

Nutrient Management: *Landscape Fertilizer Ordinances*

Dr. J. Bryan Unruh

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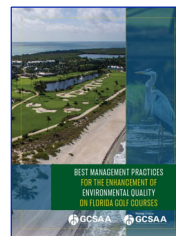
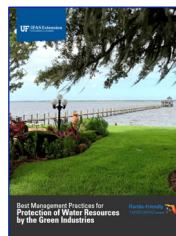
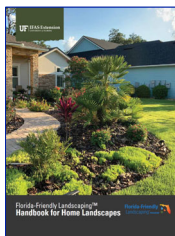
West Florida Research and Education Center



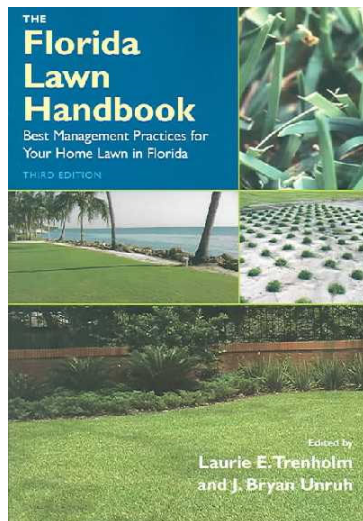
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J. Bryan Unruh, Ph.D.

- January 1996 – Joined the faculty at the University of Florida.
- January 2000 – First Fertilizer Ordinance – St. Johns County, FL
- July 2000 – Hosted the first meeting of the Turfgrass Best Management Practices development group.
 - GI-BMP development initiated in September 2000; published in 2002.
- June 2003 – Hosted the inaugural meeting to develop Florida Golf Course BMP Manual
 - Published in 2007.
- February 2006 – Launched the Florida Sod Production BMP Manual.
 - Published in 2008.
- April 2024 – Launched the Florida Sports Turf BMP Manual



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“Do not fertilize when rain is imminent.”

This statement led to numerous fertilizer “black out” or restrictive ordinances – typically May through October.



J. Bryan Unruh, Ph.D.

“As scientists, we are often prone to say, “Show me the data.” Unfortunately, the data that we have in hand is limited. It is limited to a few studies primarily conducted in only one region of the state; hardly enough to serve as the basis for which these important BMPs can be based upon.”

- **Dr. J. Bryan Unruh**
BMP Development Meeting
Orlando, Florida
September 13, 2000

Florida Department of Environmental Protection Funded Study

There is increasing concern about the effects that lawn and landscape management practices may have on natural water resources, particularly in a state with abundant water resources, encroaching urbanization, shallow water tables, karst soils, and other fragile ecosystems and habitats. Like other agricultural industries in Florida, Best Management Practices (BMPs) have been developed for the **Green Industries** in Florida in an attempt to mitigate any potential nonpoint source pollution of water resources from fertilization and other landscape maintenance practices. With the development and ensuing regulation of the BMPs, there was a need to quantify nutrient loading from these practices under different conditions and sites and to verify the currently recommended rates of nitrogen and phosphorus for use on lawn grass species throughout the state.



This research was undertaken by the University of Florida Institute of Food and Agricultural Sciences (UF-IFAS) with \$4.2 million in funding from the **Florida Department of Environmental Protection (FDEP)**. The research was conducted in 3 locations statewide: the **Ft. Lauderdale Research and Education Center**, the **Plant Science Research and Education Unit** in Citra and the **West Florida Research and Education Center** in Jay. The research consisted of multiple projects, some of which were common to all locations. Over 120,000 water samples were taken along with 1,000,000 data points.



Turfgrass Nutrient Management Symposium

On January 15, 2013, a symposium was held at the **Frank Stronach Plant Science Research and Education Center** in Citra, Florida. The Symposium was comprised of presentations on the Results of the Evaluation of Urban Warm-Season Turfgrass Fertilization and Irrigation Best Management Practices to Minimize Nutrient Leaching Project, funded by the Florida Department of Environmental Protection. Each presentation was recorded along with a Q&A session, and comments from Andy Rackley, Director, **Agricultural Environmental Services**, Florida Department of Agriculture and Consumer Services. These recordings can be viewed at: http://training.ifas.ufl.edu/research/turfgrass_nutrient_symp2013/.



