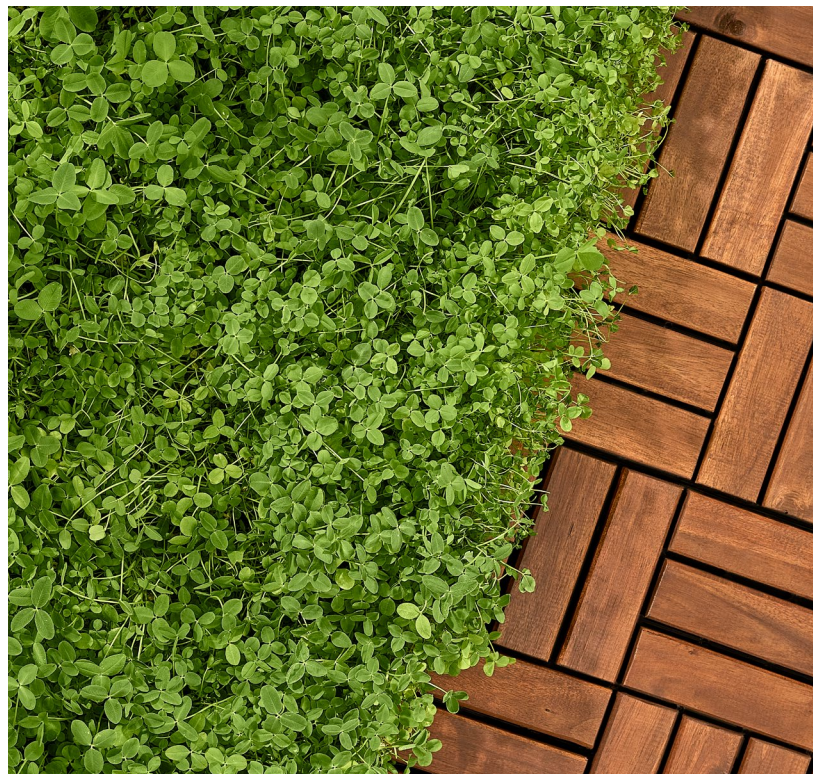




Scotts Miracle-Gro

The Truth About Lawns

September 2024





A lush green lawn became a symbol of the American dream in the 1940s, post-World War II, when military veterans were granted low-interest home loans and moved to the suburbs in droves. A well-maintained lawn offered curb appeal and an enjoyable outdoor space for children and family pets.

Since then, homeowners have faced the harsh reality of climate change and its impact on residential green spaces and water usage. Global warming and overall heat indexes have steadily increased, with 2023 becoming the hottest year ever. The 10 warmest years on record have all occurred in the past decade (2014-2023).¹ This continues to be an upward trend.

For those in the Southwestern United States, the resultant decline of the Colorado River Basin water supply has led to tighter restrictions on municipal, commercial, and residential water usage in the seven surrounding states. Many cities have responded by turning to turf rebate programs, incentivizing or even requiring homeowners and business owners to rip up natural turfgrass on their properties in exchange for tax incentives and cash rebates. However, there is debate over the effectiveness of such programs, as turf removal has led to a host of other issues, including exacerbating urban heat islands and zones. The bottom line is that removing or restricting natural turfgrass in public or private spaces and replacing it with concrete, rock gardens, or artificial turf is a loss for citizens.

It is important to note that as the climate changes, so does the way we care for a lawn. There are a wide variety of naturally drought-tolerant turfgrasses, such as clover and buffalo grass, that require less water. When these turfgrasses are combined with native plants, they enable homeowners and communities to realize the environmental benefits of lawns and green spaces in the changing world. This is less about protecting the curb appeal of lawns and more about the multitude of benefits that a natural living lawn provides for a sustainable future and overall well-being.

