Exhibit 1

Turf Nutrition: The Bottom-line on Summertime Fertilizer Blackouts

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Let it be stated upfront – the body of science does not support summertime fertilizer blackouts and, therefore, the University of Florida does not recommend or endorse them.

Across Florida, most summertime fertilizer blackout periods extend from June through September. Though there are variations in the ordinances, most completely forbid the application of nutrients during this period of time. Consequently, turf managers struggle to keep lawns healthy and nourished through this four month period.

The genesis of the summertime fertilizer blackouts stem from a misinterpretation of the statement, "Do not fertilize when rain is imminent" that was contained in many UF/IFAS publications. The premise behind this statement was to avoid applying fertilizer when significant rain (≥ 1") was expected within the next 24 hours. Environmental activists, however, suggest that rain is imminent every day during Florida's rainy season (May – October). This is the reason behind their push for summertime fertilizer blackout periods.

Much has been written on the unintended consequences of fertilizer ordinances[i]. The single largest argument against the summertime blackouts is best illustrated by the warm-season grass growth potential curves (Figure 1). These curves illustrate that growth potential increases as temperatures increase (i.e., greater growth occurs during the summer months). As temperatures increases and the growth of the grass increases, their need for nutrition (i.e., fertilizer) increases proportionately. Conversely, during the cooler times of the year, growth is less and the need for nutrition also decreases. . Additionally, warm-season turfgrasses lose up to 60% of their root system during the fall and winter months, reducing their ability to take up nutrients. During the growing season, the roots are at their maximum and have the greatest ability for nutrient uptake.

A good analogy of this is the caloric intake of a football player. During the season, a football player may consume three to four times the number of calories of an average person – simply because they are burning them off during practice and games. However, if they continue to consume that many calories during the off-season, they will gain excessive weight and lose their competitive edge. Bottom-line – they match the caloric intake with the expenditure.

The same is true of plant nutrition. When nutrients – applied as fertilizer – are given to a warm-season turfgrass during their off-season (spring, fall, and winter months), the assimilation of those nutrients is reduced and the potential for loss increases. These losses may typically occur as nutrient leaching or run-off. However, when nutrients are applied during periods of maximum assimilation, very little loss will occur because the plant is quickly taking the nutrients up and using them for its growth and development.

UF/IFAS Lawn Fertilizer Recommendations

Regardless of summertime fertilizer blackouts, UF/IFAS scientists stand behind their existing turf nutrition recommendations and do not support the summertime fertilizer blackout ordinances. University of Florida guidelines for lawn grass fertilization offer a range of fertilizer rates over which a particular species may be successfully maintained in the various regions of the state (Table 1). These ranges account for the effect that localized microclimates can have on turfgrass growth. A range of rates allows for these environmental variations. An example of this would be a typical home lawn that is partially shaded and partially sunny. The grass growing in the shade needs less fertilizer than that growing in full sun. Fertilization also is affected by soil type, organic matter in soils, and practices such as clipping management. Additionally, a newer lawn on a sandy soil with little organic matter requires more fertilizer than a lawn that has been fertilized for years. In Florida, new homes and new developments may be next to much older developed landscapes, and

a one-size-fits-all approach to fertilization is not reasonable. These guidelines provide a base range from which the end user can begin a fertilization program.

The best measure for success is to take the annual quantity of nutrient needed by a particular species and to apply it in small doses throughout the growing season – from spring green-up through fall (or year-round in south Florida). Do not apply too early in the growing season, particularly in north Florida, because late-season frosts may damage the grass and the root system will not be fully grown in at this time to assimilate the nutrients. Likewise, do not fertilize too late in the year after growth has subsided. As a general rule, the first fertilizer application of the year should be early April in central Florida and mid-April in north Florida. In south Florida, fertilizer applications may be made throughout the year since growth is year-round.

Debate exists over conflicting recommendations related to the quantity of soluble nitrogen that can be applied in a single application. The Florida Yards & Neighborhoods (FYN) Homeowner Program (http://ffl.ifas.ufl.edu/homeowner.htm) and the Green Industry Best Management Practices (GI-BMP) Training Program (http://ffl.ifas.ufl.edu/professionals/BMP_overview.htm) both reference limiting soluble nitrogen to 0.5 lb per 1,000 square feet whereas other UF/IFAS turf publications reference 0.7 lb 1,000 square feet.

