RIVER STAR HOMES

The River Star Homes LAWN MAKEOVER WORKBOOK

What Works, What Doesn't
To Help Residents Achieve Beautiful, Eco-Friendly Lawns

Elizabeth River Project
Making restoration a reality.

Motivation starts with our signature yard flag, which serves as a public pledge. Social marketing research shows people are more likely to carry out a commitment to which they pledged publicly.

Acknowledgements

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"But I don't want a brown lawn"

Introduction

Signing people up for Elizabeth River Project's River Star Homes program is easy, when you first start explaining it. We offer our signature free yard flag and list seven behavior changes we expect in return. The homeowner smiles; nods along. Then we come to "Step 7, Reduce fertilizer use." More frequently than for any other step listed, the homeowner frowns. "But I don't want a brown lawn," he or she objects.

And there you have one of the causes of algal blooms choking the urban Elizabeth River and spreading into the lower Chesapeake Bay each August, when excess nutrients have washed off our city lawns and combined with the heat of late summer. Sound familiar? It probably does, if you're like our non-profit, the Elizabeth River Project, charged with improving water quality in the urban environment. You're facing down the American love affair with lawns, paired with the persistent belief that what the lawn wants is bag after bag of synthetic nutrients. With each rain, this overload of nitrogen and phosphorous washes off the lawn, down the storm drains and into the river.

Telling people simply to stop fertilizing - meaning, give up all hope of lovely lush turf - was about as promising as preaching other forms of abstinence always has been. Could we instead motivate people to make changes in lawn care practices that would still give them beautiful lawns, but through the more difficult, often more expensive process of rebuilding healthy soil?

Fertilizer from lawns contributes to massive algal blooms like this one in the Elizabeth River's Lafayette branch. Simply telling people to stop fertilizing is not effective, though.

"We'll help you with that one," we now say when people pause over Step 7. "We have a great lawn makeover program." And so we do, thanks to the National Fish and Wildlife Foundation, the Hampton Roads Sanitation District, the cities of Norfolk and Chesapeake, Va., other generous supporters and many pioneer homeowners. Over the last five years, our small non-profit in Portsmouth, Va., has taken on the Goliath of the American appetite for lawn fertilizers. Through 250 lawn makeovers so far, we've learned a lot and we've helped some homeowners achieve their prettiest lawns ever, the natural way. This work book is about what worked as well as some challenges still ahead in this emerging field, such as gaining better regulatory credit for pollution levels reduced through alternative residential lawn care, increasing the pool of trained lawn care companies available to help, and finding more effective natural approaches to weed control.

Essentially, the process means teaching people to restore healthy soil if they want beautiful lawns. It's an art and a science worth more focus from the environmental and regulatory community. After all, lawns are our most intimate vistas. Making them people, pet and planet friendly is not just a nicety. Here on the Chesapeake Bay, urban/suburban runoff is the only source of nutrient pollution still growing, and we suspect that is likely the case where you are.

- *Marjorie Mayfield Jackson,* Executive Director, Elizabeth River Project, November 2016

Seven Things that Work to Motivate Eco-Friendly Lawn Care

1. **Build a personal relationship.** There's no replacement for the personal site visit. Our lawn makeover participants ranked "meeting with the lawn care specialist" as the most helpful assistance they received. We also send a personalized letter, make follow up calls and seek to build an on-going personal relationship.

Survey respondents said meeting with our lawn care specialist (Terri Foss, horticulturist, center) was the most helpful assistance they received. Building personal relationships is key with our makeovers.

2. **Yes, soil tests matter (they're the holy grail of prudent lawn care), but you will need to take the lead**. It doesn't work to simply hand out soil test kits to homeowners and hope for the best. The homeowner probably thinks testing the soil is some kind of bewildering science, and may never make it to the yard with a spade, much less to the post office. Go to the home, show the homeowner how, then send the samples off to the lab yourself. Lastly, interpret those complicated results for the homeowner. We write a cover letter.
3. **The key to a gorgeous lawn is healthy soil, and the most reliable path is to aerate the lawn and top-dress it with compost.** Why does the urban yard turn out brown grass? It's compacted and starved for organic matter. Most any hardware store will rent you an aerator. Find a reputable supply of organic compost. Once you recreate healthy soil (full of oxygen and compost), it can support healthy, verdant grass (the type of grass matters, too - recommend species that tolerate your climate and the specific yard conditions).
4. **Reduce costs to the homeowner - seek grants or municipal help**. Natural lawn care can be expensive; in fact, cost is the biggest barrier after aesthetics. Local governments may have storm water funds to share costs, in exchange for documented pollution

reductions (two cities here have stepped to the plate in this way; caution though, regulatory credit for this "Best management practice" is still emerging).

5. **Train the turf care community.** The green homeowner can be an untapped market for landscaping companies – and boy, do you need their help! Rebuilding the soil is essentially heavy outdoor labor. We joined with the professional turf care association to offer training at their conferences.