¹ Lindsey, R., and Dahlman, L. "Climate change: Global temperature," January 18, 2024 <https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature>

LAWNS SUPPORT A SUSTAINABLE FUTURE

Increase carbon sequestration

Natural turfgrass plays a crucial role in offsetting the negative effects of climate change by enhancing carbon sequestration, i.e., capturing atmospheric carbon dioxide and using solar energy to convert it into complex carbon compounds, primarily sugars. This carbon can be deposited into stems, leaves, and roots, where it is used for growth and development, but it can also be captured in the soil as aging plant roots die off and new ones are produced, thereby removing carbon from the atmosphere.² It is estimated that U.S. lawns remove 5 percent of carbon dioxide in the atmosphere³ and just one acre of natural turfgrass will absorb hundreds of pounds of fossil-fuel-created sulfur dioxide in a single year.⁴ Natural turfgrass has more leaf surface area per square foot than most other foliage, making it one of the most productive plants at carbon sequestration. In fact, a natural turfgrass environment can sequester more carbon than a rainforest environment.⁵

Golf course greens and fairways, for example, store nearly a ton of carbon per acre per year.⁶ On the individual homeowner front, a well-fed lawn removes twice the amount of carbon from the air in a single year than a tree captures in 10 years.⁷ This makes establishing and maintaining natural turfgrass lawns a proven contributor to creating a more sustainable world and a mitigator of the future effects of climate change, as a rapid increase in carbon sequestration occurs in the first 25 to 30 years after natural turfgrass is established.

Combat heat islands through evapotranspiration

Heat zones and heat islands are being created at a more rapid pace globally through a combination of rising temperatures and an increase in urbanized landscapes featuring concrete and asphalt, which absorb the sun's heat and lead to further increases in ground and ambient temperatures. An example is Las Vegas, where over the past 30 years, normal mean temperatures for each month were at least a half a degree warmer this 30-year cycle than the previous one.⁸ Natural green spaces in urban environments can help to combat the effects of these urban heat islands. Both cities and homeowners can look to incorporate more natural landscapes to help cool the surrounding areas, encouraging evapotranspiration.

Evapotranspiration is the process by which water vapor leaves the soil or a plant via its roots and is released into the atmosphere as a vapor. Roughly 50 percent of the sun's heat striking your lawn is eliminated by evapotranspiration.⁹

U.S. lawns remove

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of carbon dioxide
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A well-fed lawn removes

twice

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² The Lawn Institute. "Carbon sequestration," 2021. <https://www.thelawninstitute.org/environmental-benefits/carbon-sequestration/#:~:text=Research%20suggests%20that%20grasses%20can,carbon%20per%20acre%20per%20year>

³ Natural Turfgrass Federation. The U.S. Turfgrass Industry, 2006.

⁴ Eliot C. and Beverly C. Roberts. "Lawn and Sports Turf Benefits." The Lawn Institute, Pleasant Hill, Tennessee, 1989.

⁵ Stachelwitz, Rusty. "The Answer Is Turf." American Nurseryman, 2007. <https://eurekamag.com/research/018/148/>

⁶ Elstein, D. "Are Golf Courses Holding the Carbon? Turfgrass As a 'Sink' for CO2." Agricultural Research Magazine, 2003. <https://agresearchmag.ars.usda.gov/ar/archive/2003/jun/golf0603.pdf>

⁷ Lawn Institute. Lawns & Gardens. Impact Statements for Drought, 2023.

⁸ NOAA's National Weather Service. Las Vegas, Nevada 1991-2020 Climate Normals. National Weather Service, 2021. <https://www.weather.gov/vef/1991-2020Normals>

⁹ Eliot C. and Beverly C. Roberts. "Lawn and Sports Turf Benefits." The Lawn Institute, Pleasant Hill, Tennessee, 1989.



A well-maintained lawn and landscape keeps homes cooler on hot days.



It reduces surface temperatures by **30 to 40 degrees** compared to bare soil.



It is **50 to 70 degrees** cooler than streets and driveways.¹⁰

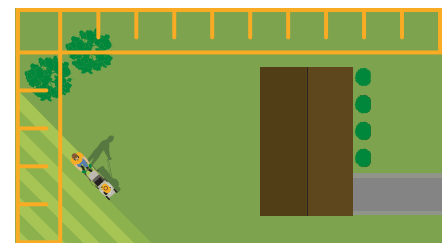


Each blade of natural turfgrass acts as an evaporative cooler.

Evapotranspiration also helps the Earth rid itself of excess radiant heat from the sun, which helps maintain a constant temperature. Well-maintained lawns and landscapes keep homes cooler on hot days, reducing surface temperatures by 30 to 40 degrees compared to bare soil, and 50 to 70 degrees cooler than streets and driveways,¹⁰ as each blade of natural turfgrass acts as an evaporative cooler.

