West

In California and Southwestern states, there are many varied climates with a wide range of growing conditions, from cool mid-coastal climates to hot and dry or freezing high deserts and mountains. Hilly terrain, extremes in soil types, hot dry summers and no summer rainfall characterize much of California and the Southwest. Lawns require a broader definition, including mowed flat lawns to steep meadows, and from grasses to drought-tolerant native grasses and ground covers.

Central California has 18 major climate zones, many of which have a 10-12 month growing season. Summer is the dry dormant season, with 10-20 inches of rain available only during the cool winter season. If a lawn is desired, it makes sense to use the native, slow-growing evergreen fescues. They are useful for low-water-use; lawns, meadows, hillsides, or ornamental borders. Western Fescue, Molate Blue Fescue, Idaho Fescue, and Hard Fescue are long-lived, slow-growing perennials which develop large roots systems and other drought-tolerant characteristics. They are adapted to our lean western soils, and dry summers, and need only half the fertilizer and less than a third of the water required by warm-season bluegrass.

Mixes or individual use of the above fescues make a low-water-use mix that stays green all year if some supplemental summer water is applied. A deep soaking every two weeks or during hot dry spells is adequate for established lawns in Central California and Colorado. These lawns can be mowed weekly, only once or twice a year, or only once every two to three years if a meadow is preferred.

For shaded areas, Red Fescue, a creeping evergreen grass, is preferred; it also makes lovely waves of grass when used as a meadow planting. For cooler coastal summers, natives such as California Melic, Purple Needle Grass, and Hard Fescue can be used. For a meadow lawn, use fescues alone or with California Poppy, Lupine, Tidy Tips, and other drought-tolerant native annuals, perennials and bulbs. Pacific Coast Seed in Livermore, California makes six California climate zone mixes and erosion control mixes.



Another grass with low water requirements and no mowing required is Catlin Sedge or Texas Sedge, naturalized in Southern California. It is a carex no taller than 3 to 4 inches, so needs only once a year mowing. It is tough and durable in hot arid climates, tolerating moist and dry conditions as well as light shade and full sun. It is slowly becoming more available to the nursery trade in California. Berkeley Sedge with 12 inch to 24 inch foliage is often used as an ornamental perennial or meadow type lawn. It tolerates a variety of soils and moisture conditions, as well as sun or shade.

Water-wise lawn grasses from the Southwest include 4" to 6" high Buffalo grass (*Bucheloe dactyloides*), and 4 inch high Blue Gramma Grass (*Bouteloua gracilis*), a native shore prairie grass from the Great Plains. Both are drought tolerant, using 75% less water than Kentucky Blue Grass, (about 2" per month in the heat of summer). Buffalo Grass prefers clay soil and little or no fertilization, while Blue Gramma Grass prefers sandy soil and higher altitudes. Both are available as plugs, and will fill in quickly to form a tight weed-resistant ground cover. Blue Gramma Grass is also available as seed.

### Regional Notes - South

Both warm-season grasses and the cool-season grasses are used in the South. Warm-season grasses are Bahia, Bermuda, Buffalo grass, Centipede, St. Augustine and Zoysia. Cool-season grasses, also called the evergreen grasses, are Kentucky Bluegrass, perennial ryegrass, and tall fescue. An important note on some of the warm-season grasses: they can be very invasive, Bermuda and St. Augustine in particular. Another note: Buffalo Grass is a great low-water turf, but it doesn't do well in high humidity.

### Regional Notes - Northeast

In the humid Northeast, Kentucky bluegrass and bluegrass cultivars in such forms as sod, plugs, or springs, are cool-season grasses that like sun but requires a high demand for water, although surviving during periods of drought by going dormant. Rough bluegrass is best suited for shade areas, where it is cool, humid, and too wet for fine fescues.

Fine fescues are good for shade areas and when combined with Kentucky bluegrass make an excellent turf in cool, moist conditions such as the upper Great Lakes Region. Fine fescue varieties include creeping red, Chewings, sheep, and hard fescues.

Ryegrass, both annual and perennial is best known for its rapid germination and is often used as a nurse grass when establishing Kentucky bluegrass. It cannot tolerate cold and lasts only until winterkill in the northern areas of the United States. It is best adapted where winter and summers are moderate and when sufficient moisture is present. Ryegrass thrives on well-drained soil with moderate fertilization.