The FYN and GI-BMP programs are partner programs with the Florida Department of Environmental Protection and they have taken a more precautionary stance on nutrient recommendations. On 11 April 2014, the UF/IFAS Plant Nutrient Oversight Committee[ii] – the group that standardizes UF/IFAS fertilizer recommendations based on the body of scientific knowledge – endorsed the following statement, *"To maintain healthy turfgrass and minimize environmental impact, UF/IFAS turfgrass scientists support up to 0.7 lb of soluble nitrogen (N) per 1,000 square feet per application on actively growing, dense turfgrass."* The body of science suggests that the 0.7 lb rate of soluble nitrogen applied to actively growing, dense turf is acceptable and will not increase nutrient loss over the lower rate.

2015 Revision to the Florida Urban Turf Rule

On January 8, 2015, the Florida Department of Agriculture and Consumer Services adopted changes to the statewide Urban Turf Fertilizer Rule 5E-1.003 F.A.C. This rule regulates the labeling language on bags of specialty fertilizer (bags weighing less than 50 lbs)The changes were in response to the culmination of 8 years of research conducted by UF/IFAS turf scientists and funded by the Florida Department of Environmental Protection. The two most notable changes to specialty fertilizer labels as a result of the rule are:

1. The addition of the term "actively growing turf" to the fertilizer label.
2. Increasing the nitrogen application rate to 2 pounds N per 1,000 sq. ft. in the spring and summer.

By adding the term "actively growing turf" to the fertilizer label, regulators acknowledged that timing of fertilizer application is a key factor in maximizing fertilizer uptake and minimizing nutrient losses. Research conclusively demonstrates that nutrients applied to actively growing turf are quickly assimilated into the plant. Applying fertilizer when the turf is not actively growing can lead to potential increases in nutrient loss.

The second notable change increases the previous single application limit of one pound of nitrogen per 1,000 sq. ft. up to two pounds of nitrogen per 1,000 sq. ft. However, the maximum amount of soluble nitrogen (quick release) remains unchanged at 0.7 pounds per 1,000 sq. ft. The sole reason for this change is to allow turf managers to apply this increased rate of slow release nitrogen to help sustain the turf through the summertime blackout periods. For those regions not affected by the blackouts, UF turf scientists recommend that conventional applications guidelines be followed.

Exhibit 1

Table 1. Fertilization Guidelines for Established Turfgrass Lawns	
	Nitrogen Recommendations (lbs 1,000 ft^{-2} $year^{-1}$)[1, 2]
North Florida[3]	
Bahiagrass	2.0 – 3.0
Bermudagrass	3.0 – 5.0
Centipedegrass	1.0 – 2.0
St. Augustinegrass	2.0 – 4.0
Zoysiagrass	2.0 – 3.0
Central Florida	
Bahiagrass	2.0 – 4.0
Bermudagrass	4.0 – 6.0
Centipedegrass	2.0 – 3.0
St. Augustinegrass	2.0 – 5.0
Zoysiagrass	2.0 – 4.0
South Florida	
Bahiagrass	2.0 – 4.0
Bermudagrass	5.0 – 7.0
Centipedegrass	2.0 – 3.0
St. Augustinegrass	4.0 – 6.0
Zoysiagrass	2.5 – 4.5

[1]Because homeowner preferences for lawn quality and maintenance level will vary; we recommend a range of fertility rates for each grass and location. Additionally, effects within a localized region (i.e., micro-environmental influences -- such as shade, drought, soil conditions, and irrigation) will necessitate that a range of fertility rates be used.

[2]These recommendations assume that grass clippings are left on the lawn.

[3]The arbitrary dividing line between north and central Florida is a straight east-west line from coast to coast through Ocala, and the dividing line between central and south Florida is a line from coast to coast through Tampa and Vero Beach.