6. **Give simple, snappy instructions.** Don't let your program die under the weight of scientific jargon. Among our slogans: "Mow 3 inches high, let grass clippings lie." "From river to Rover, no poop left behind."

7. **Motivate through a public pledge and peer pressure**. Our yard flags not only attract interested neighbors but keep the homeowner true to his/her lawn care pledge.

Four Things that Don't Work - Yet

1. **One-time or sporadic assistance.** Transitioning to a healthy, natural lawn typically takes three years. Stop in the middle and you may leave a disappointed citizen with a raggedy looking lawn.

2. **Relying only on lawn care contractors**. Lawn care professionals who are ready and willing to take the natural approach are in too short supply. We have had to supplement the professionals by developing basic in-house capacities. We rent and operate aerators, load, deliver and spread compost. A board member donated a pick up truck – big break through moment - and we have hired part-time (now full-time) outdoor labor.

3. **Promising a lawn with no weeds.** Weeds might be your toughest challenge… homeowners just don't like them, and the environmentally friendly controls currently identified, such as corn gluten meal, aren't as reliable as synthetic herbicides. Once a healthy natural lawn is well-established, weeds will have less of a chance, but this takes time. Meanwhile, encourage the homeowner to live with turf diversity. Clover was once prized for its beauty in the meadow.

4. **Expecting beefy regulatory credit - yet.** Here on the Chesapeake Bay, regulatory concern regarding nutrient pollution is more focused on agriculture than on lawns. However, it's also true here on the bay that residential runoff is the only significant source of nitrogen that's still increasing. More needs to be done to further the conversation and science of alternative lawn care as a Best Management Practice. In particular, adding compost is not yet widely accepted out of concern for leachate; but to us, remains essential to the beautiful lawn that melts away the key aesthetics barrier.

The River Star Homes Model – Step by Step

Step 1 – Prepare Your Team, Your Resources & Partners.

The team. This is pioneer work; both labor-intensive and specialized. You must learn to recruit people to do something they think they'd rather not (give up synthetic lawn fertilizers). This is the science of social marketing. You'll need to understand soil, plant life, grasses that do and don't thrive in your climate, and how to rebuild healthy soil. Thus this is the marriage of marketing plus biology. You'll need willing manual labor, as in, willing to load, unload and operate a loud, heavy aerator machine; willing to load, unload, shovel and rake yard upon yard of compost in the hot sun. On top of all that comes a program manager able to manage up to 100+ small sites at once, while documenting measurable results, answering a barrage of homeowner questions and concerns and negotiating contracts with municipalities to cost-share expenses.

Sound daunting? It's worth it when you realize you are helping pioneer the turn around of a national problem, America's addiction to over-fertilizing, leading to rivers and bays choked with algae….and when someone like River Star Home Chuck Beers reports his "best lawn ever," with no synthetic fertilizers.

We have found we need on our team:

1) Program Manager – Needs advanced science degree with an understanding of soils, horticulture, runoff pollution and water quality. Familiarity with regulatory agencies is highly helpful. People person with sales skills, able to translate science for the lay person; organized with ability to manage and track multiple projects at once. Persistence!
2) Lawn Care Specialist – We contract with a seasoned local horticulturist to make the initial lawn care visit, identify existing grass species, discuss the resident's current lawn challenges and interests, teach them to take soil tests, package and mail the tests to the lab – and conduct an initial interpretation.
3) Grassroots Coordinator – Our fulltime Grassroots Coordinator is on the road almost constantly to recruit River Star Homes for all our Best Management Practices (not just lawn makeovers). She visits civic leagues, community fairs, benefit concerts and anywhere else she might encounter interest in our priority focus areas. She also takes the lead to organize the annual festival where we recruit the most River Star Homes in a single day, organizes volunteers and assists with manual labor as needed.

Teammates Terri Foss, horticulturist (right) and Casey Shaw, Grassroots Coordinator (left) assess a River Star Home for a lawn makeover.

4) Environmental Specialist – Initially part-time, now full-time, our environmental specialist is the lead manual labor behind our key lawn makeover practices, aeration and top dressing with compost. He drives our pick up truck to load, deliver and operate a rented aerator (these are quite heavy) and load and spread compost by the cubic yard.
5) More help where you can find it! We have found interns highly useful as well as landscape companies when they have a background and willingness to carry out alternative practices (these are hard to find and often completely booked).

Team training - how to change behavior. The Elizabeth River Project was fortunate early in this program to benefit from monthly, one-on-one consultation with Doug McKenzie-Mohr of Canada, dubbed "the father of social marketing" or the practice of motivating behavior change. McKenzie-Mohr hosts workshops around the world that are worth attending, but you also can read his research and recommendations in his books including *Fostering Sustainable Behavior, An Introduction to Community-Based Social Marketing* (2011, New Society Publishers) . In addition, local marketing guru Ron Primm donated his expertise to come up with the winning concept of the yard flag, designed the flag and the brochure with key marketing messages.