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Nutrient Leaching Peer-Reviewed Scientific Papers

1. Nitrogen required for acceptable centipedegrass quality, color, growth rate, and nitrate leaching (Int. Turfgrass Soc. Res. J. 13:1-8)
2. Annual nitrogen requirement of bahiagrass lawns maintained in sub-tropical climates (Int. Turfgrass Soc. Res. J. 13:1-9)
3. Nitrate Leaching from Soluble Nitrogen applied to 'Floritam' St. Augustinegrass and common centipedegrass during dormancy (Crop Sci. 56(2):837-844)
4. Nitrogen rate required for acceptable St. Augustinegrass Nitrogen rate required for acceptable St. Augustinegrass and associated nitrate leaching (Crop Sci. 56(1):439-451)
5. Nitrate Leaching and Turf Quality in Established 'Floritam' St. Augustinegrass and 'Empire' Zoysiagrass (J. of Environmental Quality)
6. Nitrate Leaching and Turf Quality in Newly Sodded St. Augustinegrass (J. of Plant Nutrition)
7. Orthophosphate Leaching in St. Augustinegrass and Zoysiagrass - Growth in Sandy Soil under Field Conditions (J. of Environmental Quality)
8. Effects of Sod Type, Irrigation, and Fertilization on Nitrate-Nitrogen Turfgrass Nutrient Management Symposium Augustinegrass Sod (Crop Science)
9. Nitrate Leaching, Turf Quality, and Growth Rate of 'Floritam' St.

Welcome to the Turfgrass Nutrient Management Symposium, held on January 15, 2013 at the Frank Stronach Plant Science Research and Education Center in Citra, Florida.

The Symposium was comprised of presentations on the Results of the Evaluation of Urban Warm-Season Turfgrass Fertilization and Irrigation Best Management Practices to Minimize Nutrient Leaching Project, funded by the Florida Department of Environmental Protection.

Please click on the links on the right to view the presentations. Note that each presentation provides a pdf copy of the presenter's PowerPoint presentation, available via the Resources tab just under the video playback window.

System Requirements: Windows PC with Microsoft Internet Explorer and Windows Media Player 9 installed. While the presentations will play with other browsers, Internet Explorer provides the best results. While presentations will play on a Mac, some functions may not work optimally.

Presentations:

- Dean John Hayes, "Welcome and Introductory Comments"
- Bryan Unruh, "Overview and Research Methodology for FDEP-Funded WM889"
- John Cisar, "Nutrient Leaching Update from South Florida"
- Laurie Trenholm, "Effect of N Rate on Nitrate-N Loading"
- Jerry Sartin, "Controlled Release Fertilizers and Their Nutrient Release"
- Bryan Unruh, "Practical Considerations for Minimizing Environmental Impact of Turf Nutrition"
- Panel Discussion, Moderated by Dean John Hayes
- Andy Rackley, Director AES, Florida Department of Agriculture and Consumer Services, "Perspective of Where FDACS Will Go with Research Findings"

Disclaimer: Product brands mentioned during the course of the presentations are for educational purposes only and are not directly or indirectly endorsed by the University of Florida/IFAS.



UF/IFAS Research • FL Agricultural Experiment Station

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Nutrition and Fertilization Best Management Practices

- The goal of a proper nutrient management plan should be to apply the minimum necessary nutrients to achieve acceptable quality and performance and to apply these nutrients in a manner that maximizes their plant uptake.

Inputs:

- Minerals from Soil
- Fertilization & Reclaimed Water
- Atmospheric Deposition
- Deposition of Organic Residues

*Plant-Available
Nutrient Pool*

Outputs:

- Clipping Removal
- Gaseous Loss
- Conversion to Unavailable Forms
- Leaching/Runoff Loss

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Caloric Intake for Football Players
By Graham Ulmer - Updated February 21, 2019

- Football players need about 50 calories per 2.2 pounds during the season.
 - 300-pound lineman = 6,818 calories
- What happens when a lineman eats this many calories in the off-season?*

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UF/IFAS Turfgrass Recommendations

Table 1. Fertilization Guidelines for Established Turfgrass Lawns

	Nitrogen Recommendations (lbs 1,000 ft ⁻² year ⁻¹) ^{1, 2}		
	North Florida	Central Florida	South Florida
Bahiagrass	1.0 – 2.0	1.0 – 2.0	1.0 – 2.0
Bermudagrass	3.0 – 5.0	4.0 – 6.0	5.0 – 7.0
Centipedegrass	0.4 – 2.0	0.4 – 3.0	0.4 – 3.0
St. Augustinegrass	2.0 – 4.0	2.0 – 5.0	4.0 – 6.0
Zoysiagrass	2.0 – 3.0	2.0 – 4.0	2.5 – 4.5

¹Because 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.

