

STEWARDSHIP NOTES

Water Use Replaces Pesticides as Golf's Top Environmental Issue

By Shelly Foy



We sure have been talking a lot about water in Florida lately. First, we don't have enough; now some places have too much. It's a vicious cycle that unfortunately, will more than likely repeat itself every year.

Ten years ago, I would have said that the misconception of pesticide use on golf courses was the

greatest environmental concern we faced. I have since come to realize that the real danger for golf courses lies in water use. The bottom line is that there is only so much to go around.

There is a Scottish proverb that says, "We'll never know the worth of water till the well goes dry." And perhaps Benjamin Franklin was reading Scottish proverbs when he said, "When the well's dry, we know the worth of water."

I recently had an opportunity to read through Audubon International's updated "A Guide to Environmental Stewardship on the Golf Course," and there is some great information in this publication on water conservation. Jean Mackay, director of educational services for AI, has given me the okay to share some of the information from this publication with Florida Green readers.

Consider this:

- Though water use on golf courses varies widely depending on climate and other factors, an average golf course may use 10 to 30 million gallons of water per year. (USGA Green Section)
- Superintendents continually rank securing adequate irrigation water among their top concerns. (GCSAA)
- Given recent droughts and erratic weather patterns, adopting water conservation measures is essential for addressing public concerns, securing irrigation supplies, and saving this essential natural resource.

What can you do? Audubon International has a self-assessment checklist for water conservation. Read through the following information and "assess" yourself and your management practices as they relate to water conservation.

General Knowledge:

- Train employees to conserve water and make water conservation a priority in your management approach.
- Identify the water sources used for irrigation and drinking water.
- Know how to operate and manage the irrigation system properly.

Irrigation Equipment and Plumbing Fixtures:

- Irrigation system should be properly designed, correctly installed, and performance should be tested.
- Check irrigation system for proper water distribution in all irrigated areas at least once per year.
- Eliminate all non-target watering (e.g., sidewalks, ponds, habitat areas).
- Check all irrigation equipment daily, and maintain the system on a regular schedule.
- Fix leaks in a timely manner.
- Regularly maintain the pump station so that it is working efficiently.
- Update irrigation system, or components of the system (e.g., valves, sprinkler heads, nozzles, computer software), to reduce inefficiency and malfunction and reduce water use.
- Install part-circle irrigation heads where possible to save water.

Watering Practices and Turf Care

- Incorporate evapotranspiration rates or weather data into daily irrigation decisions.
- Avoid running the irrigation system at peak evapotranspiration times.
- Water "hot spots" to target needed areas only, rather than running the entire irrigation system during the peak of the day.
- Work to maintain an effective water cycle to maximize water absorption and reduce runoff and evaporation, including: maintaining soil cover, improving soil structure, adding or maintaining natural organic matter in the soil, and improving drainage to minimize runoff and maximize water penetration through soil layers.
- Reduce or eliminate irrigation on all unused or minimally used portions of the property.
- Monitor daily water use, tally monthly usage, and set targets for yearly improvement.
- Select turfgrasses on greens, tees, and fairways

that are appropriate for local climate and growing conditions.

So, how did you do? I have no doubt that most of you are already doing most of these things to conserve water. If you aren't, then you should be.

Additional information from this book that I found pertinent:

Keep Records

Monitoring your use of water and tracking yearly trends can help you gauge the success of water conservation efforts. Track water use via municipal usage records, information from a fully automated irrigation system, or estimates of the number of gallons used per cycle and per week. Tally the number of gallons used monthly and yearly. Use these records to set realistic conservation targets, detect trends, plan for drought, and promote your success.