Team training - how to achieve a beautiful lawn without synthetic fertilizers. If you are lucky enough to have a certified organic lawn care company in your area, go and sit at their feet. We had only one when we started, My Sister's Garden, and Heather Driscoll, proprietor, was extremely helpful. She also pointed us to where she received her training and certification in organic land care, NE Organic Farming Association, and we sent our program manager through their certification program which essentially teaches you how to rebuild healthy soil through organic land care practices. Virginia Department of Conservation and Recreation (DCR) also offers a four-day training and certification as a Certified Turf and Landscape Nutrient Management Planner that can be key for localities seeking top regulatory credit.

Resources – The heart of our alternative lawn makeover is aeration, or getting oxygen into compacted soil, followed by top-dressing with a thin layer of compost to increase organic matter in the soil. We rent aerators, available at most hardware stores for around $85 a day as of this printing, and purchase compost by the load. It takes one cubic yard of compost (approximately $40 in our area right now) to dress a 1,000 sq. ft. of lawn, ¼ inch deep. We also found we needed a hefty pick up truck. Ours was generously donated by board member Karen Jones Squires. Other equipment needed: Compost spreading, industrial strength rake, shovels, wheelbarrow, and gloves. You'll also want to identify an affordable source of compost and verify content (examples of sellers we use are Four Seasons, Jack Frost, and Colley Gardens). You will need to ensure that the compost is organic leaf-based compost (preferably certified). If you follow our model, you'll want to order yard flags ahead of launching the program. Ours cost $12 each plus shipping.

Environmental Specialist, Mike Fowler, operates the core aerator for a lawn.

Partners – After aesthetics, thee biggest barrier to alternative lawn care is the high cost to the homeowner. An expansive lawn, the kind that can really generate some runoff pollution, can be quite expensive to treat with compost and aeration, plus whatever else is recommended after the soil test to achieve healthy conditions for turf. Our typical River Star Homes lawn makeovers range from 1/10th of an acre to half an acre. Average cost for ½ acre for our program is about $1,500. Few would participate if they had to pay this by themselves. Currently we fund up to $500 in cost-share and incentivize the homeowner pitching in to work with us in-house versus hiring a contractor. We pay 75% of costs (up to $500) if the homeowner helps us, and 50% of costs if a contractor does it all. We have found it critical to enlist our localities as partners for these cost-share agreements. In turn, they gain some level of regulatory credit for reducing pollution through residential Best Management Practices. Our regional wastewater management authority, on the lookout for partners in improving water quality, provided critical seed funding as well – and grant funds from National Fish & Wildlife Foundation held it all together through our pilot years.

Step 2 – Know Your High Priority Lawns

The Elizabeth River Project identifies high priority lawns based on 12 "high risk export factors" identified in the Chesapeake Bay Program's 2013 "Recommendations of the Expert Panel to Define Removal Rates for Urban Nutrient Management," Tom Schueler and Cecilia Lane, Chesapeake Stormwater Network, http://www.chesapeakebay.net/documents/Final_CBP_Approved_Expert_Panel_Report_on_Urban_Nutrient_Management--short.pdf.

These high risk factors include: 1. Owners are currently over-fertilizing beyond state or extension recommendations 2. P-saturated soils as determined by a soil analysis 3. Newly established turf (Easton and Petrovic, 2004, Line and White, 2007) 4. Steep slopes (more than 15%) 5. Exposed soil (more than 5 % for managed turf and 15% for unmanaged turf) 6. High water table (within three feet of surface) 7. Over-irrigated lawns (Barton and Colmer, 2005, Guillard, 2008) 8. Soils that are shallow, compacted or low water holding capacity (Easton and Petrovic 2008a and b) 9. High use areas (e.g., athletic fields, golf courses) Urban Nutrient Management Expert Panel: Approved Final Report 28 10. Sandy soils (infiltration rate more than 2 inches per hour) 11. Adjacent to stream, river or Bay (within 300 feet) 12. Karst terrain (underlain by limestone or dolomite).

Almost all of our 200 square mile watershed meets one of these criteria, a high water table. Generally we are on the lookout for additional priority factors that may indicate a high risk for fertilizer runoff without our intervention, including steep slopes and near proximity to the river.

Step 3 – Motivate Priority Residents – Try a Free Yard Flag

The Elizabeth River Project started a movement when we introduced the royal blue River Star Homes yard flag at our first RIVERFest, in 2011. We hoped it would motivate 50 homeowners to sign up for the new program and its 7 steps, including the pledge to reduce fertilizer use. We signed up 250 homes the first day and the blue flags just kept sprouting like mushrooms throughout our initial focus area, the Lafayette River sub-watershed. Now the enticement of a free a yard flag has been adopted by the 17 localities that make up the Hampton Roads Planning

District Commission across Southeast Virginia, as well as surrounding non-profits including Lynnhaven Now on the Lynnhaven River and the James River Association on the James.

