

# Environmental Stewardship Requires a Successful Plan: Can the Turfgrass Industry State One?

Best management practices all start with planning.

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Henry Ford was right: “Coming together is a beginning. Keeping together is progress. Working together is success.” And “if everyone is moving forward together, then success takes care of itself.”

## THE FIRST STEP — A PLAN

Environmental stewardship requires that an effective environmental management approach (i.e., plan or model) exists, is recognized, and is implemented for each environmental issue of concern. If each component of the turfgrass industry (golf courses, sod farms, athletic fields, landscape areas, etc.) cannot define, articulate, and support an effective environmental management approach, then we cannot complain if others do the task for us — even in a manner that we may not like. Or, to put it in other terms, the critical first step in addressing any problem is to develop a plan that will truly address the problem.

Without a unified plan rising out of the turfgrass industry, different components of the industry will likely develop diverse environmental management approaches, terminology, and regulatory approaches for different components of the turfgrass industry and each unique environmental issue. The net result will be diverse chaos and, most likely, a strong tendency toward rigid regulations. There have

been numerous cases across industry sectors where voluntary, beyond-compliance action on the environment by business has helped to forestall a



potential or impending regulatory response to environmental issues, such as the phase-out of halogenated hydrocarbons to reduce the impact on the ozone layer (Piasecki, 1995).

Like many other industries, the turfgrass industry is confronting environmental issues that are numerous, complex, and ongoing. For example, Carrow and Fletcher (2007) noted 17 broad environmental areas of concern to a golf course facility (these may differ for other turfgrass industry areas), namely:

1. Environmental planning and design of golf courses, additions, and renovations.
2. Sustainable maintenance facility design and operation.

3. Turfgrass and landscape plant selection.
4. Water use efficiency/conservation.
5. Irrigation water quality management.
6. Pesticides: water quality management.
7. Nutrients: water quality management.
8. Erosion and sediment control: water quality management.
9. Soil sustainability and quality.
10. Stormwater management.
11. Wildlife habitat management.
12. Wetland and stream mitigation and management.
13. Aquatic biology and management of lakes and ponds.
14. Waste management.
15. Energy management.
16. Clubhouse and building environmental management concepts.
17. Climatic and energy management.

When confronted with numerous and complex issues, can the turfgrass industry present a unified environmental management approach on these issues? We believe that the answer is yes. In this article, the *first purpose* is to propose two environmental management approaches that are highly effective: one for managing *individual* envi-



Whether potable or recycled water is used on the golf course, irrigation water quality management will be an issue of primary concern for many years to come.

ronmental problems (Best Management Practices, BMPs), and one for environmental management of *all* environmental issues at a single facility (Environmental Management Systems, EMS). The *second purpose* is to present the case for adoption of these two approaches, including their underlying characteristics and terminology. While on first view this may appear to be a *cookie-cutter* or *one-size-fits-all* approach, the very nature of BMPs and EMS is flexibility. When it comes to managing turfgrass facilities, given the complexity and diversity of landscapes and ecosystems, this flexibility is a necessity. The *third purpose* is to note a simple *talking points* based plan of action for a turfgrass industry group to become involved in the regulatory and political processes for proactive support of environmental stewardship.

## BEST MANAGEMENT PRACTICES (BMPs)

**BMPs History.** Best management practices (BMPs) is an environmental management approach that focuses on a single environmental issue. The first federal initiative using the term “best management practices” came 30 years ago in the 1977 amendment to the EPA Clean Water Act (CWA) (Rawson, 1995; Gold, 1999; USEPA, 2005; Carrow and Duncan, 2007). The BMPs concept has been refined over 30 years to protect surface and subsurface water quality from pesticides, nutrients, and sediments, and it has culminated in comprehensive regulations supporting BMPs within agriculture (USEPA, 2003) and urban landscapes (USEPA, 2005). The terminology of BMPs remained almost exclusively related to water quality up until recent years when the BMPs term and concept started to be applied to other environmental issues (Carrow and Duncan, 2007). Many other approaches or models can be found in the literature, such as Integrated Pest or Plant Management (IPM, pesticides), Sustainable Agriculture (soil quality, water issues,

air quality, etc.), and Precision Agriculture (efficient use of inputs). But these are more limited in scope, while BMPs encompass all possible strategies to address an environmental issue. In the end, it is the solution, rather than the means to the solution, that really matters — but the means must be able to accomplish the best solution.

