

BMP Best Management Practices
Where Leadership & Action Intersect

A Must Have: Written Best Management Practices Plans for Golf Facilities

J. Bryan Unruh, Ph.D., University of Florida, IFAS

GCSAA USGA

J. Bryan Unruh, Ph.D.
University of Florida

- Professor of Environmental Horticulture at the University of Florida.
 - Ph.D. – Iowa State University
 - M.S. and B.S. – Kansas State University
- Research focuses on water quality (nutrient impairment) and quantity (drought), pest management, and new cultivar development.
- Results from his team's work are included in all three Florida turf industry Best Management Practice (BMP) manuals:
 - Florida Friendly BMPs for Protection of Water Resources by the Green Industries
 - BMPs for the Enhancement of Environmental Quality on Florida Golf Courses
 - Water Quality/Quantity BMPs for Florida Sod
- Led his UF colleagues to develop the content for the GCSAA BMP Planning Guide and Template.

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Key Question:
Are golf courses good for the environment?

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Are golf courses good for the environment?

About 4,182,000 results (0.57 seconds)

Golf Courses: Friend or Foe? - Beachapedia
www.beachapedia.org/Golf_Courses_Friend_or_Foe%3F# *
Aug 25, 2014. Do they have any effect on water quality, coastal access, beach and marine ecology, or beach erosion? As it turns out, golf courses can have significant environmental impacts. Let's look at the good, the bad and the ugly regarding golf courses.

Golf Courses Benefit People And Wildlife - USGA
www.usga.org/resources/education/golf-courses-benefit-people-and-wildlife.html *
Golf Courses Benefit People And Wildlife. These same benefits are available on the golf course when the combination of mowed turf, trees and natural areas provides a diverse environment for people and wildlife. Preserving these green -- 1) Golf Course Roughs And Trees Create Good Wildlife Habitat. More than 75.

Why Golf and the Environment - Audubon International
https://www.auduboninternational.org/_golf%20and%20Environment%20-%20%20 *
Golf courses offer numerous opportunities to not only provide physical places to play, but also to protect drinking water, improve the water quality of on-site and surrounding lakes, streams, and rivers, support a variety of plants and wildlife, and protect the wilderness for future generations.

The case against golf | Opinion | The Guardian
https://www.theguardian.com/environment/2012/jun/14/the-case-against-golf *
Jun 14, 2012. But the serious case against golf's ecological and cultural status is its environmental impact. The construction and maintenance of golf courses is harmful to high waterways in the world over. Its proliferation on the international podium of the leisure class is multiplying the problem, and its approach is:

Why the Decline of Golf is Good News for the Environment
https://www.decodedscience.org/why-the-decline-of-golf-is-good-news-for-the-environment/50036 *
Oct 12, 2014. Golfing is in decline - golf courses are closing all over the nation. That's sad news for those who love that hobby, but good news for the environment.

Why Golf Courses: Our Planet's Environmental Sanctuary
golfandnature.org/why-golf-courses-good-for-environment.doc *
Preserved by the Golf Course Superintendents Association of America. Have you ever looked at those lush golf courses in your community and wondered how much water and how many chemicals were needed to make that look so beautiful? The way to prevent "Golf courses can't possibly be good for the environment" sign.

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- A well-managed golf course provides substantial ecological and community benefits.
- Healthy turfgrass is an excellent filter that traps pollutants, preventing them from reaching groundwater supplies.
- Golf courses can serve as catch basins for residential and industrial runoff. In fact, golf courses are effective disposal sites for effluent wastewater.
- The trees and turfgrass on a golf course produce vast amounts of oxygen while cleansing the air of pollution and cooling the atmosphere.
- Golf courses provide community green spaces that offer not just recreational opportunities for people, but key sanctuaries and habitat for wildlife.
- Creating a golf course also is a good way to reclaim and restore an environmentally damaged site, like a landfill.

BMP | ccsa | usga golfturf.rutgers.edu/docs/golf-courses-good-for-environment.doc

Why the Decline of Golf is Good News for the Environment
October 12, 2014 by Elizabeth Kluksnik 9 Comments

The game of golf as we know it is in decline.

According to the National Golf Federation, in the United States, more golf courses closed than opened for the eighth year in a row, participation among 18-34 year olds has declined thirty percent over the past twenty years, and the U.S. has lost around five million players over the last decade.



When it comes to golfing, who are the Millennials? Image by NALSA.

What do these statistics say about the state of the game? Basically, people are losing interest in the game, and many Millennials are forgoing the experience altogether.