The flag serves both as a badge of pride and a public pledge, the latter of which tends to make people more likely to carry out their commitment, according to McKenzie-Mohr's social marketing research. It also sparks peer pressure and neighbor curiosity.

Elizabeth River Project staff help a high-profile River Star conduct a soil test.

Once people have made a simple, small commitment (in our case, agreeing to 7 simple steps; see www.RiverStarhomes.org) they are more likely to take a larger step, according to social marketing research. In our case, one of the larger steps we are looking for is the lawn makeover. It's important to note here that we also help our River Star Homes implement a series of other Best Management Practices, including rain gardens, super-sized rain barrels, living shorelines and vegetated buffers.

We promote the lawn makeovers by advertising the benefits, beginning with the FREE initial site visit with a lawn care expert, the further enticement of whatever cost-share funding we have available and additional benefits of greater safety for pets and children. Our lawns are people, pet and river friendly! We seek to overcome the barriers of both cost and aesthetics, promising to help them have great looking lawns the natural way – and partly on our dime.

Step 4 – Specialist Makes Visit (and Teaches Soil Testing)

Once a homeowner has signed up for a lawn makeover, our next steps are to send a pre-makeover survey and schedule our contracted horticulturist, Terri Foss, to visit the lawn. This visit is free to the homeowners except we do ask them to consider paying the $10 lab fee for our preferred lab to analyze each soil test. We use Waypoint Analytical. At this point, Terri also asks

for signature on a more specific pledge to reduce fertilizer use if the resident likes the results of the lawn makeover. Terri notes the kind of grasses growing in the lawn currently, and whether they are suitable for the local climate. She may recommend grasses that are more likely to thrive in this area and in the conditions specific to the particular yard, such as St. Augustine in a shady area. She listens to the resident's concerns and desires, which may range from bare spots to pest infestations. She teaches the homeowner to take soil samples, a skill they should retain into the future, and hands the soil samples over to Elizabeth River Project to ensure they are mailed promptly to the lab. This addresses several barriers we have observed waylaying other programs in our area. If you hand out soil sample kits and expect people to do them on their own, the barriers include a lack of comfort with conducting this bit of science, and the human tendency to procrastinate mailing a package.

"(Other programs') method was to hand out boxes for soil and hope they came back. The process of meeting the homeowner at the property and mailing in the samples was certainly successful," recalled Sara Felker, who managed River Star Homes in its most formative years.

"I learned so much in the whole process" –
Martha Versprille, Norfolk River Star Home

Step 5 – Analyze Soil Results, Write Recommendations, Follow Up

When the soil test results come back, Terri analyzes them and interprets them for the homeowner in a detailed letter of recommendations specific to the site and in keeping with Chesapeake Bay Program's "Core Urban Nutrient Management Practices," see below, but also reflecting organic land care training that the Elizabeth River Project received in 2012 from the NE Organic Farming Association. These organic land care principles are intended to rebuild healthy soils over time, usually three years, to a level of ecosystem function that requires little to no fertilizer to support healthy turf. Typically this begins with aeration and top-dressing with organic compost, found to bind with the soil for limited runoff risks.

Core Urban Nutrient Management Practices, Chesapeake Bay Program *(Not all practices are applicable on all sites.) 1. Consult with local extension service or certified nutrient management planner to get a soil test. 2. Maintain a dense vegetated cover. 3. Choose nutrient application strategy: no fertilizer; reduce rate and monitor; or split extension recommended rate into 3 to 4 smaller doses during the growing season. 4. Retain clippings and mulched leaves on the lawn. 5. Do not apply fertilizer when grass is dormant. 6. Use slow release N fertilizer. 7. Set mower height to at least 3 inches. 8. Immediately sweep up any fertilizer that lands on pavement. 9. Do not apply fertilizer within 20 feet of a water feature. 10. Use lawn care practices that increase soil quality (composting, aerating, dethatching).*

Each recommendation is accompanied by a simple how-to fact sheet, whether the practice involves aeration and top dressing, amending with lime, addressing weeds with corn gluten meal, changing mowing practices or other steps indicated by the site visit combined with the soil test (see Attachment C for a series of fact sheets).

Regarding Urban Nutrient Management Plans: In Virginia, you can earn the most regulatory credit for pollution reduced from lawn management if you obtain certification through DCR as a Certified Turf and Landscape Nutrient Management Planner, and then prepare detailed plans following their guidelines and specifications. To be certified as one of these planners, you must have worked in the field for at least 3 years and/or have a degree in agronomy or closely related field. DCR offers training classes (four full days) for professionals interested in obtaining this certification. Once the education and time requirements are met, an exam must be passed to demonstrate proficiency.