**Characteristics.** BMPs have certain inherent characteristics that account for their success in achieving environmental stewardship (ELC, 2005; Carrow and Duncan, 2007). These characteristics have made the BMPs approach highly successful for protection of water quality from pesticides, nutrients, and sediments with a long track record — i.e., the gold standard or premier means of dealing with this complex environmental problem. These same characteristics make it the best model for other individual environmental concerns. Understanding these characteristics is crucial to understanding how this tested and science-based approach can be adopted as a model for other environmental issues, including all those previously noted. The characteristics are as follows:

- *Science-based.* BMPs are science-based and continue to evolve as science advances. The very definition of BMPs illustrates why this approach is effective: a) “best” is used to imply the best combination of strategies that can be adopted on a site or for a particular situation with current technology and resources; b) “management” denotes that environmental problems must be managed, and that management decisions by trained personnel can maximize success; and c) “practices” implies that multiple strategies are necessary to make a positive difference. BMPs can be documented, and accountability can be monitored.
- *Holistic or whole-systems based.* BMPs recognize that no “silver bullet” or single practice can achieve successful stewardship with regard to a specific environmental problem because we work within complex, dynamic eco-

systems. In contrast, rigid regulations (or command-and-control approach) are based on limited strategies and a one-size-fits-all concept, ignoring the principle that successful environmental stewardship must consider interactions among ecosystem components (ELC, 2005). For a particular environmental

shed-based strategies. Involvement of stakeholder groups in the development and implementation of strategies for achieving and maintaining state water quality and other environmental goals is another hallmark of this approach” (USEPA, 2006). When the BMPs concept is applied to other environ-



One tool to use as part of best management practices is a hooded sprayer to cut down on spray drift when applying insecticides.

issue, there will be a number of potential strategies or options that can be used to address the issue — for example, with water conservation, strategies may include using water-efficient grasses, irrigation design for uniformity, irrigation scheduling to maximize water-use efficiency, use of alternative irrigation sources, and other practices. A basic principle of BMPs is to keep all strategies available and then to select the best combination for a specific site.

- *Holistic in considering all stakeholders and implications relative to potential environmental and economic effects.* The holistic and multiple-stakeholder dimensions as components of the CWA are noted by: “Evolution of CWA programs over the last decade has also included something of a shift from a program-by-program, source-by-source, pollutant-by-pollutant approach to more holistic water-

mental issues beyond water quality, the same stakeholder principles are inherent in the BMPs — i.e., more reliance on stakeholder voluntary actions than on rigid regulations.

- *Educated site-specific choices and management.* Because no single factor will achieve maximum environmental benefits on a site, adjustments within the whole ecosystem are the basis of the BMPs model; thereby, educated decision making is important. BMPs encourage professionalism and education of the turfgrass manager, including continuing education. Each site is different, and adjustments, therefore, must be site-specific and account for system changes over time. Also, regional differences in climate and soil will modify site-specific BMPs.
- *Fosters entrepreneurial development and implementation of new technology and concepts that will improve environmental*



Managing turfgrass facilities involves many facets, from the turfgrass playing areas to the water features and out-of-play areas. Given the complexity and diversity of these landscapes, flexibility in the use of management tools is a necessity.

*stewardship*. BMPs encourage ongoing integration of new technology, plants, concepts, and products to achieve the *best practices*.

- *BMPs allow ongoing monitoring of progress.* BMPs require a number of adjustments in individual practices to achieve a high degree of environmental stewardship for a specific issue, and these individual strategies within an overall BMP can often be monitored. However, this is an area where regulatory agencies could go to extremes and develop a more rigid approach — i.e., the overall approach for alleviation of an environmental issue is accepted as a BMPs model, but the agency develops highly regulated monitoring requirements on a number of the individual practices to the point that it is very costly and rigid. The net effect is rigid regulations with all the negative aspects. A more appropriate type of monitor-

ing is to monitor the overall goal for each individual BMP. For example, for water use efficiency/conservation, what is the water use level or degree of efficiency; or for wildlife habitat management, how does the wildlife population change?