While this is bad news for owners of golf courses and enthusiasts of wearing silly pants, this is potentially positive news for the environment.

Good News for the Environment

Since the goal of golf course maintenance is to have a pristine stretch of grass that more closely resembles a natural lawn than anything from nature, best ecological practices are not necessarily a top priority.

Golf courses keep the grass short, well-maintained and free of any living organisms by spraying generous amounts of herbicides, synthetic fertilizers and pesticides, and mowing frequently.

BMP | ccsa | usga <https://www.decodedscience.org/why-the-decline-of-golf-is-good-news-for-the-environment/50036>

Instead of Killing Lawns, We Should Be Banning Golf

California is facing its worst drought in decades, so why is anyone playing golf in a desert?

"Golf courses are a huge problem," said Adam Keats of the Center for Biological Diversity, an environmental advocacy group. And part of that huge problem is the people who play it. "They're a wealthy elite that have no connection to want or lack," Keats, head of the center's California Water Law Project, told me over the phone. "Golfers live in a world of excess."

https://www.vice.com/en_us/article/yqq5w/save-water-ban-golf-815

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Why Should Golf BMPs be Developed?

- Development and implementation of Best Management Practice (BMP) programs is one of the major tools for water quality improvement.
- BMPs are the shared language recognized by regulators, conservationists, engineers and others as the means to driving improvements.
- Because BMPs are recognized in federal and state TMDL policy as a major component of water-quality improvement plans, it is essential that the turf industry be proactive in developing and implementing BMPs related to turf management.

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Golf Course BMPs

9 BMPs in place

1 2017

19 2018

11 2019

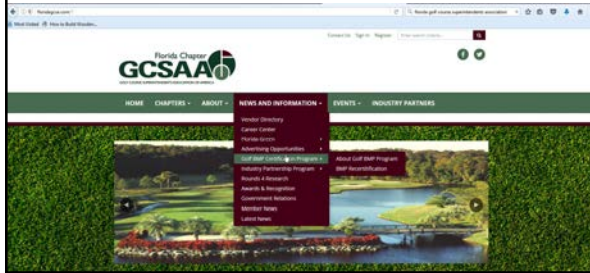
10 2020

GOAL: 50 BY 2020

GCSAA

Facility Level BMP Adoption

It's one thing to have a book on the shelf – it's another thing to adjust your management practices.



FAILING TO PLAN IS PLANNING TO FAIL. ALAN LAKEIN

The Importance of Planning

- Planning helps identify goals
- Planning offers directions
- Planning uncovers problems
- Planning adds professionalism
- Planning gives perspective

BMP GCSAA USGA <http://dbhurley.com/importance-planning/>



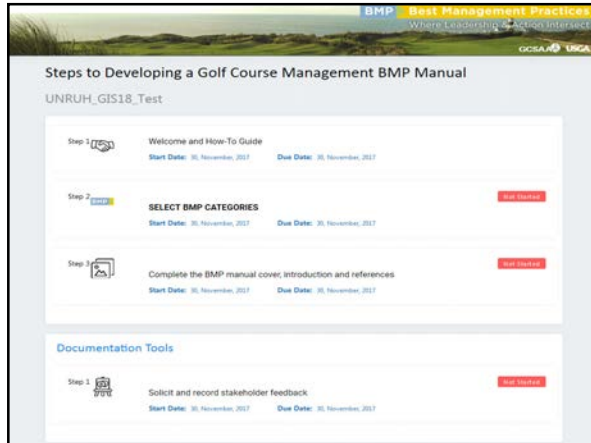
Quick Steps:

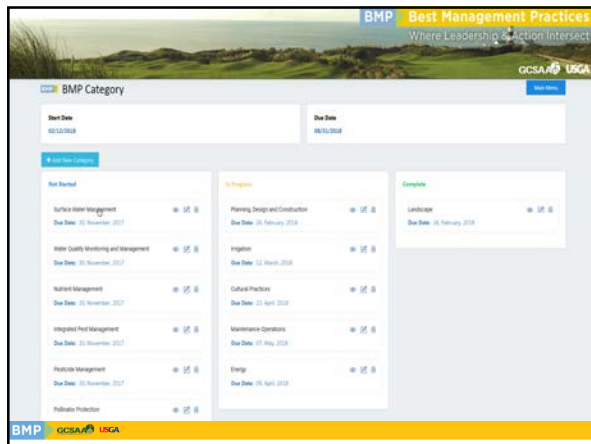
BMP Best Management Practices

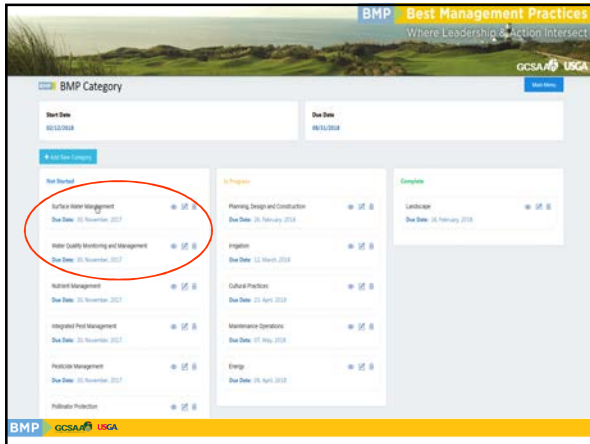
Where Leadership & Action Intersect

- The tool allows you to quickly copy (clone) your state BMP manual accepting each BMP category or to go through each BMP category, section by section, incorporating information that is pertinent to your facility's needs.
 - If your state does not have a BMP manual completed, you will have to wait until it is completed.
 - If this is the case, download the print version of the GCSAA National BMP Planning Guide and Template.









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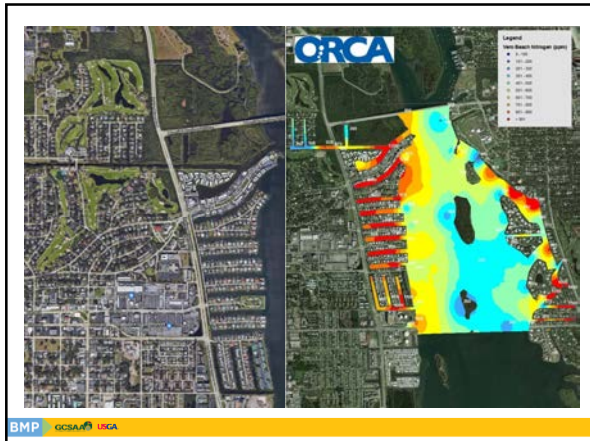
Water Quality Challenges

- Concerns about water quality are related to **point and nonpoint source pollution**.




Photo credit: <https://www.pinterest.com/pin/156258486240199725/>
<http://blog.sawtree.com/2014/05/particulars-nonpoint/>

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GORDON RIVER GREENWAY

Greenways are attractive spots for hikers, nature photographers and other artists, environmental and "greening" enthusiasts, and travelers who seek out new greenway and trails to explore!

Access Points

- HIGH DOVERVILLE PARK ROAD, Naples, FL
- HIGH GULFSTREAM PARKWAY, Naples, FL

Directions: From Airport Road head West on Golden Gate Pkwy. The Golden Gate Parkway arrow will be to the left side of the road. To continue to the Goodwin Frank Road across continue heading west on Golden Gate Parkway. Turn left at Goodwin Frank Road, turn left into the Naples Zoo Entrance. The parking lot is the very eastern end of the Greenway.

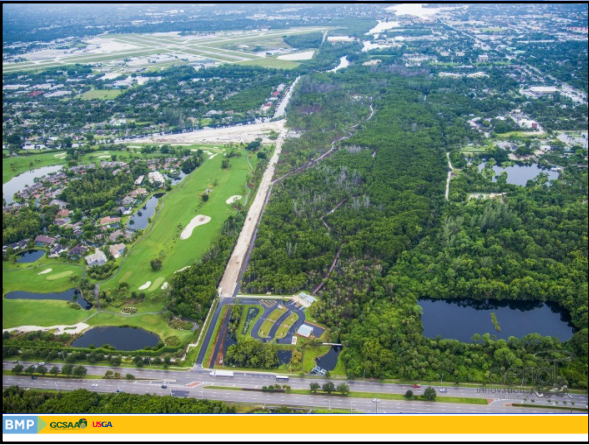
EPA
U.S. Environmental Protection Agency

Waterbody Search

Waterbodies matching search criteria: Area equals '11' and waterbody name contains 'Gordon River'

NOTE: Click on the underlined "Waterbody Name" to view the waterbody report.

Waterbody Name	Waterbody ID	Most Current Data Available	Location	Map	Waterbody Type	Score	1998	Status	State	EMCL	Enhancement Status
<u>Waterbody Address</u>	PL32796 (22956)	2012	Southwest Coast	Data Unavailable	Stream	4			FL		THML needed



LOCAL NEWS | January 4 | 2019 | January 5 | 2019 | Archived News | 2018

Portland's tough new ban on synthetic pesticides allows few exceptions

Hadlock Field, Riverside Golf Course and 5 athletic field will be the only exempt properties when the ordinance takes effect July 1, 2019.