While we have prepared Urban Nutrient Management Plans, certified in this way, for about 50 of our lawns, we find the process generally too technical for our audience and the size of their lawns. The plans appear perhaps more appropriate for large commercial sites such as golf courses and parks, and can be dauntingly scientific and overwhelming for homeowners. Instead, we more often prepare a modified "light" version that follows the same principles, along with practices we learned from the NE Organic Farming Association. We call our light version the "Ultra Urban Nutrient Management Plan" and believe they are much easier for a homeowner to follow. See Attachment B for an example, customized for each individual, reflecting site-specific conditions in different parts of the yard. The downside is lower regulatory credit. Perhaps the largest regulatory challenge for our lawn makeovers is not resolved, pending more science. So far, Urban Nutrient Management approaches do not favor the addition of compost, out of concern it will leach nutrients. But we don't know another natural method as effective for feeding the starving urban lawn, so to us, compost is key to the green grass that leads people to choose synthetic fertilizers. Some research has been done on this; more is needed.

After mailing our recommendations, our program manager calls to answer questions and negotiate a cost-share agreement.

Step 6 – Implement Makeover, Year 1; Calculate Results

Mike Fowler helps a homeowner apply compost to his lawn.

Implementation: With a landscape company or with in-house help from Elizabeth River Project staff, the participant implements the first phase of recommendations. With 90% of our lawns, the recommendations implemented include aeration and top-dressing with compost. See River Star Homes Lawn Makeovers – The Basics for details (p. 14).

Calculating Results: In Virginia, the amount of regulatory credit for pollution reduced through lawn management is determined using a calculator called the "Nutrient Cruncher." Developed by Chesapeake Stormwater Network and approved by the Chesapeake Bay Program, the calculator is posted at (http://chesapeakestormwater.net/bay-stormwater/urban-stormwater-workgroup/crediting-residential-bmps).

Step 7 – Keep Going, Years 2 and 3. Survey, Tweak.

One of the most tempting mistakes is to go for big numbers of yards, at the expense of quality, which can only be achieved by working with the same homeowners for an extended time. The NE Organic Farming Association teaches that recreating healthy soil, sufficiently to support healthy turf, typically takes three years. So don't declare success and move on just because the lawn looks great after year one. Encourage the homeowner to test again and adjust treatment again in years two and three. Ideally by year three, the lawn is ready to sustain itself long-term.

We try to test for homeowner satisfaction with an "after" survey at the end of year three. In a 2016 on-line survey, we found participants were almost twice as satisfied with the look of their lawns after the lawn care makeover, averaging a score of 4.7 out of 6 (6 being very satisfied). Before the makeover, the average score was 2.5!

The survey also tells us where we need to keep working to overcome barriers, both as an organization and as the community seeking to standardize alternative lawn care practices. One of the key barriers is weeds. In both our before and after surveys, more than 70% of homeowners say they are concerned about weeds… which brings us to what we're working on next, in our odyssey to inspire a paradigm shift to natural lawns that are also good-looking.

What's Next for Truly Green Lawns

While lawn makeovers are just one piece of a many pronged effort underway at Elizabeth River Project to restore the health of our urban river, we're dedicated to working with the larger environmental, scientific and regulatory community to continue to resolve the barriers and promote the benefits that will keep improving the odds for homeowners to make the natural lawn care switch. Among next steps we think might help most:

1) **Better alternatives for natural weed control.**
   "A healthy, well maintained lawn will discourage weeds," says Felker. "However, during the transition from conventional to organic, the lawn will struggle with weeds… What is missing from the organic toolbox is a selective herbicide, similar to weed and feed. A product like that would go a long way in adoption of organic methods."

2) **More training for landscape professionals regarding alternative practices.**
   A breakthrough moment for us was the exciting invitation to present training at the annual conference of the Virginia Turfgrass Council in 2016. Our region is sorely lacking in landscape companies that are willing to promote natural lawn care practices.

3) **Automated "prompts" that remind people at the proper time to apply the next steps in their lawn makeovers.**
   "I know it sounds obvious, but in a rush to get lots of people's soils tested, it's difficult to maintain personal contact with all of them," says Felker. "It would be awesome to create an automated reminder system for when it is time for people to apply corn gluten and to aerate for example… I tried to send out regular emails to participants to remind them to schedule their soil tests, discuss the results, schedule aerating, etc., but it should be more automated because there is only so much time in the day!" McKenzie-Mohr encourages using such prompts, "presented as close in time and space as possible to the targeted behavior: (p. 90, *Fostering Sustainable Behavior*).

4) **Greater regulatory acceptance of the pollution reductions afforded by natural lawn care practices and the aesthetic barriers overcome with compost -- facilitated by further scientific validation of practices such as top dressing with compost.**
   "The evidence is still accruing about the benefits of compost amendments in lawns," notes Felker, which makes regulatory credit all the more challenging. Regulatory credit, meanwhile, is key to allowing localities to expend limited resources helping homeowners implement changes in lawn care as a Best Management Practice.

   Very special thanks to two localities on the urban Elizabeth River, the City of Norfolk and the City of Chesapeake, who joined with the National Fish and Wildlife Foundation to fund our pioneer efforts to establish the River Star Homes lawn makeover as a model for overcoming the objection, "but I don't want a brown lawn!"

