

Raising Lawnmower Height

Submitted to:
Southwest Florida Water Management District

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Background

The simple act of raising one's lawnmower can reduce water consumption as well as pesticide and fertilizer use. Because raising the height of one's lawnmower creates healthier lawns, grass will require less watering and fertilization and it will fight off weeds naturally, reducing the need for pesticides.

Water Consumption: Florida is the fourth most populated state in the U.S. and is growing by more than 1,000 new residents daily, continuously increasing demands on freshwater supplies.¹ The risk of water shortages in Florida continues to grow, due to increased urbanization, population growth and limited water supply.² Drought is common in Florida and it is crucial that Floridians learn how to conserve water.³ Nearly 50% of all water used daily in a typical Florida home is used outdoors, mainly for lawn and garden irrigation.⁴ One simple yet effective step residents can take to help protect Florida's precious fresh water is raising the height of their lawnmowers. Mowing a lawn high allows each blade of grass to produce more food for its roots through photosynthesis.⁵ This promotes roots to grow deeper into the soil where they will absorb more water and nutrients.⁶ Taller blades of grass also help shade the soil, reducing the amount of water loss from evaporation.⁷ Cutting more than the top one-third of grass blades decreases the depth to which roots will grow, thus causing grass to require more watering.⁸

Fertilizer Use. Excess fertilizer washes off lawns with storm water into storm drains, transporting the nutrients nitrogen, phosphate and potassium to nearby lakes, rivers and streams.⁹ Excess nutrients produce blooms of algae and other aquatic plants, which then decompose, depleting much-needed oxygen from the water, which fish and other aquatic life require to survive.¹⁰ This process is called "eutrophication," and is responsible for killing fish and affects the most sensitive aquatic life first, such as young fish.¹¹ Eutrophication is the most common cause of water being not fit for drinking, irrigation, industry, recreation and/or fishing and is responsible for 50% of impaired lake area and 60% of impaired river area in the United States.¹² Overuse of fertilizers can also contribute to decreased populations of earthworms and other beneficial soil organisms, and increased soil acidity, thatch accumulation, soil compaction, certain turf diseases, weed growth¹³ and rapid shoot growth.¹⁴ Mowing a lawn high, on the other hand, allows each blade of grass to produce more food for its roots, which encourages roots to grow deeper into the soil where they will absorb more nutrients, thus reducing the need for synthetic fertilizers.¹⁵

Pesticide Use: Pesticides are responsible for both chronic and acute health side effects.¹⁶ Organochlorines, such as DDT, make up the first generation of synthetic pesticides.¹⁷ Organochlorines persist in the environment and are attracted to fats.¹⁸ Organochlorines bioaccumulate in the fatty tissues of living organisms.¹⁹ Organochlorines are not fast-acting poisons; instead, they are associated with chronic effects such as cancer, immune suppression and disruption of hormone function leading to reproductive dysfunction.²⁰ Most of the pesticides that followed organochlorines are

not overly persistent, but are acutely toxic, such as carbamates and organophosphates.²¹ Acutely toxic pesticides inhibit enzymes essential for the proper functioning of the central nervous system in humans and other organisms.²² Designed to work like a nerve gas to kill unwanted bugs and weeds, acutely toxic pesticides can work similarly on humans, other mammals and natural pest predators, resulting in disorientation, spasms and ultimately—death.²³ When natural pest predators are destroyed, pests flourish, creating further reliance on pesticides.²⁴ Raising a lawnmower's cutting height helps to fight weeds naturally. Most lawn grasses tend to be upright-growing plants. Most weeds that invade grass plants are spreading weeds, such as dandelions.²⁵ A healthy lawn forces the spreading weeds to grow upright, weakening them, eventually crowding them out with healthy grasses.²⁶ Thus, raising the height of one's lawnmower reduces the need for chemical pesticides.²⁷

There are significant societal impacts associated with the adoption of such a simple behavior as raising the height of one's lawnmower. Reduced fertilizer, pesticide and water use will all positively impact the environment. The economic savings from adopting this behavior are also considerable, as reducing water consumption can save millions of dollars. Groundwater quality will also improve if pesticides and fertilizers are reduced in stormwater runoff. Groundwater quality is significantly related to both public health and tourism.