Help mitigate drought

Lawns aid in drought mitigation by optimizing water absorption, fostering sustainable water management practices and conservation efforts. Climate change is causing longer periods of drought in many areas of the country, leading to increased potential for flooding damage when it rains due to the ground's inability to absorb water after long dry spells. Cities can and should utilize the water retention properties of natural turfgrass to create what is known as "sponge cities." The idea behind sponge cities is fairly simple: increase green spaces using natural turfgrass and other plants, replacing impervious concrete and asphalt where possible, to reduce flooding. By increasing green spaces in urban areas with trees, plants, natural turfgrass, and other green infrastructure, the landscape is better equipped to absorb rainfall and filter water efficiently. Similar to the way natural turfgrass prevents soil erosion during storms, natural turfgrass and other green elements can reduce the burden on stormwater runoff systems and mitigate flooding. A 5,000-square-foot natural grass lawn has the potential to capture around 2,000 gallons of rainwater before runoff occurs on sandy-loam soil¹¹ and is able to slow the flow of water during periods of heavy rain, preventing runoff and erosion.



A 5,000-square-foot lawn can absorb more than **2,000** gallons of rainwater before runoff occurs on sandy-loam soil¹¹

Different natural turfgrass species have different root systems, offering varying levels of water absorption and erosion reduction, but overall, well cared for lawns and drought-tolerant natural grasses with strong roots require less water. By way of comparison, trees and shrubs are regularly found to be higher water users than natural turfgrass.¹² The more natural turfgrass, the better.

¹⁰ Lawn Nation. "How The Environment Benefits From a Well-Maintained Lawn," 2019. <https://lawnnation.com/how-the-environment-benefits-from-a-well-maintained-lawn/>

¹¹ "Runoff Reduction." The Lawn Institute, 2021. <https://www.thelawninstitute.org/environmental-benefits/runoff-reduction/>

¹² Street, J. S. "Water Conservation for Landscape Turf." University of Massachusetts Amherst Center for Agriculture, Food, and the Environment, 2015. <https://ag.umass.edu/turf/fact-sheets/water-conservation-for-landscape-turf#:~:text=Numerous%20misconceptions%20exist%20regarding%20turf%20areas%20as,to%20be%20higher%20water%20users%20than%20turfgrass.>

Dust in the air can not only be breathed into your lungs, but also reduce sunlight in a city as much as

15%¹⁶

An acre of grass will absorb **hundreds** of pounds of sulfur dioxide every year¹⁶

LAWNS CONTRIBUTE TO OVERALL WELLNESS

Increase oxygen and improve air quality

Natural turfgrass provides benefits in terms of what it produces and absorbs. Lawns are some of the largest producers of oxygen via photosynthesis. A 2,500-square-foot lawn produces enough oxygen to sustain a family of four,¹³ and one acre of natural turfgrass produces enough oxygen for 64 people a day.¹⁴

Healthy lawns also act as an air filter, encouraging air purification and oxygenation for a cleaner environment and improved air quality. If you've ever walked through a construction site or a similarly dry, unplanted area on a windy day, you may have some idea of what life might be like without natural turfgrass. Clouds of windblown dust make for difficult breathing, irritated eyes, and reduced visibility. But natural turfgrass helps trap dirt and dust. In fact, every year lawns trap smoke particles and more than 12 million tons of dust and dirt.¹⁵

Dust in the air can not only be breathed into your lungs, but also reduces sunlight in a city by as much as 15 percent.¹⁶ Natural turfgrass helps keep our cities cleaner and more beautiful while also reducing smog. An acre of grass will absorb hundreds of pounds of sulfur dioxide every year,¹⁶ typically emitted from coal combustion. In addition, the microorganisms in a turfgrass soil ecosystem can clean up petroleum products, metals (such as lead, copper, zinc and cadmium) and organic chemicals, including pesticides.¹⁷

¹³ Felton, G. K. Maryland Professional Lawn Care Manual. Maryland Department of Agriculture, 2018. https://mda.maryland.gov/SiteAssets/Pages/fertilizer/MDAProLawnCareManual_10.3.18.pdf

¹⁴ Sundberg, M. "Environmental Benefits of Organic Lawns. Ecological Landscape Alliance," 2020. <https://www.ecolandscaping.org/03/installing-and-maintaining-landscapes/lawn-care/environmental-benefits-of-organic-lawns/>

¹⁵ Maryland Department of Agriculture. "Maryland Turfgrass Survey. An Economic Value Study." Institute of Applied Agriculture. University of Maryland, College Park, 1996.