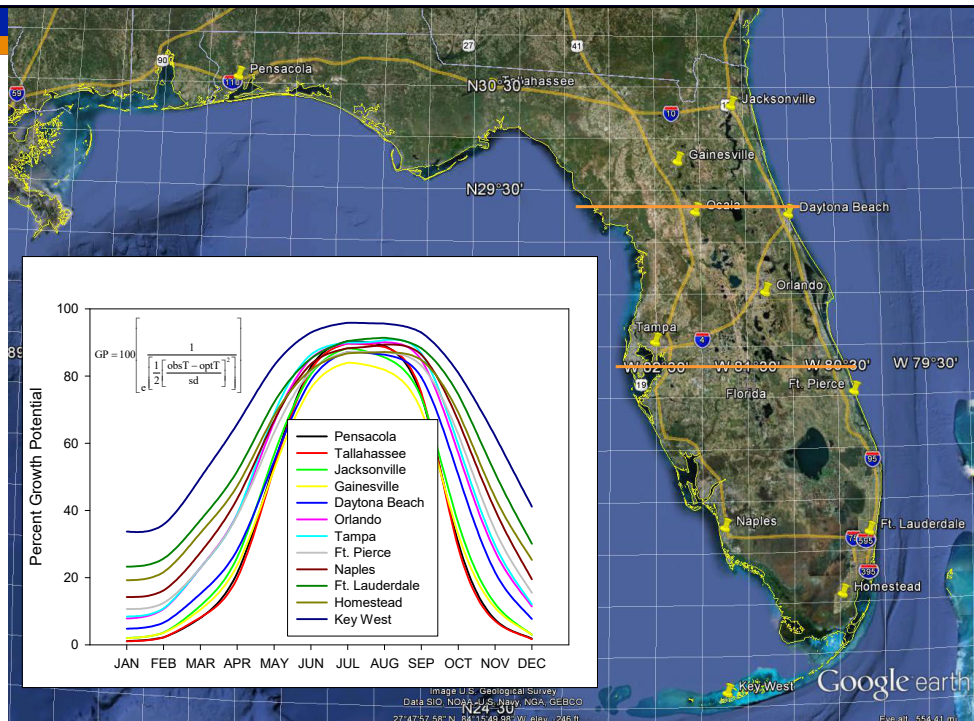
²These recommendations assume that grass clippings are left on the lawn.



We do NOT test for soil nitrogen!!!

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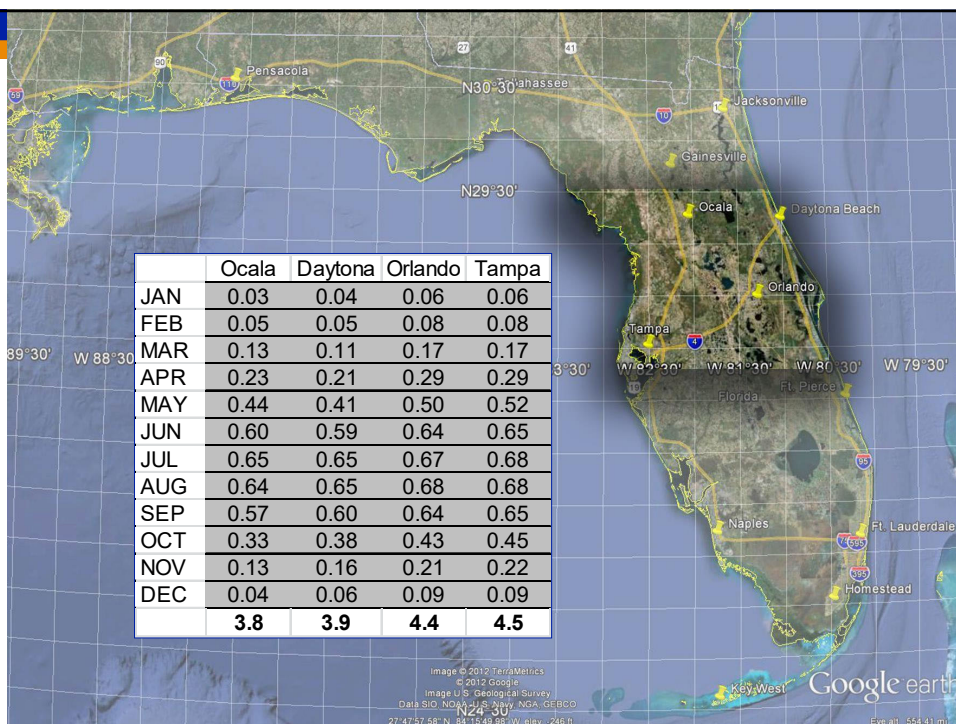
Growth Potential Modeling