Barriers and Benefits

Several barriers should be considered when trying to get residents to raise the height of their lawnmowers. First, different types of grass are grown optimally to different heights and, therefore, need to be cut to different lengths.²⁸ Not knowing which height to set one's lawnmower at may be a barrier to raising its blades. Another barrier to cutting grass higher is that homeowners *think* they will have to mow their lawns more often. However, cutting grass short actually stimulates plants to grow faster to make up for lost greenery.²⁹ Grass should in fact be mowed once a week in high season in order to be cutting grass blades, not stems.³⁰ Lack of knowledge that raising the height of one's lawnmower will help keep grass healthier is another main barrier to adopting this behavior.

There are far more benefits than barriers to mowing grass high. Benefits include deeper rooting and shading for the grass, thus making the lawn healthier and providing competition for weeds; a denser turf; reduced browning; and saved energy and water from reduced watering.³¹ Also, the lawnmower's blades will only have to be sharpened once a year.³² Raising lawnmower height is also related to reduced outdoor water consumption, which is both beneficial for the environment and household finances. Raising the height of one's lawnmower will also improve a lawn's appearance by reducing the occurrence of browning and weeds, as well as creating a denser turf.³³

Raising lawnmower height is one step toward a healthier lawn, and healthier lawns do not require pesticides or synthetic fertilizers. Perhaps the most prominent benefit to

reducing pesticide and fertilizer use is a reduction of health risks to vulnerable children and pets.³⁴ This is followed by prevention of well and waterway contamination.³⁵ Also, there is a cost benefit involved with eliminating or reducing pesticide and fertilizer use.³⁶ After all, raising the height of one's lawnmower is a simple activity that will benefit the lawn's health and appearance, and it won't cost the homeowner a cent.

Summaries of Programs

Raising the height of one's lawnmower is a main component of any healthy lawn campaign. Healthy lawn programs are designed to reduce pesticide and fertilizer use, as well as promote outdoor water conservation. For this *Summary of Programs* section, all healthy lawn campaigns that included raising lawnmower height as a key educational component to promoting healthy lawns were considered for evaluation. Because raising the height of one's lawnmower works in conjunction with a number of natural lawn care behaviors, it makes sense to promote the behavior in conjunction with other related behaviors, such as pesticide reduction, fertilizer reduction and outdoor water reduction.

Bert the Salmon—Promoting Natural Lawn Care (NLC), King County³⁷

There were three main objectives to King County's NLC program: to increase the number of people who use grasscycling, to decrease the number of people who use weed-and-feed products on their lawn and to decrease the amount of water used on lawns. While getting people to raise the height of their lawnmowers was not a major program objective, as part of King County's NLC program, a brochure was developed prior to the program's launch in 1997 outlining six steps to using NLC. The first step was to mow high, mow often and to leave the clippings on the lawn. Other steps included trading in chemical fertilizers for organic alternatives or adopting slow-release fertilizers, and watering lawns and plants deeply but infrequently. The brochure was delivered at seminars and events, such as at the Home Show, Garden Show and neighborhood meetings, as well as through Seattle Public Utilities and a toll-free phone line. In 1999, the brochure was delivered as part of a "habit change kit," which also included additional pamphlets loaded with practical lawn care information and a "Bert the Salmon" lawn sign to display on one's lawn in hopes of encouraging NLC norms in the neighborhood. Habit change kits were distributed at special events and through the NLC hotline.

Other components of King County's program included TV and radio advertising during Seattle Mariners baseball games, effective engagement of news media, a promotional video, and education at special events such as the Garden Show and Home Show.

King County measured behavior change through residents' self-reports. Periodic polling between 1997 and 2001 revealed that the percentage of people who leave grass clippings on their lawns "most of the time" reportedly increased from 27.7% to 41%, or by 146,000 households. The percentage of the population who reported not using pesticide products increased by from 46.8% to 60%, or by 145,200 households. Finally,

the percentage that reported not watering their lawns increased from 18.4% to 34%, or by 171,600 households.

The program cost approximately \$352,000 USD for each year that it ran, with the majority of costs stemming from media planning and purchasing. The habit change kit cost \$20,500 USD in 1999 and \$5,000 USD in 2000. The program did not specifically measure the behavior of raising one's lawnmower height and thus the program's effectiveness in this regard cannot be assessed. Further, it should be stressed that this initiative used self-reports as the measure of behavior change. It is possible that after this campaign residents were more likely to report that they engaged in the behaviors that this program encouraged because they were now perceived as the "socially acceptable" actions to take.