Kamila said Thursday she is still concerned that the city exempted its golf course, which is located in the Presumpscot River watershed. She is also concerned that high-use athletic fields will continue to be exempt until 2021. Exemptions for invasive insects are also a concern, she said.

"Portland Protectors will closely monitor the implementation of this ordinance," Kamila said. "We also hope the council will come back later and restrict synthetic fertilizer use and restrict the sale of synthetic pesticides and fertilizers."

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<https://www.pressherald.com/2018/01/04/portland-council-approves-tough-synthetic-pesticide-ban/>

Science News from research organizations Print Email Share

Health of ecosystems on U.S. golf courses better than predicted, researchers find

Date: April 10, 2014
Source: University of Missouri-Columbia

Summary: Currently, there are more than 18,300 golf courses in the US covering over 2.7 million acres. The ecological impacts of golf courses are not always straightforward with popular opinion suggesting that environmentally, golf courses have a negative impact on ecosystems. Now, researchers have determined that golf courses can offer a viable habitat for stream salamanders, and enhanced management practices may be beneficial to ecosystems within golf courses.

Share:

RELATED TOPICS: PLANTS & ANIMALS FULL STORY

Most Popular this week:

- Mice Change Their Appearance as a Result of Frequent Exposure to Humans
- New Deep Reef Ocean Zone, the Rariphotic, Teeming With New Fish Species
- The Enemy Within: Gut Bacteria Drive Autoimmune Disease

RELATED TOPICS:

"Surprisingly, we found no change or reduction in the abundance or diversity of salamanders downstream, which is where we expected to find chemical runoff from the upkeep and maintenance of the courses," Semlitsch said. "Golf courses have an environmental impact when they go in and clear an area; however, because of improved management techniques, we're seeing no signs of chemical effects around these courses. It implies that the turf science industry is doing a great job at utilizing fairway design techniques, plants that reduce chemicals found in the soil, and other methods to ensure that biodiversity succeeds on the course."

"We have this image of pristine and highly manicured fairways such as the ones we see in Augusta, or at Pebble Beach," Semlitsch said. "However, our research suggests a more natural course that includes streams with leaf litter, sticks and twigs that offer a natural habitat for different species is preferred. Turf and golf course managers are taking note of these practices, and it is making a real ecological difference."

BMP CCSA UGA <https://www.sciencedaily.com/releases/2014/04/140410122201.htm>

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Water Quality Challenges

- Nonpoint source pollution occurs as rainfall moves over the surface and through the ground picking up natural and man-made pollutants and then depositing them into lakes, rivers, wetlands, coastal waters and ground waters.
- In most states, nonpoint source pollution is the **leading cause** of water-quality problems that adversely affect drinking water supplies, recreation, and marine life and wildlife.

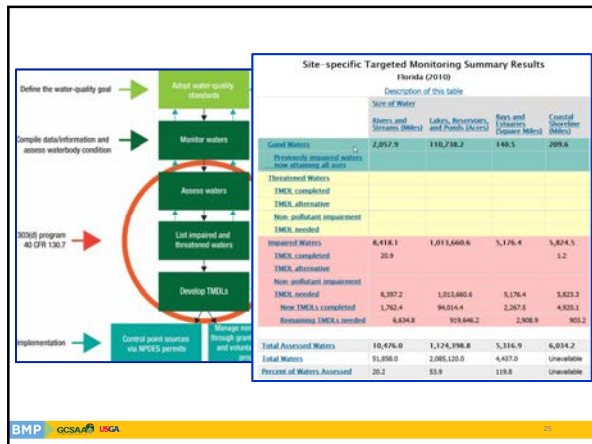
BMP CCSA UGA

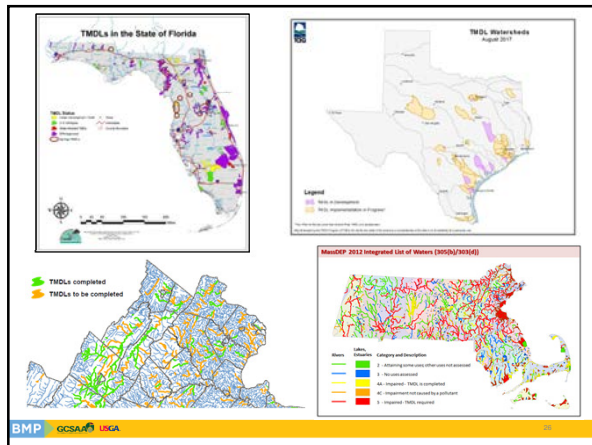
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Total Maximum Daily Loads (TMDLs)