Bentgrass is a cool-season perennial grass best known for its fine texture and adaptation to low mowing heights. The most widely used bentgrass is creeping and Colonial. Used mostly for high-quality golf greens and putting surfaces, it is an excellent turf for fairways and tees. Still used today on some estates, it requires an intense maintenance program and specific turf management equipment.

Deserving mention here are Alfalfa, red clover, and the field pea. These field crops are still used in many states in the Northeast as they farm and raise cattle. Capable of high yields used for roughage for dairy cattle in winter, red clover is grown primarily as a hay crop second only to alfalfa. Known as Austrian Winter and used for forage, the field pea has a wide adaptation from New England and the Upper Midwest to south through Texas.

### **Regional Notes - Plains / Midwest**

The Great Plains and Midwest section of the United States are somewhat vast areas from open ranges and pastures for native grazing grounds to crop growing. It should be noted here that the following is a sampling of what has been introduced or is native to this region. In comparison, bluegrass cultivars remain the dominant introduced perennial grass of choice for most residential turfs.

Defined as lands that have been reseeded to non-native turf and plant species that are being managed as if they are native, introduced crested wheatgrass is part of a major group of Eurasian perennial bunchgrass used to reseed 'go-back land' (that is abandoned farm land and marginal crop fields used during the first third of the Twentieth Century).

Others include dryland creeping alfalfa (a forage legume), desert crested (used in drier areas), Jose tall (does particularly well as a pasture from New Mexico to Canada), and quackgrass (introduced into North America prior to the Revolutionary War) and naturalized in North America in parts of Oklahoma, Arkansas and well into the Canadian territory. Although it can be particularly aggressive and considered a weed, used for pasture or grazingland, it becomes high-quality, high-yield hay when cut in the boot stage.

Managed agronomically as tame pasture and/or hay crops, smooth brome grass has naturalized portions of the Western Range. Its species is associated with other grasses such as timothy (cool-season member of the oat tribe), orchardgrass (a forage species). Known as domesticated legumes, white clover (perennial), crimson (winter annual), hop (self-seeding annual) and red (biennial, best grown on poorer soils), clovers are regarded as having a beneficial impact as a result of their invasion. Other grasses introduced for domestic hay production, are cool-season perennial grasses such as redtop (replaced as a pasture grass by species like tall fescue and ryegrass), reed canary grass, smooth brome, creeping foxtail and meadow foxtail.

The eastern loka IV (native tallgrass) and Pete (developed cultivar from Kansas and Oklahoma) are eastern gamagrasses; they are large prairie grasses that do remarkably well during periods of drought. Indiangrass, sideoats grama, and little bluestem are native, warm-season prairie grasses; they can be used as a natural complement to wildflowers. They grow well on normal, well-drained soil and can tolerate dry conditions. Native to the short grass prairies of the United States, buffalo grass can be found from the Missouri River to the Rocky Mountains and from Mexico to the Canadian border. Well adapted to arid conditions, it can withstand high pH and heavy soils, is excellent heat and cold tolerant, goes dormant under prolonged water stress, but recovers quickly once sufficient moisture returns.



**Resources:**

Christians, Nick with Ashton Ritchie.

Scotts Lawns: Your Guide to a Beautiful Yard. Meredith, 2002.

Courtier, Jane. Lawns and Lawn Care. ( Gardening Factfile ). 2001.

Daniels, Steve, ed. Easy Lawns: Low Maintenance Native Grasses for Gardeners Everywhere. Brooklyn Botanic Garden, 1999.

Franklin, Stuart. Building a Healthy Lawn: A Safe and Natural Approach. Garden Way, 1988.

Xeriscape Gardening: Free, [www.highcountrygarden.com](http://www.highcountrygarden.com)

Early American Prep. slide presentation and compiled research information.  
[www.tarleton.edu/%7Erange/Grasslands/Introduced%20Forages/introducedforages.htm](http://www.tarleton.edu/%7Erange/Grasslands/Introduced%20Forages/introducedforages.htm)

ATTR –National Sustainable Agriculture Information Service, PO Box 3657,  
Fayetteville, AR 72702, Phone: 800.346.9140, Fax: 479.442.9842, [www.attra.org](http://www.attra.org)

# Turfgrass Maintenance

Our traditional approach to lawns requires the application of fertilizers and pesticides plus regular mowing and watering to keep them to acceptable standards of appearance. This high level of maintenance requires choices in products and methods.