Halifax Regional Municipality Pesticide Bylaw³⁸

Halifax Regional Municipality (HRM) has had a bylaw restricting the use of pesticides on municipal and residential properties to protect health and the environment since 2000. From April 2001 to March 2003, pesticides were banned from properties that would pose the most risk to vulnerable persons, such as day cares, schools and playgrounds. Effective April 1, 2003, cosmetic pesticide use was banned from all residential and commercial properties. Clean Nova Scotia, a nonprofit organization, partnered closely with HRM to provide personal service, educate residents one-on-one in sustainable lawn maintenance practices and to process pesticide permit applications within 24 hours. HRM's objectives were to create public awareness about the bylaw and its relation to human health and the environment, to educate and encourage residents to voluntarily practice sustainable yard management and to implement the bylaw efficiently and cost-effectively. The pesticide bylaw implementation was promoted under the umbrella of HRM's "Naturally Green" sustainable community campaign.

Promotional tools, such as tens of thousands of decals and fact sheets, were distributed for example at home shows and workshops. In 2001, recipe cards, posters, decals and seed packs were used as prompts to promote sustainable lawn care. Raising the height of one's lawnmower to 6.0–7.5 cm (2.5–3.0 inches) was the first suggestion printed on the decal (see Appendix A). HRM encouraged people to place the decals on their lawnmowers as a reminder.

Also related to raising the height of one's lawnmower is a sustainable turf "Maintenance Tips" fact sheet that includes proper mowing maintenance tips. The sheet promotes proper mowing techniques, such as raising the height of the lawnmower, as one of the most important tips for keeping a lawn weed-free.³⁹

HRM also promoted mowing at the appropriate height of 3 inches in at least one Naturally Green newsletter.⁴⁰ Naturally Green newsletters are distributed to all 150,000 households in the HRM region, and are also available online. Also part of Halifax's program were radio and newspaper advertisements; educational posters; TV, radio and newspaper interviews; public service announcements; pesticide bylaw brochures; free public workshops; and a call center dedicated to pesticide briefing.

HRM's total regionwide pesticide use reduction program cost approximately \$0.54 USD per person. A 2002 poll found that 90% of residents practice sustainable lawn care alternatives to pesticides, while only 7% still used pesticides as their main weed and pest maintenance method. The total number of pesticide complaints was reduced from 400 in the first season of the initiative, to 111 in the second season, which is a 70% reduction. This program was considered effective at promoting voluntary compliance with the bylaw.⁴¹ It is difficult, however, to assess how much of an impact raising the height of one's lawnmower had on helping residents to practice natural lawn care.

North Shore Recycling Program's Natural Yard Care, Vancouver⁴²

Vancouver's North Shore Recycling Program contains a Natural Yard Care educational component in addition to its solid waste recycling efforts. North Shore offers "LawnSmart" lawn maintenance tips through their brochure entitled "7 Steps to a Great Lawn" (see Appendix B).⁴³ Step number 2 of this brochure is "Mow High."⁴⁴ Step 2 suggests raising the height of the lawnmower to 3 inches to crowd out weeds and conserve soil moisture.⁴⁵ It also promotes regular mowing — suggesting that no more than the top one-third of grass blades should ever be cut in a mowing session.⁴⁶ The North Shore's efforts also include free lawn maintenance workshops, and fun, informative backyard gardening workshops are offered to groups of 15 or more.⁴⁷ North Shore also has a separate web site dedicated to lawn and garden maintenance, *GardenSmart.com*. Under the heading, "Lawns," mowing is the first listed behavior. The same information that is included in the brochure is under the "mowing" section of the *GardenSmart* site. There are no formal assessments of North Shore Recycling Program's Natural Yard Care program.⁴⁸

Lawnmower Height Pilot

Encouraging homeowners to raise the height of their lawnmower will likely involve:

- Enhancing understanding of why raising the height of the lawnmower is worthwhile.
- Making it convenient to raise its height.

Unlike many other environmentally friendly behaviors, this change in behavior is likely much more easily accomplished than other desired behavior changes as it has few barriers and potentially several perceived benefits (a healthier lawn with reduced reliance on pesticides and fertilizers and reduced need for watering).

Enhancing Understanding: Face-to-face conversations are often more persuasive than advertisements or direct mail campaigns. As a consequence, it is suggested that a horticulturist be hired who goes door-to-door discussing with homeowners how they can have a healthier lawn, reduce pesticide and fertilizer use and reduce water use by simply raising the height of their lawnmower. This individual should wear clothing and a photo identification that clearly shows that he is an employee of the municipality. It is recommended that this individual be a male, as lawn care is more likely to be done by a

male than a female in a dual-head heterosexual household. Further, horticulturists are likely to be seen as credible regarding the importance of raising the height of their lawnmower, and more credible sources of information are more persuasive.¹

Convenience: In addition to discussing with the homeowner the importance of raising the height of his/her lawnmower, the homeowner would be asked if the lawnmower could be briefly inspected to ensure that it is set at the appropriate height. If the homeowner agrees to this request, the lawnmower would be inspected and its height altered if necessary. The horticulturalist would carry with him the appropriate tools to alter lawnmower height.