- In 1972, the Clean Water Act (CWA) was passed by the United States Congress, and signed by President Richard M. Nixon.
- Section 303(d) of the Act requires States to establish Total Maximum Daily Loads (TMDLs) for impaired waters on a prioritized schedule.
- A TMDL is a pollution budget – a scientific calculation of the maximum amount of a pollutant that can be present in a body of water and still meet water-quality standards.

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EPA How's My Waterway www.epa.gov/myswaterway

How it Works

- SEARCH:** Use a smart phone to find out about a lake, river, or stream and view the app on the water's edge. Or check out the location on the USA map, or print or place name on your computer, smart phone or tablet.
- RESULTS:** Results screen shows a list of waterways within about five miles of the search location. Each waterway is identified as an unimpaired, polluted, or non-assessed stream along with the water's condition map. A map legend shows some of the search area with the water color-coded by assessment status. Click on the name details to go across the map to check on more news and site status.
- DIAGNOSIS:** Once you select a specific waterway from the map to the list of waterways, the app and website offer more detailed results, including the type of pollutant reported and what has been done by EPA and the water's status in National Water Inventory scientific assessment reports.
- LEARN:** Read simple, non-technical descriptions of each type of water pollutant. These include what the pollutant is, where it comes from, how it can harm the environment, human health, or wildlife (including some of the waterways, and what you can do to help).
- FAQ:** Looking for more news? The website has a page dedicated to popular water information on beaches, drinking water, fish habitat projects, and more!

Visit How's My Waterway at www.epa.gov/myswaterway For questions or comments, contact WaterInfo@epa.gov

Nutrient Management

Regulatory Considerations

Due Date: 06/15/2028

Subtask Categories: [Add New Sub-Category](#)

- Regulatory Considerations
- Soil Testing
- Plant Disease Analysis
- Carbon Cycle and Soil Carbon Management
- Nutrient Management

BMP

Proper nutrient management plays a key role in the reduction of environmental risk and increases resource profitability. Among other benefits, applied nutrients reduce the available pool of nutrients and allow nitrogen to recover from denitrification, increase its resistance to stress, and increase its plant-use efficiency. However, the increase in available nutrients also increases the potential of environmental impact. Nutrients may move beyond the nitrogen cycle to soil, which may directly impact the environment. Other systems also require to increase in nutrients, and in some cases, these systems may be detrimental to the soil resources. The goal of a proper nutrient management plan should be to apply the minimum necessary nutrients to achieve an acceptable growing surface and apply these nutrients in a manner that maximizes their plant value.

Regulatory Considerations

Principles

* Look and side regulation are in place to better manage nutrient risks based on the unique conditions that exist in your location. Designing a nutrient management plan within

EDIS

Florida A&M - Local Offices - Risk Assessment - Advanced Search

Practices on Intersect

Soil Testing and Interpretation for Florida Turfgrasses!

Authors: [Sheldahl, Travis W](#)

Publications

- Management for Florida Lawns
- Family Contributions for Soil Production
- The Florida Turfgrass Lawn
- Florida Turfgrass Management Practices
- General Recommendations for Publication of Turfgrass and Florida Soils
- Managerial Publications for Florida Soil Classes
- Recommendations for N, P, K, and S for Soil Color and Nitrogen Status Publications
- Turfgrass Testing and Interpretation for Florida Turfgrasses

Additional FWS Sites

- College of Agriculture and Life Sciences
- Extension Service
- Faculty of Agriculture
- Department of Agricultural and Environmental Sciences

Practices on Intersect

Soil Testing and Interpretation for Florida Turfgrasses!