## Lawn care applications: synthetic or organic

The majority of lawn care products on the market today are derived from fossil fuels and synthetic chemicals. Therein lies the problem. The burden of using such products falls on the very environment they intend to fortify to help produce healthy lawns. **If you choose to use pesticides and fertilizers, make certain you read the directions completely and follow them precisely.** Do not use any product in any way other than what is recommended.

**We encourage you to choose a natural organic method of fertilization and lawn care over the fossil fuel based synthetic chemical approach. The organic method is better for your lawn and the environment overall. These products carry a much smaller environmental impact and use ecological practices worked out by nature long ago.**

By reconsidering the standards of appearance for our lawns, we can reduce the required maintenance practices, their economic cost and environmental burden.\

## ORGANIC LAWN CARE

**“A nation that destroys its soil destroys itself.”**

Franklin D. Roosevelt

**“Organic turf care is not a great mystery. It is a different system that requires observation and common sense. In an organic program, the soil life ends up doing most of the work.”**

Paul Sachs, Northeast Organic Farming Association

Organic lawn care requires that grass is grown using only fertilizers and pesticides that are natural. This means controlling diseases, weeds, and harmful insects without the use of synthetic chemicals.

It also asks for more tolerance when it comes to results, as it takes several seasons to adapt from a traditional chemically-treated lawn to one that is organic. That's because organic fertilizers are slower-acting, and they are slower to release their nutrients into the soil. But the upside to using organic fertilizers is that it slows down the overall growth of the lawn.

One of the most important factors of organic lawn care is the condition of the soil. If the soil is healthy, there will be a multitude of organisms that live in it, four billion in just a teaspoon.

There are macro ( large ) and micro ( small ) nutrients that must be present in the soil. A **soil test** will determine the levels that should be present. Nitrogen, phosphorus, and potassium, as well as calcium, magnesium, and sulfur are the most common. To determine how much fertilizer is needed and how many square feet the container (or bag) will cover, carefully read the instructions on the package prior to application. The key is to not overdo the fertilization so that the roots are encouraged to go deeper.

Since **soil condition** is another factor that contributes to the overall health of the grass, it is important to make sure that the soil it is growing in has what it needs to sustain growth. There are several ways to enrich the soil base. A **top dressing** should be applied 2 times a year at no more than 1/2" in depth. This dressing can be compost or other organic materials. It will help reduce thatch buildup by speeding up the natural decomposition process performed by microorganisms. These micro and macro organisms help in the breakdown of minerals into liquids, which attack disease and insect organisms as well as produce nutrients for plants in proper composition.



Use one of the following **organic materials** to top dress your lawn.

- . Blood meal
- . Corn gluten meal
- . Ground seaweed
- . Limestone for acid, gypsum for alkaline
- . Milorganite, a commercial organic fertilizer
- . Peat moss
- . Rotted sawdust (other than treated timber)
- . Sand
- . Topsoil
- . Well-rotted manure
- . Finely ground organic compost

**Aeration** of the lawn is a way to allow oxygen and moisture into the soil. Using heavy machinery or foot traffic can compact the soil, so alternatives such as spiking tools or even a pitch fork pushed into the soil at a 4" - 6" depth is beneficial.

There are several **organic fertilizers** on the market today that can address most of our issues associated with lawns. The goal in fertilizing should not be to have an instantly green and lush lawn, but to encourage a steady and vigorous growth to sustain your lawn in times of stress.

Fertilizers can be applied in several ways: by hand spreader, traditional rotary spreader, push-behind drop spreader, or by using a water-soluble solution that is put through a hose-end type applicator.

Some safe, non-polluting natural fertilizers contain alfalfa (for root growth), molasses (a carbohydrate that feeds beneficial microbes), poultry protein (high protein for slow release of nitrogen), and soluble seaweed (rich nutrients). Corn gluten (nitrogen rich with amino acids and minerals to green up the lawn) is another available organic option.

## **PLAN FOR ACTION:**

Choose organic fertilizers and organic / natural pest treatments and methods  
Fertilize and treat for pests only as needed

## Resources:

The Chemical-Free Lawn: The Newest Varieties and Techniques to Grow Lush Hardy Grass, Warren Schultz 1989.

Turf Management Handbook: Good Turf for Lawns, Playing Fields and Parks, Charles B. Schroeder & Howard Sprague 1994.