River Friendly Lawns – The Basics

Organic Fertilizers

A common fallacy is that organic fertilizers are safer for plants and the environment than inorganic (chemical) products, yet improper *organic* fertilizer application can also contribute to surface and ground water pollution, plant nutrient deficiency or toxicity, or salt burn. When properly used, organic fertilizers are safe for plants and the environment. The purpose of this guide is to provide general selection and use information.

Lime Application

- Liming is an important part of a turf management program in the humid, Eastern United States. Lime should only be applied if a soil test indicates it's needed. Too much lime can be as harmful as too little, causing potential trace element deficiencies.
- Limestone is easy to apply. Use either a drop or a spinner spreader. Uniform coverage is the key as lime is very insoluble and essentially stays where it is put. Skipped areas won't receive the lime needed to neutralize acidity. Overlapped areas, where double the recommended amount is applied, will have too high a pH level with the potential for trace element problems. To ensure even coverage, one half of the lime should be applied in one direction, and the remainder applied in a perpendicular (crisscross) pattern. If using ground lime, it is simple to determine uniformity because of the visible white color of the material. More care should be taken if pelletized lime is used.
- If the recommendation calls for more than 50 lbs./1000 sq. ft. to established turf, the application should be split. For additional applications, if required, should be applied three to six months after the first application. Applications of less than 50 lbs./1000 sq. ft. will disappear from the turf area after one or two rains, while larger amounts will remain visible for a longer period of time.
- Although lime can be applied any time of year it is recommended that lime be applied in the fall to enable the material to break down over the winter for the next season's growth.

Turf Water Management

- Deep but infrequent watering encourages roots to penetrate deeper into the soil. Water only about once every 7 to 10 days when there has not been a good rain. Water for one to two hours at a time when you do water. Light watering encourages shallow root growth and weed seed germination. Shallow roots dry out quickly in dry, hot weather. Most lawns perform quite well on 1’’ of water applied each week during the growing season. Never apply water to the point of runoff.
- You should wet the soil down to the full root depth, about 6-8 inches. To figure out how deep the soil is saturated, stick a shovel or spade into the soil and press forward to see how far the saturation goes. If you do not know the rate of your sprinkler, place a coffee can within its range and measure the depth of the water collected.
- **Do not over-water**. Too much water can suffocate turf and encourage disease. More lasting damage can be done to a lawn by over watering than by drought. Organic lawns have better

soil structure, more organic material, hold more water and can withstand dry weather better than chemically-treated lawns.

- The best time to water is in the early morning. Watering should never be done at night and generally not in direct sunlight.
- We will provide a rain gauge to help. Drought stress will open the door for chinch bug problems as well as many other issues.
- How long can you wait between waterings before the lawn starts to go brown?
  12 - 21 days: Bahia grass, Buffalo grass, Bermuda grass, St. Augustine grass, Centipede grass
  8 - 12 days: Carpet grass, Fine fescue, Kikuyu grass, Seashore paspalum, Tall fescue, Zoysia
  5 - 7 days: Ryegrass, Kentucky bluegrass, Bentgrass

Mowing

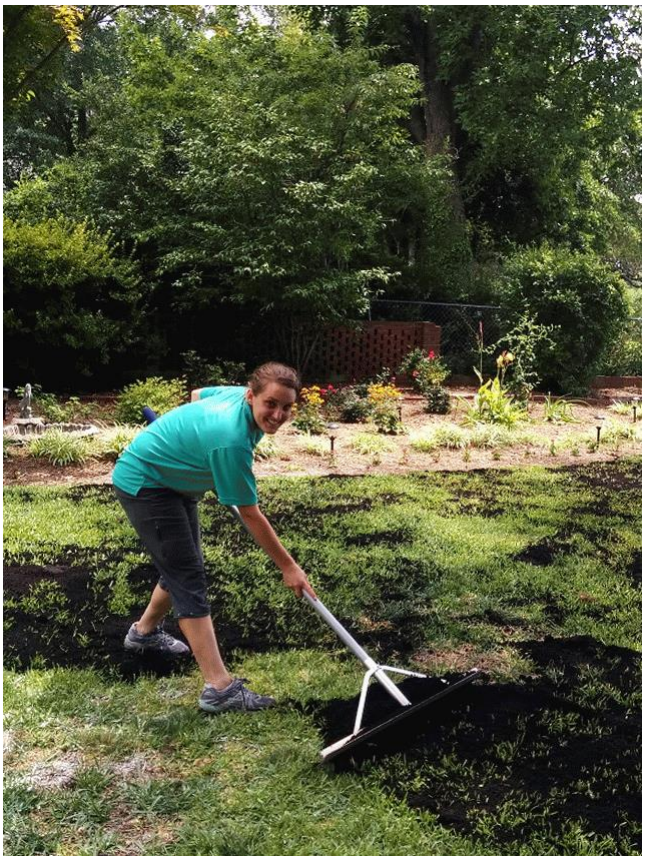
- Proper mowing creates a low-maintenance, drought-tolerant lawn.
- Cutting grass higher will shade out weed seeds and keep them from germinating. Mow when your grass is dry and 3 to 3-1/2 inches tall. Never cut it shorter then 2 to 2-1/2 inches or remove more than one third of the leaf surface at any one mowing as this can shock the plant and increase the chances of infection. This means you may have to mow more than once a week.
- Alternate the direction in which you mow each lawn mowing session to prevent your grass from "getting into a rut" (literally). If your lawnmower wheels pass over the same area in the same direction each time you mow, they'll form ruts over time.
- Keep the mower blade sharp. Dull blades tear grass, leaving larger surface areas vulnerable to disease. Blades should be sharpened with every 8 hours of use.
- Use a mulching lawn mower to return the grass clippings to the lawn, providing vital nitrogen to keep it green. In healthy soil, the clippings break down quickly. This will reduce the need for fertilization and watering.