Due Date: 06/15/2028

BMP Category

Start Date: 02/15/2028, Due Date: 06/15/2028

Subtask Categories: [Add New Category](#)

- Not Started
- In Progress
- Complete

Surface Water Management	Planning, Design and Construction	Landscape
Due Date: 01 November 2027	Due Date: 04 February 2028	Due Date: 04 February 2028
Water Quality Monitoring and Management	Engines	
Due Date: 01 November 2027	Due Date: 12 March 2028	
Nutrient Management	Cultural Practices	
Due Date: 01 November 2027	Due Date: 01 April 2028	
Integrated Pest Management	Maintenance Operations	
Due Date: 01 November 2027	Due Date: 07 May 2028	
Pesticide Management	Energy	
Due Date: 01 November 2027	Due Date: 04 April 2028	
Pesticide Protection		
Due Date: 01 November 2027		

XERCES SOCIETY

Parks and Golf Courses

Learn and practice ways to improve quality and quantity of wildlife resources, pollinators, birds and other species on the landscape. Identify the value of conservation, the benefits of wildlife, and the importance of habitat and quality resources. We have a lot of quality resources on the website and in our other online courses. For more information, please contact us.

Wildlife conservation is widely practiced across all of our courses. We have many ways to help you learn more about the value of wildlife conservation on your own property.

4 Key elements to conserving pollinators in parks and golf courses

- Requires the entire staff to be involved
- Identify existing and important pollinator habitat areas, including other areas on the property
- Monitor habitat or create habitat for wildflowers and pollinators

BRING BACK THE POLLINATORS

Monarch Watch.org
Education • Conservation • Research

Creating Habitats for Monarch Butterflies & Pollinators on Golf Courses – On Demand

"Monarch butterfly populations are declining due to loss of habitat. To assure a future for monarchs, conservation and restoration of milkweeds needs to become a national priority."
Chip Taylor, Director, Monarch Watch

BMP **OCSA** **UGA** <https://xerces.org/pollinator-conservation/parks-and-golf-courses/>
<https://noipmc.org/action/bmpturf.pdf>



Pollinator Protection

Pollinator Habitat Protection

Regulatory Considerations

Pollinator Habitat Protection

Principles

- It is important to manage the impacts of pesticides on bees and beneficial pollinators. Pesticide applicators must use appropriate tools to help manage pests while safeguarding pollinators, the environment, and humans.
- Be mindful of pollinators when applying pesticides. Focus on minimizing exposure to non-target pollinators in past and non-past cropland areas.
- Pollination requires a diversity of flowering resources to complete their life cycle. Pollinator habitat contains a diversity of wildflower species of different colors and heights, with resources throughout the entire growing season.

Best Management Practices

- Follow label information regarding the application of pesticides when the plant may be in bloom. Avoid applying pesticides during bloom season.
- Stay on target by using coarse droplet nozzles, and monitoring winds to reduce drift.
- Do not apply pesticides when pollinators are active.
- Before applying a pesticide, scout/inspect the area for both harmful and beneficial insect populations, and use pesticides only when a threshold of damage has been indicated.
- Use flowering plants (weeds) before herbicide application.
- Flowering weeds are prevalent. Control them before applying herbicides.
- Use herbicides that have a lower impact on pollinators.
- Use the latest spray technologies, such as drift reduction to prevent off-site drift/contamination of pesticide.
- Avoid applications during unusually low temperatures or when dew is present.
- Use granular formulations of pesticides that are less likely to be blown together to bees.
- Consider bees, bats, and other animals as alternatives to insecticides for pest management.
- Develop new pollinator habitat and/or enhance existing habitat.

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BMP Category

Start Date: 02/13/2018 **Due Date:** 06/13/2018

Plan **Progress** **Complete**

<p>Surface Water Management <input type="checkbox"/> 0%</p> <p>Due Date: 01 November 2017</p>	<p>Planning, Design and Construction <input type="checkbox"/> 0%</p> <p>Due Date: 04 February 2018</p>	<p>Landscape <input type="checkbox"/> 0%</p> <p>Due Date: 04 February 2018</p>
<p>Water Quality Monitoring and Management <input type="checkbox"/> 0%</p> <p>Due Date: 01 November 2017</p>	<p>Impacts <input type="checkbox"/> 0%</p> <p>Due Date: 12 March 2018</p>	
<p>Nutrient Management <input type="checkbox"/> 0%</p> <p>Due Date: 01 November 2017</p>	<p>Cultural Practices <input type="checkbox"/> 0%</p> <p>Due Date: 21 April 2018</p>	
<p>Integrated Pest Management <input type="checkbox"/> 0%</p> <p>Due Date: 01 November 2017</p>	<p>Maintenance Operations <input type="checkbox"/> 0%</p> <p>Due Date: 07 May 2018</p>	
<p>Pesticide Management <input type="checkbox"/> 0%</p> <p>Due Date: 01 November 2017</p>	<p>Energy <input type="checkbox"/> 0%</p> <p>Due Date: 04 April 2018</p>	
<p>Pollinator Protection <input type="checkbox"/> 0%</p>		