Bradfield Natural Fertilizers, (417) 882-1442, Fax (417) 882-9312, Springfield MO. [www.bradfieldind.com](http://www.bradfieldind.com) or [Bscott6500@aol.com](mailto:Bscott6500@aol.com)

Ohio Earth Food, Inc. Hartville OH, (330) 877-9356, Fax (330) 877-4237 and [www.ohioearthfood.com](http://www.ohioearthfood.com)

King Country ( soils and composting ), [www.metrokc.gov/soils](http://www.metrokc.gov/soils) 206-296-4466, TTY Relay 800-833-6388

Earth Right LLC, Overland Park, KS 66212: (913) 492-2992, [janmariehornack@hotmail.com](mailto:janmariehornack@hotmail.com), Earth Right's "The Mushroom stuff", and Earth Right liquid fertilizer for good soil tilth and condition.

Hendrikus Schraven Organics, P. O. Box 1289, Issaquah WA 98027, 800-828-9977, Seasons 8-2-4 turf fertilizer; [www.hendrikusorganics.com](http://www.hendrikusorganics.com)

Sachs, Paul. The Right Height, Landscape Management, June 1996, p 28-30. (Extracted from his book Handbook of Successful Ecological Lawn Care, Edaphic Press, P.O. Box 107, Newberry, VT 05051; (802) 222-4277). [www.norganics.com](http://www.norganics.com)

Safe & Easy Lawn Care: The Complete Guide to Organic, Low-maintenance Lawns. (Taylor's Weekend Gardening Guides). Houghton, Mifflin, 1997.

Amaranthus, Michael P, PhD. Declaration of Interdependence, Mycorrhizae are the 'tiny little secrets' for successful planting. Mycorrhizae Applications, Inc, PO Box 1181, Grants Pass, OR 97528, Ph (541) 476-3985, [www.mycorrhizae.com](http://www.mycorrhizae.com).

# Irrigation

## General thoughts on irrigation

The best irrigation may be NO irrigation. Before deciding that irrigation is required, explore the other possibilities. Alternatives to lawn, tolerance for a dormant lawn and the use of drought-tolerant grasses should all be considered first before committing to irrigation.

Irrigation efficiency is the ratio between the water required and the water used beneficially. Inefficient irrigation practices may be more harmful to turf than no irrigation at all. Light watering actually wastes water because it discourages roots from growing deep into the soil. Light or occasional irrigation during drought conditions may cause the depletion of stored carbohydrates. Turfgrasses in this condition are more prone to severe drought injury and are slower to recover when the drought has ended. Infrequent, deep watering is most effective and promotes deep root growth. If deep watering cannot be achieved, allow the turf to enter dormancy by letting the lawn turn brown. Dormancy will allow a better recovery at the end of the drought.

## General water conservation tips:

- Keep the grass high. Mowing less frequently and higher in dry conditions can keep a lawn looking greener without watering.  
**See Mowing**
- Water deeply and infrequently
- Water early in the morning.
- Avoid excess nitrogen fertilization
- Core-aerate compacted soil and reduce thatch to allow water to penetrate to the roots.
- On slopes: use shorter watering times, more cycles, and use drip or rotor type heads.
- Avoid watering during windy periods.



## Conventional Irrigation

Many people have thousands of dollars invested in conventional irrigation systems. Just by using current technology to its optimum capacity it may be possible to get a 50% gain in water savings. Typical residential use is poorly documented but estimated to be only 15% to 50% efficient. (Agricultural irrigation efficiency range is 50% to 90%.)

There is no “one size fits all” irrigation system. The need for irrigation depends on several factors such as the species of grass used, soil type, climatic conditions and management practices. Proper scheduling and appropriate timing devices, the use of rain sensors and efficient nozzles are some of the technological considerations when designing an efficient irrigation system.

The basics that must be considered are:

- When to begin irrigation
- Frequency of irrigation
- Time of day to irrigate
- How much water to apply
- Rate of water application
- Water quality

It may be wise to work with a professional irrigation specialist to maximize the water saving potential of any irrigation system.

## Drip Irrigation

Drip irrigation is the slow precise delivery of water through emitters directly to chosen plantings. Drip irrigation for turf is, by necessity, below the surface. Typically a subsurface irrigation system contains emitter line placed in parallel rows 4” to 6” below the soil with emitters 12” to 18” apart on the lines.