Preparing For Drought

The most effective drought management plan is to implement water conservation measures in advance of a drought and on a long-term basis. Planning for drought before one strikes will allow you to mitigate its effects and reduce damage. Being prepared, coordinating conservation measures among staff of various departments of the golf course (grounds, clubhouse, resort amenities, etc.), and implementing a variety of conservation measures will go a long way toward mitigating the effects of drought. In addition to the information in this book, you can also refer to these websites for more information:

According to Audubon International's Managed Lands Survey of 2001, here's what has happened on golf courses since joining the Audubon Cooperative Sanctuary System:

- 60% reduced water costs
- 89% improved their irrigation system or the way that water is applied
- 69% decreased water usage
- Golf courses saved an estimated 1.9 million gallons of water per year per course since joining
- 86% increased efforts to monitor water quality
- 55% increased emergent vegetation in golf course ponds
- 45% instituted a contained wash off area, compared with just 23% prior to joining

What better incentive than that to get involved in the ACSP for Golf Courses?

So if you want to do your part in helping the environmental image of golf courses, make

water conservation your top priority. There is a great American Indian proverb that says, "The frog does not drink up the pond in which he lives."

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ACSP UPDATE

New ACSP Members

Airco Golf Club, Clearwater
Burnt Store Country Club, Punta Gorda
Country Club of Orlando, Orlando
Countryside Country Club, Clearwater
IGM - Tiger Point, Gulf Breeze
Links at Boynton Beach, Boynton Beach
WCI/Pelican Sound Golf Course, Estero
Sunnybreeze Palms, Arcadia

New ACSP Fully Certified Courses

Pelican's Nest Golf Club, Bonita Springs
IGM - Maple Leaf Golf and Country Club,
Port Charlotte

FOR MORE INFORMATION

Quotes are from A Dictionary of Environmental Quotations, compiled by Barbara K. Rodes and Rice Odell and published by the John Hopkins University Press of Baltimore and London.



Sun shining through a summer shower: two good reasons not to be running the irrigation system.

The water conservation information is from Audubon International's updated version of A Guide to Environmental Stewardship on the Golf Course, and can be purchased from Audubon International

Audubon International: 46 Rarick Rd., Selkirk, NY 12158; 518-767-9051; fax 518-767-9076;

www.audubonintl.org.

EPA Office of Water: Environmental Protection Agency, 1200 Pennsylvania Avenue, N.W., Washington, DC 20460; 202-260-2090; www.epa.gov/owm/drouhome.htm

GCSAA: Golf Course Superintendents Association of America, 1421 Research Park Drive, Lawrence, KS 66049-3859; 800-472-7878; fax: 785-841-2240; infobox@gcsaa.org

www.gcsaa.org/resource/drought.html

National Drought Mitigation Center: P.O. Box 830749, Lincoln, NE 68583-0749; 402-472-6707;

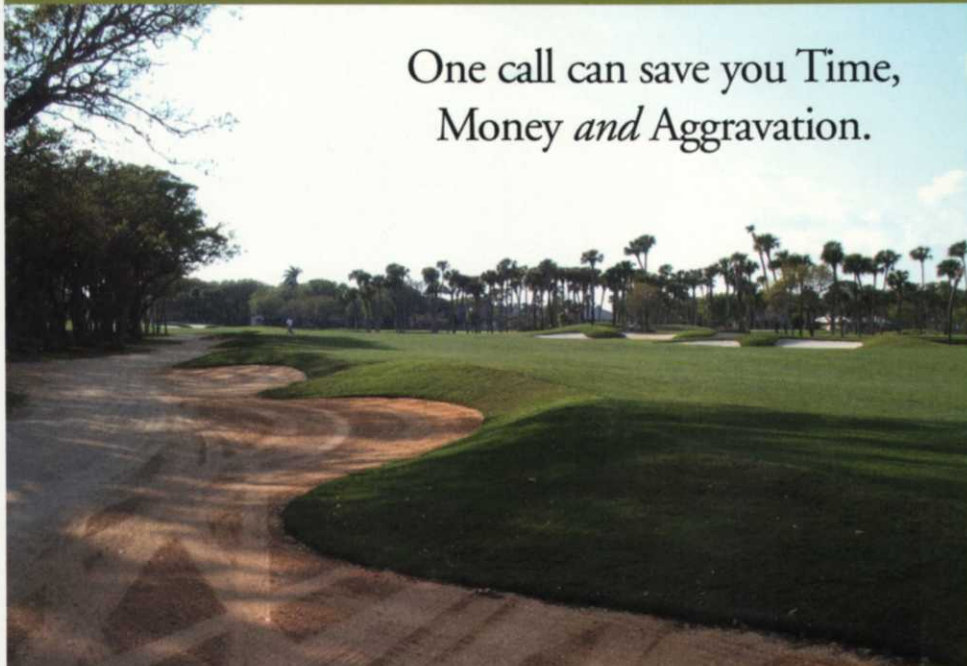
fax 402-472-6614; www.enso.unl.edu/ndmc/