¹⁶ Eliot C. and Beverly C. Roberts. "Lawn and Sports Turf Benefits." The Lawn Institute, Pleasant Hill, Tennessee, 1989.

¹⁷ "Researchers Get to the Root of Soil Remediation." Robinson Shaw, Environmental News Network, 7/11/00 at <https://www.enn.com/>



Reduce noise and pollution


Turfgrass is a natural, acoustically soft material that can absorb sound as it interacts with the ground. In fact, grassy slopes and areas along roadways can reduce noise levels by eight to ten decibels,¹⁸ an especially helpful natural protection for those who live close to busy highways or in cities with nearby neighbors. Residential lawns have been shown to reduce noise levels by 20 to 30 percent.¹⁹

Help cultivate safer recreational settings and healthier communities

Green spaces play a vital role in providing recreation, relaxation, and social interaction, helping to foster a sense of community and well-being.²⁰

Natural green spaces not only provide aesthetic beauty to the landscape or cityscape, but can also help improve mental health, increase work productivity, and lead to an overall better quality of life, especially in densely populated urban areas.²¹ City dwellers can attest to how exposure to nature can provide an often immediate impact on mood and well-being. A reduction in or absence of robust greenspaces can contribute to a loss of productivity, more susceptibility to anxiety, and a decline in mental health.²²

Natural turfgrass also offers a softer, more absorbent surface for recreational and sports activities than artificial turfgrass. The NFL Players Association has found that injuries on natural turfgrass are fewer and less severe than on other surfaces, which continues to be a hotly debated topic within the sports industry.



Residential lawn benefits include a
20 - 30%
reduction in noise level¹⁹

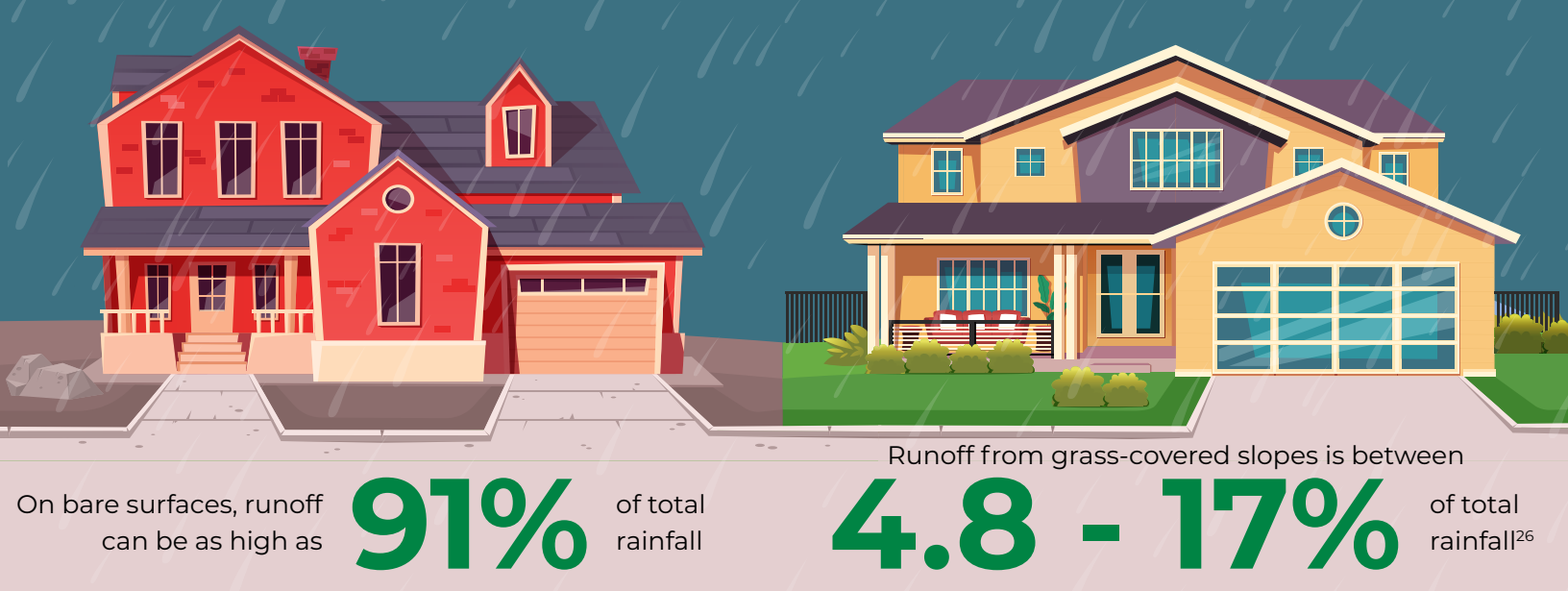
¹⁸ Eliot C. and Beverly C. Roberts. "Lawn and Sports Turf Benefits." The Lawn Institute, Pleasant Hill, Tennessee, 1989.