The advantages of subsurface irrigation include:

- Water is delivered directly to the root zone, encouraging deep root growth.
- Significant water savings, especially on hot or windy sites.
- Increased control over the amount of water that different areas receive.
- Reduction of weeds due to the lack of surface moisture that encourages seed germination.
- Decline in turf diseases.

## Alternative sources of water

In the normal hydrologic cycle, rainwater percolates into the soil and is reabsorbed by the earth. The dramatic increase in hard (impervious) surfaces covering the earth, the loss of trees and green space and other factors cause much of this rain to run off before it is able to percolate into the soil. A great way to reduce the strain on community water supplies and wells is to save some of the water that is typically lost to runoff when it rains. Rain barrels, cisterns and ponds are all ways to catch and save this water. There are many commercial rain barrel kits available for the average homeowner and simple systems are fairly easy to create for the “Do It Yourself” enthusiast.

All systems should have the following in common:

- Catchment - this is the area in which the rain is harvested. For example: a roof. Hard, non-porous surfaces make the best catchment areas because the water can easily roll off of these surfaces.
- Collection - this is the way that the water gets from the catchment area into the holding areas. For example: directed gutters and downspouts.
- Filtration - Dirt and debris must be filtered out or it will collect in the base of your holding area. For example: a screen in the downspout.
- Holding - area to store the water. This could be a barrel, bin, cistern or a pond depending on the size of your system. The holding area should be at least large enough not to overflow during a typical rain (or overflow may be channeled into an additional holding area). The holding area should have a pump or a spout to facilitate use of the stored water. Cover the holding tank to prevent mosquito breeding and algae growth.
- Distribution - moves the water from the holding area to the area to be irrigated. For example: Garden hose, perforated PVC pipe and drip irrigation systems.

## Graywater

Another alternative source of water is Graywater. Graywater is any water that has been used in the home, except water from toilets. Dish, shower, sink and laundry water comprise 50% to 80% of residential Graywater. Lawns can successfully and safely be irrigated using treated Graywater, especially when used with a subsurface drip irrigation system.

Local health departments may regulate the use of Graywater. Graywater systems require considerable planning and additional infrastructure when compared to standard residential waste water and irrigation systems. The cost of installing such a system can be prohibitive so it is often best used for large projects. Some forward-thinking communities and developers in arid areas are already using Graywater systems and more of us will (hopefully) see the benefits of this water conservation method soon.

## PLAN FOR ACTION:

Investigate drought - tolerant turfgrass species  
 Water only as needed  
 Water deep and less often  
 Use alternative sources of water when possible

## Resources

The Irrigation Association - [www.irrigation.org](http://www.irrigation.org)

Got Draught: Get Smart! by Patricia Marie - [www.igin.com](http://www.igin.com)

Micro-Irrigation The Future of Water Conservation by Sam Tobey - [www.igin.com](http://www.igin.com)

Common Gray Water Errors and Preferred Practices - [www.oasisdesign.net](http://www.oasisdesign.net)

Application of Intelligent Irrigation - [www.cohort.com](http://www.cohort.com)

Southern Nevada Water Authority - [www.snwa.com](http://www.snwa.com)

The Urban Farmer Store - [www.urbanfarmerstore.com](http://www.urbanfarmerstore.com)

Netafim USA Design Manual at [www.netafimUSA.com](http://www.netafimUSA.com) or Netafim USA 5470 East Home Ave., Fresno, CA 93727 (888) 638-2346



## Mowing the Lawn

Mowing turfgrass is a necessity if you desire a neatly trimmed lawn. Whether you do it yourself, or rely on a separate service, the cutting of lawns across the country is a massive undertaking. Besides homeowners, there are fleets of professional mowing crews moving site to site each day of the mowing season. The small engines used for lawn mowing, blowing, trimming ( and the transportation of all these machines and laborers ) are a significant source of air and noise pollution, and consume substantial amounts of fossil fuel. The following suggestions will help reduce the environmental and economic costs of cutting your lawn.

**Consider mowing less often.** By relaxing the standard of lawn appearance, we can significantly reduce the cost of mowing by simply mowing less. By mowing less, we will maintain the lawn at a taller average height.

**Consider a hand push mower.** Combine the walk-behind activity of power mowing with a little more push and leave the small gas engine behind. Rotary reel type hand mowers are easy to use and do the job without the air and noise pollution and fossil fuel use. You get a little more exercise as well.