Grass Type	**Mowing Height**
Bahia grass	2½” – 4”
Bentgrass	¼” – ¾”
Bermuda	½” – 2½”
Buffalograss	2” – 4”
Centipede	1” – 2 ½”
Fine fescue	2½” – 3”
Kentucky Bluegrass	1½” – 3½”

Ryegrass	1½" – 2 ½"
St. Augustine	1" – 3"
Tall fescue	2" – 4"
Zoysia	½" – 2"

Compost Top Dressing

- Compost, sometimes called "BLACK GOLD," can be put down any time of year. Topdressing with compost is primarily practiced to improve turf quality. It's full of the life and organic matter that create an active, healthy environment. Earthworms love it. Diseases and plant pathogens do not like compost as it has been carefully heated to kill opportunistic pests and weed seeds. There is too much competition in active, healthy compost for pathogens to thrive.
- When applying compost: spread it 1/4 inch thick, then rake it into the turf. In general it will take 1 cu yd of compost/1000 sq. ft. to get coverage of 1/4 inch thick. Compost is especially important if chemicals have been used on the lawn. It will re-establish important microorganisms that the pesticides and synthetic fertilizers kill. Compost made by homeowners is usually not well balanced enough for use on lawns. Homemade compost may be used in gardens. Compost will reduce the need for fertilization, aeration, and lime.
- Compost should also be spread under trees and shrubs to prevent insect infestations. Remember infestations are indicators of stress in the plant, usually due to inadequate nutrition in the soil.
- Compost Topdressing helps to raise the Organic Matter levels in soil over time.



Sara Felker, Program Manager, River Star Homes, spreads our signature compost.

Core Aeration

Core aeration is a recommended lawn care practice on compacted, heavily used turf and to control thatch buildup. Core aeration can also stimulate root growth in sod lawns that need to connect to the soil. The goal of any aeration is to:

- Increase the activity of soil microorganisms that decompose thatch.
- Increase water, nutrient and oxygen movement into the soil.
- Improve rooting.
- Enhance infiltration of rainfall or irrigation.
- Help prevent fertilizer and pesticide run-off from overly compacted areas.

When should I aerate? The best time to aerate cool season lawns such as fescue and Kentucky bluegrass is late August to mid September when these lawns are coming out of summer dormancy and beginning a period of vigorous growth. Competition from weeds is also minimal during this time. Warm season lawns such as Bermuda grass, St. Augustine and Zoysia grass are best aerated during June and July, as this is their period of rapid growth.

Where can I get an aerator? Aerators may be rented at many garden or rental centers. Some lawn or landscape companies will perform the service for a fee. Be sure that the machine has hollow tines or spoons to bring the soil core to the surface. These machines are large and heavy; they will require special handling and larger vehicles for transport. Many people work together with neighbors and make it a group effort, thereby lowering the overall cost. If you should decide to rent an aerator, be sure you are instructed in and comfortable with the operation of the machine before bringing it home.

How do I aerate?

- The soil should be moist but not wet.
- Lawns should be thoroughly watered two days prior to aerating, so tines can penetrate deeper into the soil and soil cores easily fall out of the tines.
- If aerating after prolonged rainfall it is important to wait until the soil has dried somewhat so soil cores do not stick in the hollow tines.
- Thorough watering means 1 inch of water from irrigation or rainfall. An inch of water can be measured by marking the side of a pet food can placed in the lawn.
- Applying 1 inch of water may be difficult to achieve in a single watering, given the slow infiltration rate on most Virginia soils. Therefore, smaller amounts of water applied every 3 to 4 days may be required to allow water to enter the soil without causing runoff.
- Aerate the lawn in at least two different directions to insure good coverage. Be careful on slopes, especially steep ones, as well as near buildings and landscape beds.
- Soil cores are best left on the lawn surface; they typically work back into the grass in 2-4 weeks.
- Apply compost 1/4 inch deep. Rake the compost over the lawn, filling the aeration holes.