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Growth Potential Modeling

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UF/IFAS Recommended Fertilizer Rates

Old Recommendations

	North		Central		South	
	Low	High	Low	High	Low	High
	----- lbs N / Year -----					
Bahiagrass	2	3	2	4	2	4
Centipedegrass	1	2	2	3	2	3
St. Augustinegrass	2	4	2	5	4	6
Zoysiagrass	3	5	3	6	4	6

New Recommendations

	North		Central		South	
	Low	High	Low	High	Low	High
	----- lbs N / Year -----					
Bahiagrass	1	3	1	3	1	4
Centipedegrass	0.4	2	0.4	3	0.4	3
St. Augustinegrass	2	4	2	5	4	6
Zoysiagrass	2	3	2	4	2.5	4.5

% Rate Reductions

	North		Central		South	
	Low	High	Low	High	Low	High
Bahiagrass	50	0	50	25	50	0
Centipedegrass	60	0	80	0	80	0
St. Augustinegrass	0	0	0	0	0	0
Zoysiagrass	33	40	33	33	38	25



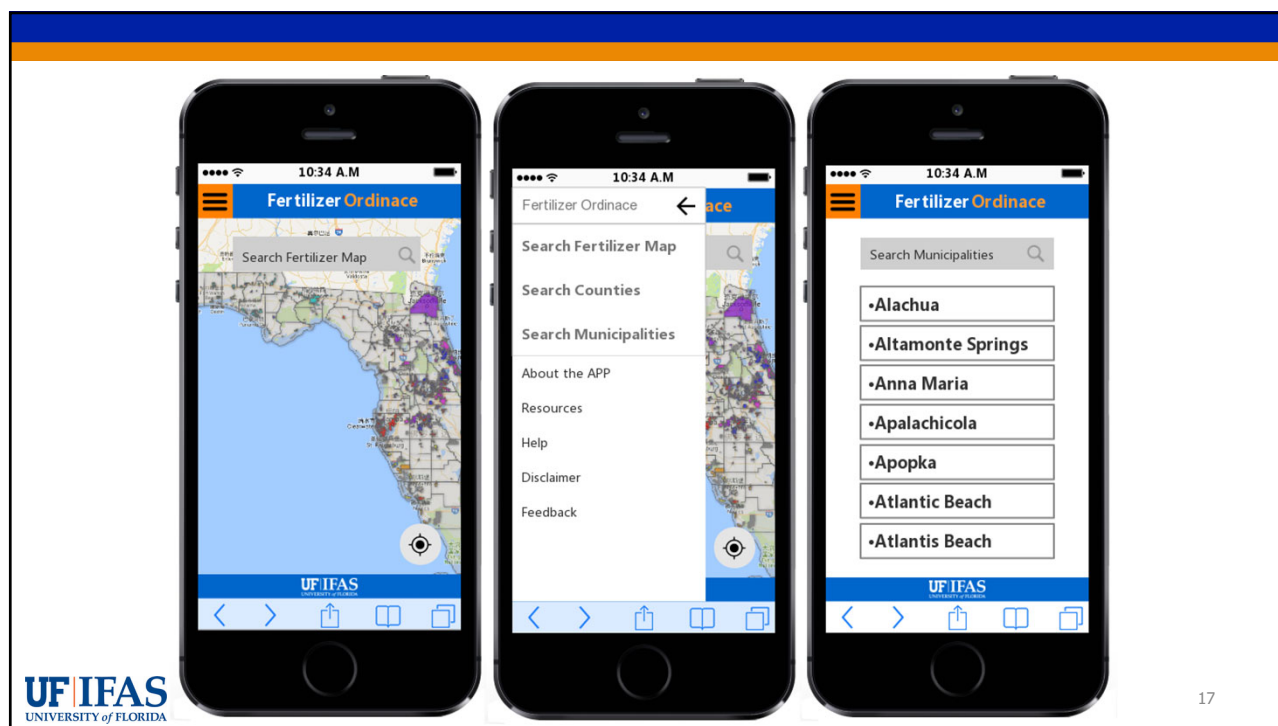
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Florida Fertilizer Ordinances