¹⁹ Cook, David I. and Haverbeke, David F. "Trees and Shrubs for Noise Abatement." Historical Research Bulletins of the Nebraska Agricultural Experiment Station (1913-1993), 1971. <http://digitalcommons.unl.edu/ardhistrb/269>

²⁰ National Association of Landscape Professionals. "Healthy Landscapes Foster Healthy Communities," 2024.

²¹ Beard, J.B. and Green, R.L. "The Role of Turfgrasses in Environmental Protection and Their Benefits to Humans. Journal of Environmental Quality," 1994. <https://doi.org/10.2134/jeq1994.00472425002300030007x>

²² Lawn Institute. Lawns & Gardens. Impact Statements for Drought, 2023.



GREEN SPACES PROMOTE BIODIVERSITY AND PROTECT NATURAL ECOSYSTEMS

Lawns and green spaces promote biodiversity by providing a habitat for wildlife and plant species. Diverse green spaces also help to attract pollinators, such as bees, and the grass itself enriches the soil by adding over 6,500 pounds of organic matter each year to an area the size of a football field.²³ Turfgrass supports microbes, invertebrates, and other organisms that shape the allied ecosystems by linking food webs. It also creates a transient environment for many arthropods, including pollinators, predators, and parasitoids.²⁴

In a residential lawn, using regional natural turfgrass can make the lawn more sustainable and reduce the need for irrigation. For bigger geographical footprints, integrating large areas of turfgrass with natural areas of trees, streams, and wetlands can serve as an important wildlife habitat.

Filter groundwater and safeguard ecosystems

Because turfgrass plays a pivotal role in preventing soil erosion and rainwater runoff, it helps filter or restrict movement of agricultural inputs such as fertilizers and pesticides to sensitive environments.

Even low-density turfgrass has lower runoff and sediment loss (both of which can affect the quality of water sources) than bare-soil landscapes.²⁵ On bare surfaces, runoff can be as high as 91 percent of total rainfall while runoff from grass-covered slopes is much lower, between 4.8 percent and 17 percent of total rainfall.²⁶ With an increase in unpredictable weather conditions, lawns are more well positioned to protect the environment than a bare lot, artificial lawn, or xeriscape.

²³ Eliot C. and Beverly C. Roberts. "Lawn and Sports Turf Benefits." The Lawn Institute, Pleasant Hill, Tennessee, 1989.

²⁴ Beard, J.B. and Green, R.L. "The Role of Turfgrasses in Environmental Protection and Their Benefits to Humans." Journal of Environmental Quality, 1994. <https://doi.org/10.2134/jeq1994.00472425002300030007x>

²⁵ National Association of Landscape Professionals. (2022). Benefits of Landscapes Research.

²⁶ Chatterjea, K. (1999). The impact of tropical rainstorms on sediment and runoff generation from bare and grass-covered surfaces: a plot study from Singapore. Land Degradation and Development, 9(2). [https://onlinelibrary.wiley.com/doi/10.1002/\(SICI\)1099-145X\(199803/04\)9:2%3C143::AID-LDR264%3E3.0.CO;2-I](https://onlinelibrary.wiley.com/doi/10.1002/(SICI)1099-145X(199803/04)9:2%3C143::AID-LDR264%3E3.0.CO;2-I)



CONCLUDING THE CASE FOR LAWNS AND NATURAL TURFGRASS

Natural turfgrass does far more good than providing aesthetic benefits—it contributes to a positive impact on the environment, personal well-being properties, and local ecosystems. As sustainability continues to be a top concern, a natural turfgrass landscape performs better under stress and is more effective at absorbing rainwater than concrete or artificial grass, which helps reduce the need for watering. There are countless turfgrass species that are adaptable to different climates and for different uses, and researchers from universities and companies such as ScottsMiracle-Gro are driving consistent innovation in this area as the environment and consumer needs continue to shift.

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