BMP **OCSA** **UGA**



Pesticide Selection BMPs

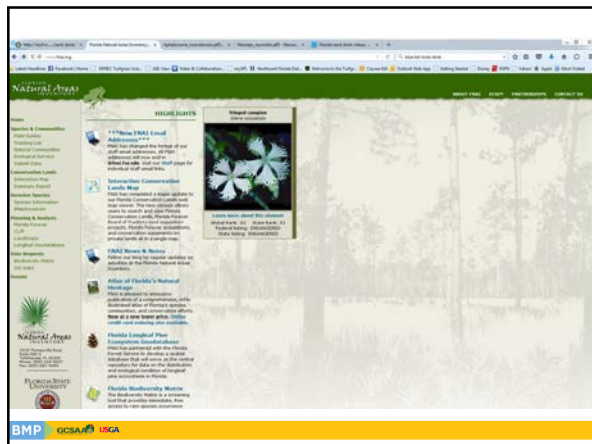
When selecting pesticides, recognize that pesticide product selection should be made based on a number of important factors including:

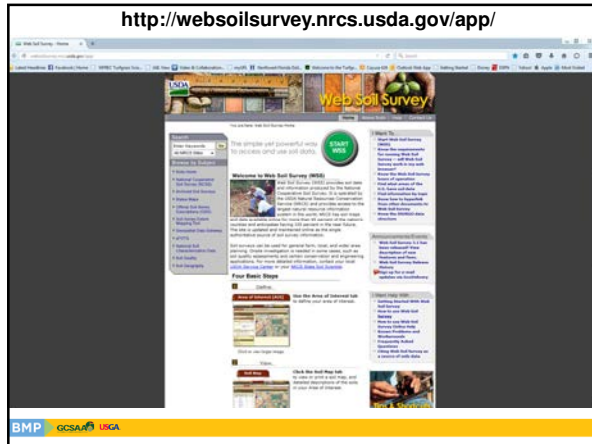
1. Product effectiveness.
2. Pesticides with minimal impact on non-target species.
3. Minimization of pest resistance.
4. Consider possible toxicological risk associated with pesticide exposure.
5. Evaluation of pesticide and site characteristics affecting off-site movement of chemicals.

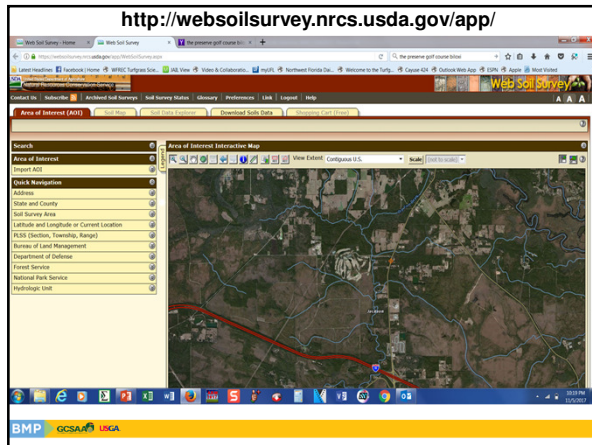
Selection Based on Impacts on Beneficial, Threatened or Endangered Species

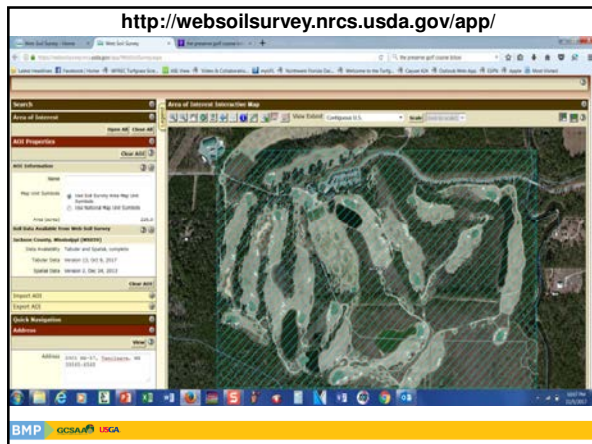
Golf courses and green space offer prime opportunity for wildlife – often including species that are beneficial, threatened, or endangered.