Strategy 1: As set out above, the first strategy entails a horticulturalist going door-to-door in order to effectively engage householders regarding the importance of raising the height of their lawnmowers. In addition, this individual requests to inspect the height of their lawnmowers and provides assistance, if necessary, in raising the height. Further, with the homeowner's permission, a sticker is placed on the top of the lawnmower, which acts as a reminder to keep the lawnmower at the desired height and indicates the advantages that accrue from this action (healthier lawn; reduced pesticide, fertilizer and water use).

Strategy 2: In this alternative strategy no direct contact is made with the household. Instead, a mailing is sent which informs the household of the importance of raising the height of his/her lawnmower, indicates the preferred height and provides the same sticker that is discussed in Strategy 1.

Pilot Evaluation

To evaluate the suggested strategies, 300 households will be randomly assigned into three groups (the two strategies set out above as well as a control group that does not receive any information or contact regarding lawnmower height). Measurement of grass height in the three strategy areas will be done by unobtrusively measuring grass height while walking through the pilot areas². More specifically, it is suggested that a researcher walk through the pilot areas with a walking stick that has been calibrated so that by simply placing it in the lawn next to the sidewalk the height of the grass can be quickly assessed without bending over. It is suggested that four to six weeks of baseline measurements be carried out prior to implementing the pilot. That is, once a week for four to six weeks the researcher will walk through the pilot areas collecting data on grass length. Once the two strategies have been implemented, these measurements will be repeated for a similar period of time. Finally, the longevity of any initial observed differences should be assessed the following year by collecting the same data for

¹ Given the similarities between the strategies for raising the height of a lawnmower and reducing pesticide and fertilizer use, it would be worthwhile to conduct a pilot that tackled all three behaviors simultaneously.

² Because random assignment is utilized, the three areas can be assumed to be equivalent prior to the beginning of the pilot. However, without baseline measurements it would be impossible to know the average length of grass in the pilot areas prior to the two strategies being introduced.

another period of four to six weeks. These follow-up measurements should be obtained at the same time of year that the original post-pilot measurements were collected. Finally, return on investments should be calculated for the two pilot strategies.

Endnotes

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- ⁴ St. Johns River Water Management District. (Undated).
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- ¹¹ Ibid. pg.8
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- ²⁹ Grinning Planet. (2006). Lawn care tips #1- Cut the grass higher. <http://www.grinningplanet.com/2006/03-07/lawn-care-tips-article.htm>
- ³⁰ Gouin, F. (2006).
- ³¹ Gouin, F. (2006).
- ³² Ibid.; U.S.EPA. (2006). Wastes: Lawn and garden. Consumer Tips. <http://www.epa.gov/epaoswer/osw/specials/funfacts/garden.htm>
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- ³⁴ Aceti, J. (2002). Reducing pesticide use in lawn care: Barriers and opportunities. <http://www.cbsm.com/Reports/JAPesticideInventory.pdf>

³⁵ Ibid.

³⁶ Ibid.

³⁷ **Program Contact:** Julie Colehour, Colehour & Cohen. 1417 Fourth Avenue, Suite 201, Seattle, Washington 98101. (Phone) (206) 262-0364, (E-mail) jcolehour@colehourcohen.com, (Website) www.colehourcohen.com.

³⁸ **Program Contact:** Stephen King, Manager-Senior Advisor, Strategic and Sustainable Resource Mgt., Environmental Management Services, HRM. (Phone) (902) 490-6188, (Email) pestbylaw@halifax.ca, (Website) <http://www.halifax.ca>, follow Naturally Green and Pesticide Bylaw links.

³⁹ Halifax Regional Municipality. (Undated). Alternatives: Sustainable turf maintenance. Naturally Green. <http://www.halifax.ca/pesticides/documents/Turf.pdf>

⁴⁰ Campbell, J., ed. (2004). Pg.6. Spring 2004, Issue #11. Naturally Green Newsletters. Halifax Regional Municipality. <http://www.halifax.ca/environment/naturallygreen.html>

⁴¹ All information, unless otherwise cited, taken from: Halifax Regional Municipality. Halifax Regional Municipality Pesticide Bylaw. *Go for Green Case Studies*. http://www.goforgreen.ca/gardening/case_studies.htm

⁴² **Program Contact:** North Shore Recycling Program, 148 East Second St, North Vancouver, BC V7L 1C3. (Phone) (604) 984-9730, (Fax) (604) 984-3563, (Email) enquiries@nsrp.bc.ca, (Website) www.nsrp.bc.ca.