**Adjust the mower height to cut the grass blades at a height of 2.5" - 3.5" above the soil for cool season grasses.** The common practice is to cut much shorter. This overcutting robs the grass roots of essential sugars, produced as the grass grows, which are required for strong healthy turfgrass. Leaving longer grass blades further shades the soil, reducing irrigation needs. The best approach for the grass is to remove just 1/2 inch off the grass blades at each mowing. Never remove more than 1/3 of the blade at a time. Mowing frequency will depend on the grass type, soil and air temperature and available moisture, all of which will change by the season. Try to balance cutting height and frequency to give you the best looking lawn with the least amount of mowing.

**Cut with sharp blades.** Buy an extra set of blades for your mower and switch to a sharp set in mid-mowing season, or sharpen your blades mid-summer. A sharp blade creates a clean cut that does not mash the grass tips, resulting in lawn browning and higher water losses through the poor cut.

**Return the grass clippings directly to the soil by using a mulching-type blade.**

The natural process of returning nutrients to the soil directly from decomposing grass clippings is the quickest way to get the fertility back to the grass plant. This 'grasscycling' can return up to 25% of the existing fertility back to your lawn.

Why send your fertile grass clippings to the landfill or compost pile? The mulching blade helps cut up the clippings into smaller pieces that rapidly dry and decompose, accelerating the natural fertilization process.

**If your lawn is large enough, consider mowing in layers.** Mow the outlying, less-used portion of the lawn less frequently to produce a layered or stepped look. By mowing once a month or even once or twice a year, the outlying areas can diversify into a meadow-like appearance, and can gracefully transition the turfgrass lawn into taller planting areas. You can plan your lawn layers by switching to taller, less intensive grass varieties for the taller sections. Remember that mowing less frequently and mowing a smaller area reduces the environmental cost of your lawn.

**PLAN FOR ACTION:**

- Mow with a hand push mower if possible
- Mow higher than you think
- Mow with sharp blades
- Mow outlying areas less than close up, high-use areas
- Return the grass clippings directly to the lawn

## Other Resources:

City of Seattle Public Utilities, Resource Conservation section. 710 2nd Ave., Suite 505, Seattle, WA 98104 (206) 684-7560  
Website <http://www.ci.seattle.wa.us/util/rescons>

Natural Lawn Care hotline 1-888-860-LAWN  
Ecologically Sound Lawn Care for the Pacific Northwest  
Findings from the Scientific Literature and Recommendations from Turf

Daar, Sheila ed. Least Toxic Pest Management for Lawns. Bio-integral Resource Center, POB 7414, Berkeley, CA. 94707 (510) 524-2576) 1992.

WSU Cooperative Extension, USDA Washington State University, Pullman, WA 99164  
Home Lawns EB0482  
Turfgrass Seeding Recommendations for the Pacific Northwest PNW299  
The European Crane Fly EB0856

<http://gardening.wsu.edu>, WSU master gardener website  
WSU/King County Cooperative Extension (206) 296-3900

Sunset National Garden Book, Sunset 1997.

Taylor's Master Guide to Gardening. Houghton Mifflin, 1994.

## INTERNET SITES/OTHER RESOURCES

### USGOV/EPA

Cooperative Extension Sites. Excellent regional information on all aspects of lawns. Check 'extension' in the blue pages under government, call your state's land grant university or search the Internet, typing in 'extension' and the name of your state.

Extonet at Cornell University (<http://pmep.cce.cornell.edu/profiles/index/html>). Excellent for information about specific lawn chemicals.



Lawn Institute (<http://www.lawninstitute.com>). Excellent link to many other valuable links.

North Carolina State University ([ww.ces.ncsu.edu/TurfFiles/pubs/insects/mip-doc.html](http://www.ces.ncsu.edu/TurfFiles/pubs/insects/mip-doc.html)). Recommended for general information about insect pests.

Ohio State University Plant Facts ([www.plantfacts.ohio-state.edu/](http://www.plantfacts.ohio-state.edu/)). A valuable search engine for thousands of relevant documents.

Scott's lawn specialist ([www.Scotts.com](http://www.Scotts.com).) Very commercial, but providing numerous services, tools and tips.

University websites. Provide very good region-specific advice. Locate through any search engine.

## Conclusion

The decisions we make in our own back yards may seem insignificant; however, short-sighted decision-making on even a small scale can lead to catastrophic consequences.

Evaluating our options, and then selecting those choices that are kinder to all species will help to ensure the health and beauty of our present and future earth.

The Environmental Committee, January 2005

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