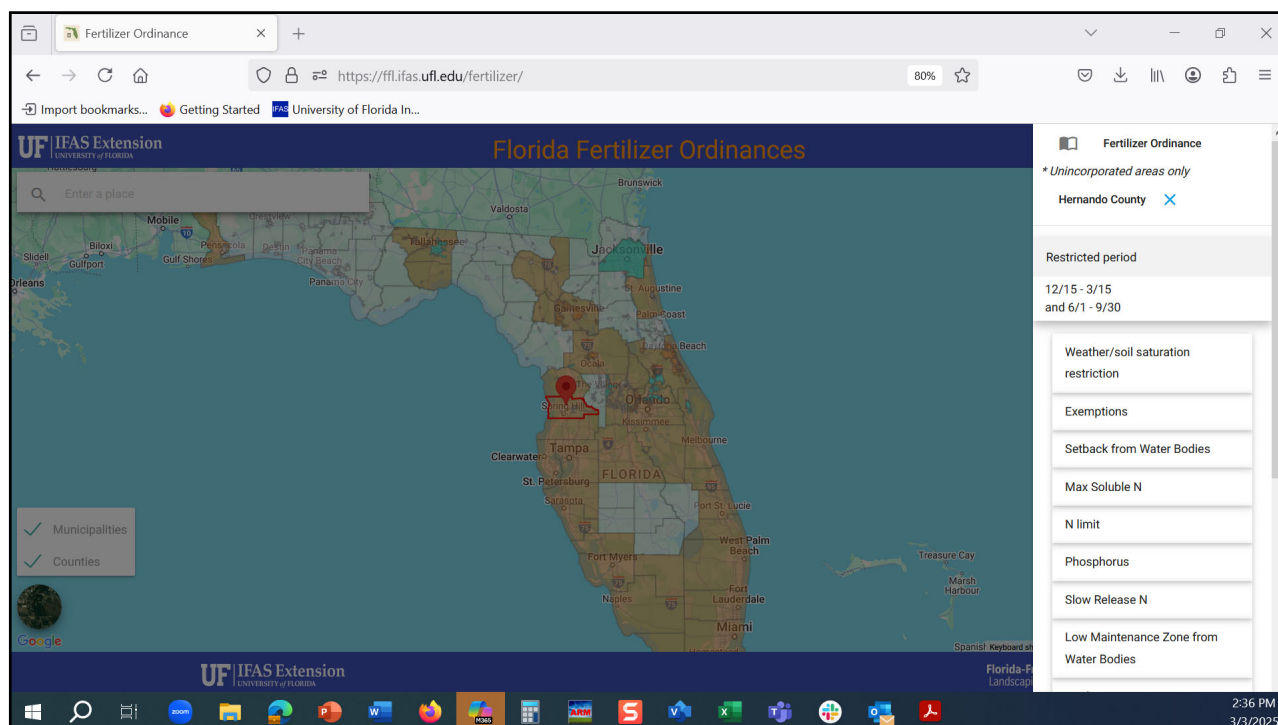
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Hernando County Fertilizer Ordinance

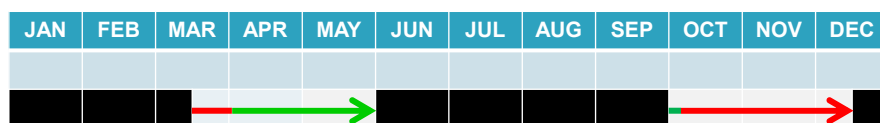
- Original Adoption: November 12, 2013
- Revised: May 23, 2023
 - The use of urban turf fertilizers containing nitrogen is prohibited from December 15th through March 15th and from June 1st through September 30th.
 - Commercial applicators are no longer exempt from the prohibitions and time frames regarding applying urban turf fertilizers containing nitrogen.
 - Fertilizers cannot be applied within 25 feet of adjacent wetlands or surface waters.
 - Commercial businesses that sell fertilizers are required to post county-provided signage stating the restrictions during the prohibited time frames.
 - Homeowners and commercial applicators are encouraged to utilize summer-friendly lawn enrichment products from June through September. This could include foliage sprays containing iron for a “green-up” treatment. Applications of potassium, magnesium, and compost products, such as Comand, can also be utilized.