⁴³ North Shore Recycling Program. 7 simple steps to a great lawn. <http://www.nsrp.bc.ca/naturalyard/lawnsmart.html>

⁴⁴ Ibid.

⁴⁵ Ibid.

⁴⁶ Ibid.

⁴⁷ Ibid.

Appendices

Appendix A



-
- raise mowers to 6.0 - 7.5 cm
 - leave clippings on lawn
 - spread 1.0 - 1.5 cm compost over lawn
 - spread fertilizer mid-autumn
 - mulch leaves mid to late fall over lawn areas



Appendix B

LawnSmart

lawn care that makes sense

Getting a great lawn doesn't have to be complicated. Even one simple step, like spreading a thin layer of compost over the grass, will have you well on your way to a healthier and more disease-resistant lawn (of course, adding some of the other steps will get you there even faster).

Did you know? Clover is not a weed, but an important companion plant. It takes nitrogen from the air and puts it in the soil where grass can use it. It's good stuff!

STEP 1 Stay Sharp
Sharpen your lawnmower blades each year. Sharp blades prevent grass from tearing and becoming susceptible to disease.

STEP 2 Mow High
Set your mower blade height to the highest setting. A grass height of 5 to 6 cm (about 3 inches) or higher helps crowd out weeds and also conserves moisture in the soil (less watering required!).
Tip: Mow regularly & never remove more than 1/3 of the grass blade at a time (mowing lower stresses the grass).

It's good to know... Thatch is dead plant material that builds up in a lawn & doesn't decompose. Lawns treated with chemical fertilizers & pesticides are more likely to develop thatch than lawns that never see a pesticide. Why? Pesticides destroy earthworms and other organisms that keep lawn soil healthy. You can encourage good bugs and keep thatch at bay by spreading a thin layer of compost over the lawn once or twice a year.



STEP 3 Leave it on the Lawn
Leave grass clippings on the lawn after mowing. They're a great nutrient source for the grass (providing up to 33% of your lawn's nitrogen needs over the growing season) and doing so does NOT cause thatch (honestly!).

STEP 4 Spread Compost
Rake a thin (1/4") layer of finished compost over your lawn once or twice each year. Compost adds important nutrients and builds healthy, disease-resistant grass. Where do you get compost? Your very own backyard composter, of course! Or you can purchase topdressing for a nominal fee at the North Shore Transfer Station (see Resources section on back). Another option is to apply a slow-release organic fertilizer. **Tip:** Avoid fertilizing until after the first rush of spring growth - excessive early growth spurred by fertilizing can weaken root systems and leave lawns susceptible to disease.

STEP 5 Add Lime
Apply lime to the lawn (as recommended on the bag) - this helps to neutralize acidity. North Shore soils tend to be acidic, making nutrients less available and reducing soil microorganism and earthworm activity.



You might not know about... the Screwdriver Test. Find out if your lawn needs aeration by poking the turf with a screwdriver - if it sinks in easily, you don't need to aerate. If it's difficult to push in (i.e., the soil under your lawn has become compacted), you likely need aeration. If weeds are a concern, aerate in the fall to avoid bringing weed seeds to the surface. And always remember to topdress with compost! Mechanical aerators can be rented locally (see reverse).

STEP 6 Sow the Seeds
Overseed your lawn every year with a good quality lawn seed mix (ask staff at your local garden centre for recommendations). A good time to overseed is after aerating the soil, or when topdressing with compost. A strong, dense lawn helps prevent weeds from getting established. **Tip:** When removing occasional weeds by hand, add a sprinkle of grass seed mix to any patches of bare earth.

Did you know? There are some hardy groundcover plants that are much more suitable than grass for some hard-to-grow areas. Just ask at your local garden centre.

STEP 7 Water Wisely
Water deeply, about an inch, once per week (put a tuna can on the lawn to measure how long this takes for your sprinkler). Watering more frequently can cause shallow, unhealthy root systems. **Tip:** Mid-day watering wastes water, as most of the moisture is lost to evaporation. The best time to water is in the early morning.

You might not know... Most lawn grasses are meant to go brown and dormant during the summer months. The grass plants that make up most of our lawns are cool season grasses which naturally go dormant in the summer and green up again with the autumn rains. Brown can be good!