USGA Green Section: PO Box 708, Far Hills, NJ 07931; 908-234-2300; fax 908-234-9687;

www.usga.org/green/index.htm

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Preserving Surface Water Quality Is As Easy As 1, 2, 3...

James H. Baird, Ph.D.

Water features are an integral part of many golf courses, especially in Florida. Thus, it is important that turf managers exercise common sense and sound management practices in order to protect water quality and the health of aquatic organisms.

One of the greatest risks to water quality is surface runoff of pesticides and nutrients. Runoff occurs when the rate of precipitation exceeds that of infiltration. Loss of chemicals is influenced by several factors:

- 1) time interval between chemical application and precipitation event causing runoff;
- 2) amount and duration of the precipitation event;
- 3) soil moisture prior to chemical application and precipitation;
- 4) slope;
- 5) amount and method of chemical application;
- 6) timing of application in regard to plant uptake;
- 7) physical and chemical properties of the pesticide or fertilizer;
- 8) rate of chemical degradation/transformation to a benign form;
- 9) soil properties; and
- 10) vegetation type or density.

Given these factors, the following recommendations will help to protect one of our most vital resources and to demonstrate environmental stewardship on the golf course.

Step 1

Have your water features and irrigation water tested to determine baseline values of pH, total salt content, sodium permeability hazard, specific ion toxicity, and critical nutrient levels.

Pay particular attention to levels of nitrogen (N) and phosphorus (P). Excessive losses of these nutrients into water resources can result in eutrophication, the promotion of algal growth that causes depletion of oxygen in water to the detriment

of other organisms. In many situations, application of additional P or other nutrients can be avoided by regular soil and water testing.

For more information on interpreting water test results, please refer to the article titled, *Understanding Water Quality and Guidelines to Management* in the September/October 2000 issue of the USGA Green Section Record.

Step 2

Establish emergent and shoreline vegetation surrounding surface water features. Examples of taller emergent vegetation include arrowhead, pickerelweed, sedges, and bulrushes. In addition to slowing down, filtering, or inhibiting surface flow, shoreline vegetation is beneficial to:

- 1) reduce or eliminate erosion;
- 2) help shade and cool water near the edge, thereby helping to maintain adequate levels of dissolved oxygen in the water to reduce algal blooms;
- 3) provide habitat for wildlife;
- 4) help deter Canada geese or other unwanted wildlife since it provides a good hiding place for predators and a barrier for entrance or exit;
- 4) save labor and, more importantly, grass clippings that normally fall into water features following trimming; and
- 5) improve aesthetics of water features especially where water levels fluctuate.

Step 3

In addition to establishing shoreline vegetation, you should raise the height of cut of turf adjacent to water features. Research has demonstrated that bermudagrass turf mowed at 3 inches was more effective in reducing time to runoff, runoff depth, concentration, and losses of chemicals compared to turf mowed at 0.5 or 1.5 inches.