Fertilizer Restrictive Ordinances

- Hernando County = Central Florida Recommendations
 - UF Recommendation: Early April through early October.



- Restrictive Ordinance: “The use of urban turf fertilizers containing nitrogen is prohibited from December 15th through March 15th and from June 1st through September 30th.”



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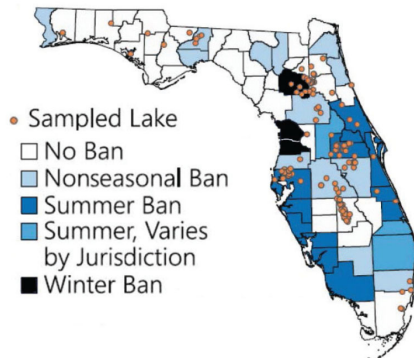


Figure 2. Florida site map of county fertilizer ordinances by type (different shades of blue). Individual lake locations used in this study are represented by (orange) circles.
Credits: Adapted from Smidt et al. (2022)

- Lakes with five years of data collected in 2000-2009; and five years of data collected in 2010-2019.
- Categorized each lake by their county's residential fertilizer ordinance:
 - Summer ban ("wet" season; June – Oct)
 - Winter ban (typically Nov. – Feb)
 - Non-seasonal (add'l restrictions)
 - No ban
- 160 lakes; 3,750 total water samples

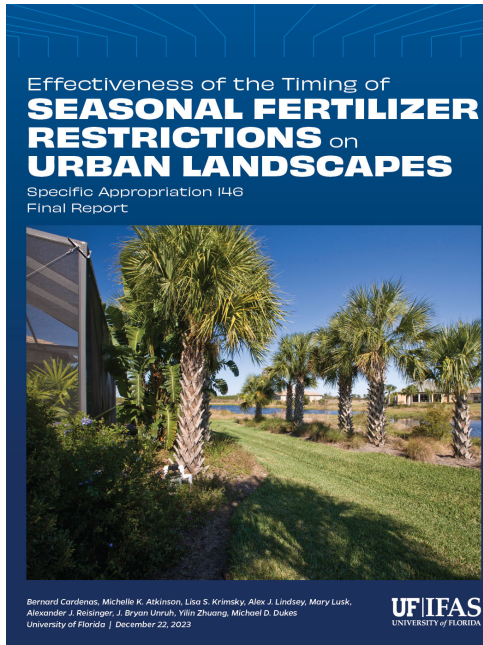
What impact do ordinances have?

Table 1. Ordinance impacts on water quality trends for different ordinance types and water quality responses. The direction (degradation, improvement, no change) and effect size (small, medium, large) are all denoted for each ordinance-response combination. Statistical significance is denoted by asterisks. Non-significant effects are denoted where relevant.

Ban type	Ordinance impact on water quality trend			
	Total phosphorus	Total nitrogen	Chlorophylla	Secchi depth
No ban	Small degradation **	No change	No change	Small improvement *
Non-seasonal	Small improvement *	Small improvement **	No change	Small effect, but not significant
Summer	Medium improvement **	No change	Small effect, but not significant	Medium improvement **
Winter	Large improvement **	Large improvement **	Large improvement **	Large improvement **

* = statistically significant effect at $p < 0.05$

** = statistically significant effect at $p < 0.01$



**Effectiveness of the Timing of
SEASONAL FERTILIZER
RESTRICTIONS on
URBAN LANDSCAPES**

Specific Appropriation 146
Final Report

Bernard Cardenas, Michelle K. Atkinson, Lisa S. Krinsky, Alex J. Lindsey, Mary Lusk,
Alexander J. Reisinger, J. Bryan Unruh, Yilin Zhang, Michael D. Duke
University of Florida | December 22, 2023

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Summary

“The existing evidence to date does not conclusively indicate that fertilizer ordinances are effective in solving water quality problems. This is not necessarily indicative of the ordinances not achieving their intended goals; rather, the current lack of comprehensive evidence makes it challenging to assess the ecological impact of these ordinances.”

- Nutrients must be applied based on the plant’s ability to assimilate them.
 - This should supersede any calendar-based regimen.
- Healthy, dense turf is the key to minimizing environmental impact of applied nutrients (i.e., fertilizer and reclaimed water) and intercepted nutrients (i.e., atmospheric deposition, stormwater runoff, and pet waste).



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