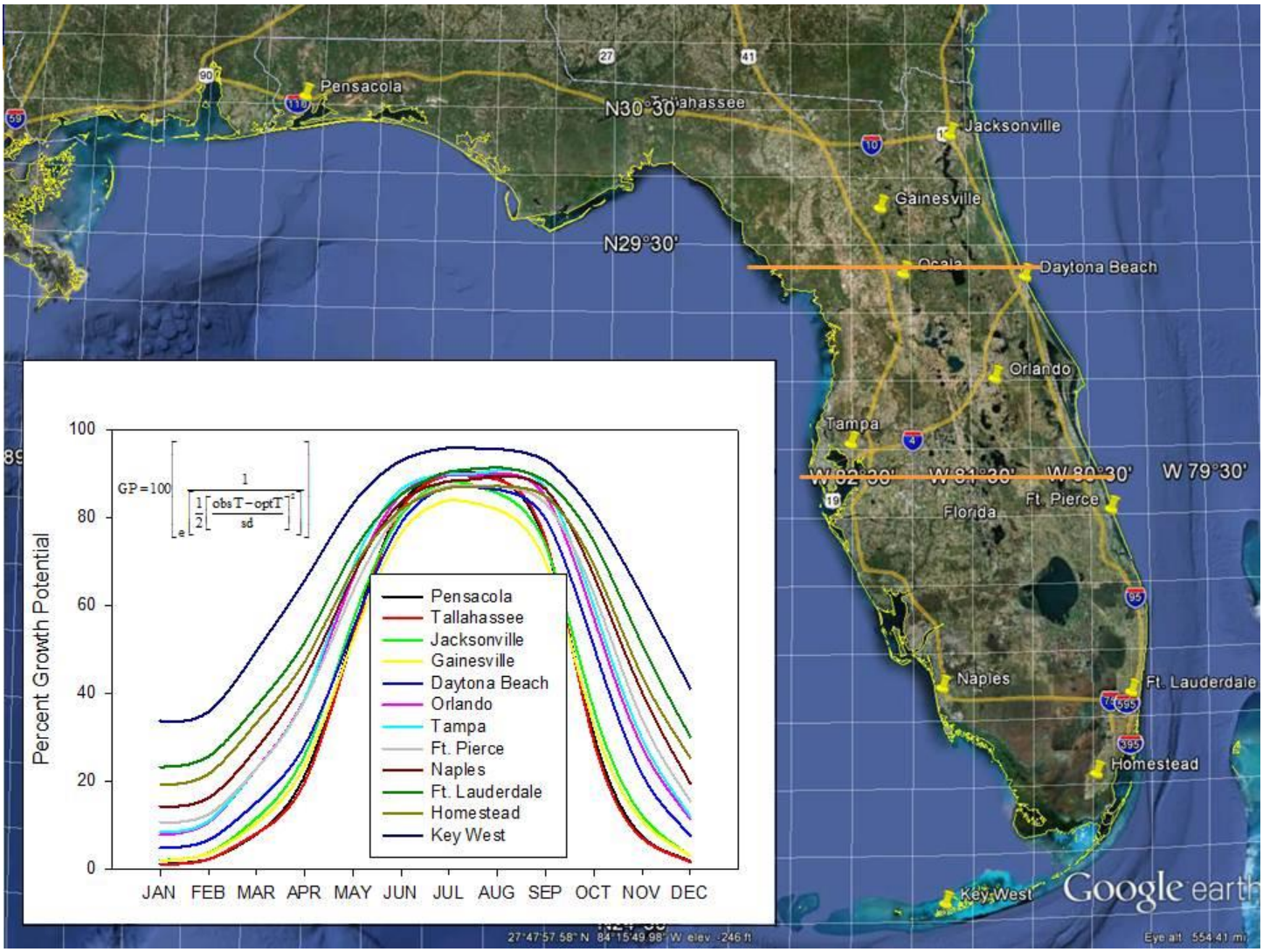

Figure 1. Growth potential curves for various cities in Florida based on 30 year temperature averages.

[i] Hochmuth, G., T. Nell, J. Sartain, J. B. Unruh, C. Martinez, L. Trenholm, and J. Cisar. 2014. Urban Water Quality and Fertilizer Ordinances: Avoiding Unintended Consequences: A Review of the Scientific Literature. SL283. http://edis.ifas.ufl.edu/ss496. UF/IFAS Extension, Gainesville, FL.

[ii] Mylavarapu, R.S. 2014. UF/IFAS Nutrient Management Series: UF/IFAS Standardized Nutrient Recommendation Development Process. SL189. http://edis.ifas.ufl.edu/ss401. UF/IFAS Extension. Gainesville, FL.