Step 4

Establish areas of untreated vegetation between turf that is treated with pesticides or fertilizer and water features. Buffer strips help reduce surface runoff by diluting applied chemicals, reducing surface flow velocity of runoff water, providing a physical filter of sediment or chemicals in solution, and increasing the potential for infiltration.

Reduced chemical runoff has been documented using buffer widths between 15 and 30 feet. However, the effective size of a buffer is dependent upon several factors including slope, overall size of the watershed, type of vegetation, playability, and potential pollution from maintenance practices.

Check with your state or local authorities to determine if regulations govern size of buffers surrounding water features on your golf course.

Step 5

Avoid application of chemicals immediately before or after heavy rainfall or irrigation. This is almost too commonsensical to mention if it were not one of the most critical steps for protecting surface water quality. A study conducted at Oklahoma State University demonstrated that runoff occurred as much as six times earlier and total runoff was as much as 16 times greater when chemicals were applied to turf under saturated conditions prior to simulated rainfall.

Step 6

When using pesticides and fertilizer near water features, choose rates and formulations that have lower runoff potential. Consult the Material Safety Data Sheet (MSDS) for pesticides to find active ingredients with low water solubility and a high adsorption coefficient (KOC). Likewise, natural organic or other slow release forms of nitrogen fertilizer (e.g., IBDU, methylene urea, sulfur-coated urea) applied in smaller amounts are less likely to

contaminate surface water compared to readily soluble forms.

Summary

Despite recent public concerns about use and environmental fate of chemicals on golf courses, research has demonstrated that turf is an effective filter of most pesticides and fertilizers by interception and degradation in the organic or thatch layer of the upper root zone profile. Chemicals that are highly soluble or not strongly adsorbed to organic matter are more likely to leach or runoff into surface water features.

However, the potential for surface runoff can easily be reduced or even eliminated by employing simple and common sense management practices that include

- 1) incorporation of shoreline vegetation adjacent to higher cut turf both of which are designated untreated buffer strips;
- 2) use of pesticides and fertilizer that have low solubility and high adsorption to soil organic matter (high KOC); and
- 3) avoidance of chemical application when soil saturation favors runoff. It's as simple as 1, 2, 3.

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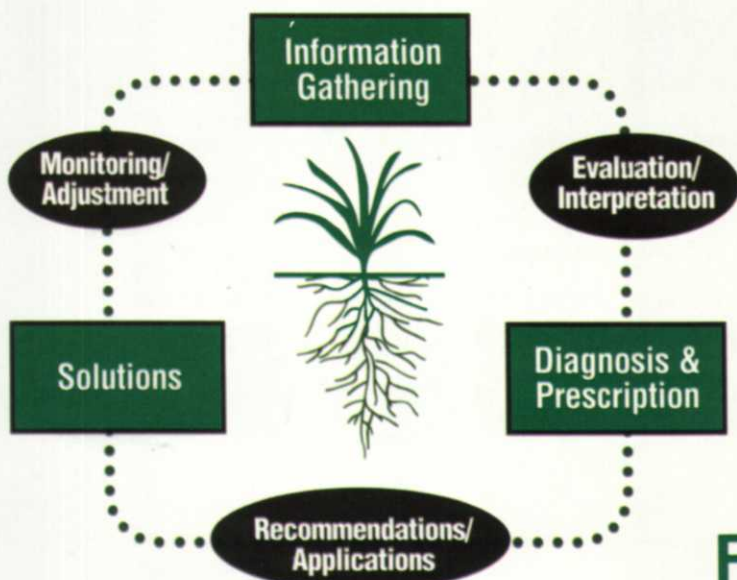
Runoff from rainfall simulators on sloped fairway height plots is stopped by 3" high rough buffer zone. Note standing water that will now infiltrate slowly. Oklahoma State research plots. Photo by Jim Baird.



Raising the height of cut to create a turfgrass buffer zone along this creek bank at the Mendham G&T Club in New Jersey could have helped to prevent the erosion. Photo by James Baird.

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