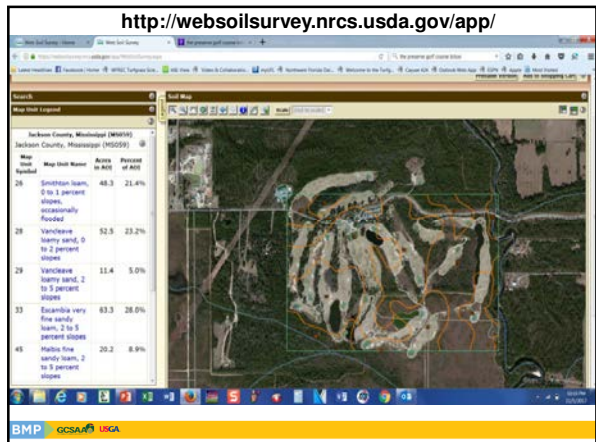
- Know what you have!
 - Florida Natural Areas Inventory (www.fnai.org)

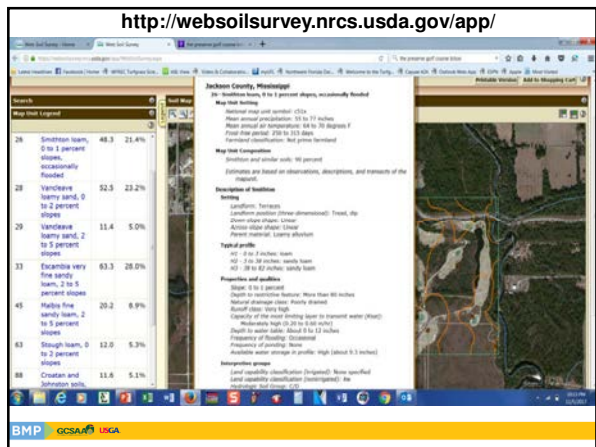












GROUP 2 HERBICIDE PULL HERE TO OPEN

Monument 75WG

Herbicide

syngenta.

Herbicide
A herbicide for control of certain broadleaf, sedge, and grass weeds in turf.

Active ingredient:
2-(4-chlorophenyl)-2-[(4-chlorophenyl)amino]propanoic acid, 1:1

Other ingredients: 25.0%

Total: 100.0%

EPA Reg. No. 105-1134 EPA Est. 061087-A0-000
Product of Battelle/Scotts

KEEP OUT OF REACH OF CHILDREN.
CAUTION - PRECAUCION

See label for instructions for use, precautions, and first aid. See SDS for more information. See storage, disposal, and precautionary statements and questions for use instructions.

SCP 1154A-L1D 0212 5 x 5 gram packets
4010814 0.88 ounce (25 grams)
Total Net Weight

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

Environmental Hazards

Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash water or rinsates.

This pesticide is toxic to vascular plants and should be used strictly in accordance with the drift precautions on this label in order to minimize off-site exposures.

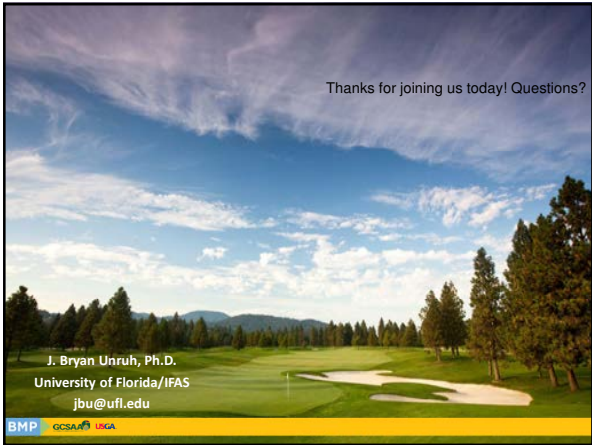
Ground Water Advisory

This chemical has properties and characteristics associated with chemicals detected in ground water. The use of this chemical in areas where the water table is shallow may result in ground water contamination.

**FAILING TO PLAN IS PLANNING TO FAIL.
ALAN LAKEIN**

The Importance of Planning

- Planning helps identify goals
- Planning offers directions
- Planning uncovers problems
- Planning adds professionalism
- Planning gives perspective



Thanks for joining us today! Questions?

J. Bryan Unruh, Ph.D.
University of Florida/IFAS
jbu@ufl.edu

Upcoming Webinars

Apr. 4 @ 10 a.m.
Standard & Unconventional Ways to Avoid Disease Woes on Warm-Season Fairways and Tees
with Lee Miller, Ph.D.

Apr. 5 @ 10 a.m.
Workplace Harassment: What has the last 12 months taught us?
with Kerri Reisdorf

Apr. 18 @ 9 a.m.
Manejo de malas hierbas en céspedes de campos de golf
with Diego Gómez de Barreda Ferraz, Ph.D.