Core aerating and topdressing at the same time is most beneficial for your turf system. Top-dress at a rate of 1 cubic yard per 1000 sq feet for no more than ¼ inch of compost. The turf area in the front of your home without the slopes is approx. 1, 440 sq feet. You will only need one cubic yard of compost to top-dress. You may place piles of compost throughout the turf area and rake in as needed.

Weed Control With Corn Gluten Meal

Corn Gluten Meal is a by-product of the corn milling process. It contains a root-inhibiting hormone that prevents weed seeds from establishing germination.

- Application rates are critical in using the product for its pre-emergent capabilities. For this purpose, 20lbs/1000 sq. ft. is the recommended rate. Any rate less than this cannot be relied upon to produce results. Prior to applying please read the application information on the product packaging.
- Corn Gluten does not guarantee 100% weed control. The first application provides about 65% control, the second 75% control and the third 80-90% control.
- The most effective application schedule at the present time is thought to be a successive growing seasons: spring, fall, spring or fall, spring, fall. For spring application apply when the forsythia is about to bloom (Forsythia blooming—photo—is generally thought to be the indicator of spring.)
- **CAUTION**: Corn Gluten inhibits seed germination. Allow several Weeks (4-8) after application before direct seeding in treated areas.

Pests—Chinch Bugs

Chinch Bugs--Identification: In the morning hours (before 11 am), get on hands and knees, part the grass at the junction of dead and living grass at one of the patches, and look for chinch bugs. Look for flecks of red, which could be the eggs and young nymphs; in August, also look for small bugs scurrying away, some with wings and distinct markings on their backs. If you are seeing definite aggregations of chinch bugs at the margins of damaged areas, then it's likely you do have a chinch bug problem. If you don't find any chinch bugs, or only one or two, check at least a half dozen sites to be sure there are few or no chinch bugs and therefore that the dying grass is associated with some other condition, e.g., drought stress alone, summer dormancy, other pests or diseases, dog urine patches, spilled mower gas.

Chinch Bugs--*Solutions:*

- **Just Water Option**: If you had small patches of this sort in the past, and they never developed into larger areas, they probably won't this time either. However to minimize the possibility that the patches will expand, keep the grass around areas that are damaged and other drought-stressed areas of the lawn well watered through the remaining droughty periods.
- **Vacuuming Option**: Get your Shop-Vac (or similar workshop type vacuum) out and vacuum the affected patches and the surrounding grass to 2 feet beyond the patch. Follow this by watering the damaged areas and their immediate surroundings through the remaining drought periods to minimize water stress on the grass, and mow at 3 inches or higher.
- **Soap-Trap Option:** Put 1 oz of dishwashing soap in 7 L water and drench a small area of lawn, i.e., 2 square feet. Using a hose attachment can treat a larger area of lawn. The chinch bugs will crawl to the surface of the grass to escape the soap. Lay a flannel sheet over the treated area and wait 10 — 15 minutes. The chinch bugs will crawl onto the sheet, where their feet will become trapped in the flannel nap. They can be vacuumed off the sheet or drowned in a bucket. Follow this by watering the damaged areas and their immediate surroundings through the remaining drought periods to minimize water stress on the grass, and mow no less than 3 inches or higher.

Periodic River Flooding Onto Lawn

Sodium Overload: to address the turf area in front of the home between the street & the sidewalk, which at times floods from the river you need to apply after each flooding: Epsom salt recipe: Dissolve 2 tablespoons of Epsom salt in 1 gallon of water.

Eroding Or Hard To Mow Slopes: Native Plantings

The need to conserve and protect our waterways has led to a search for landscape alternatives to turf areas. Planting of the slope area along the side and front of the home is recommended to act not only as a buffer and filtration system. Native plants introduced into landscape plantings are hardy, less susceptible to pests and diseases and unlikely to escape and become invasive. Native plants have other benefits as well. They are a potential source of food and of traditional and new medicines. Because maintaining native plants requires less work, they provide excellent choices for large commercial landscapes as well as residential gardens.

Low Potassium Levels

Sulfate of potash will help to correct low potassium levels. This product is applied as a granular and can be found at any Feed and Seed store. 1 lb of potash delivers .5 lb of potassium per 1,000 sq ft. Application rates will be found on every bag. Instructions need to be followed precisely. It's important to know the measurements of your yard in order to apply the right amount.

Lime Application—to address pH and Calcium Deficiency

If soil tests show pH to be out of balance, Calcitic Lime Application (at a rate of 50 lbs/1000 sq feet) can address both the pH and lack of calcium in your soil. Although Calcitic Lime is more expensive it addresses more than one problem with the soil. If Calcitic lime cannot be purchased you may use Aragonite in its place to correct the calcium deficiencies and dolmitic lime to correct the pH level. You may find Calcitic lime at John Deere in Norfolk. Aragonite may be found at any local Feed & Seed.

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