- *BMPs terminology is readily recognized within environmental groups and regulatory agencies at all government levels.* One reason is because BMPs for protection of water quality are at multiple governmental levels, starting at the federal level with the CWA, but also at state, regional, watershed, urban, and site-specific levels (DEP, 2002; EIFG, 2006; USEPA, 2005). When the BMPs terms and concepts are presented to these groups as applied to other environmental issues beyond water quality, a common ground is established that consists of the various inherent characteristics of BMPs, even though the

actual BMPs strategies differ for each environmental issue.

## ENVIRONMENTAL MANAGEMENT SYSTEMS (EMS)

**History of EMS.** An EMS is a proactive approach to environmental stewardship for all environmental issues at a facility or site. EMS entails establishing an environmental policy and long-term commitment to environmental management to promote stewardship by a business entity. The most common EMS models are patterned after the International Organization of Standards (ISO), a non-governmental network of national standards institutes from various countries. ISO is the world's largest organization devoted to development of standards, especially technical standards. In 1996, with revisions in 2004, the ISO developed a standard for envi-

ronmental management entitled “ISO 14001 Environmental Management System” (<http://www.iso.org/iso/en/ISOOnline.frontpage>).

The ISO 14001 standard is defined as: “Environmental Management is the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing, and maintaining the environment.” ISO 14001 was, therefore, developed to *standardize* a management approach for entities to manage environmental issues in a systemic manner.

Since 1996, the ISO 14001 EMS approach has been increasingly adopted in many areas of the world, including the USA, but often with some modification. In October 2005, the USEPA published the “EPA’s Position on EMS” memorandum, signed by the Acting Administrator, stating its support for Environmental Management System

use by organizations and industries. Specifically, the document states, “[t]he plan-do-check-act/continual improvement approach [by EMSs] has been effective as applied to environmental management” . . . and they help an organization to “achieve its environmental obligations and broaden environmental performance goals.” While the EPA had been exploring the use of EMS tools for more than a decade, this official memorandum finally formally gave EPA’s endorsement to EMS adoption by the business community (<http://www.epa.gov/ems/position/position.htm>).

The USEPA has modified the ISO 14001 so that the EPA-supported EMS entails a continual cycle with four key components, summarized in a *plan-do-check-act* format (<http://www.epa.gov/ems/index.html>), where these key components are defined as:

- **Plan** — Planning, including identifying environmental aspects and establishing goals.

- **Do** — Implementing, including training and operational controls.
- **Check** — Checking, including monitoring and corrective action.
- **Act** — Reviewing, including progress reviews and acting to make needed changes to the EMS.

**Elements of EMS.** The four basic components (plan, do, check, act) of the USEPA EMSs are normally expanded into 17 key elements or steps related to the development and implementation of an EMS for an entity — i.e., these 17 elements are the framework of the *standardized* EMS approach. As outlined on the EPA site, the 17 key elements are (<http://www.epa.gov/ems/info/elements.htm>):

1. Environmental policy.
2. *Environmental aspects and impacts — identify or access environmental issues present at a facility.*
3. Legal and other requirements.
4. Objectives and targets.



A basic principle of BMPs is to keep all strategies available and then select the best combination for a specific site. Basic cultural practices, such as aeration, are the first line of defense in environmental protection.

5. *Environmental action plans — develop BMPs for each environmental issue.*
6. Structure and responsibility.
7. Training, awareness, and competence.
8. Communication.
9. EMS documentation.
10. Document control.
11. Operational control.
12. Emergency preparedness and response.
13. Monitoring and measurement.
14. Nonconformance and corrective and preventive action.
15. Environmental records.
16. EMS audit.
17. Management review.

The two most important core aspects of an EMS are: a) item 2 — the assessment and identification of what environmental issues are of concern at a facility; and b) item 5 — develop-

ment of specific action plans to deal with each environmental issue of concern at the facility. It is within this realm that application of BMPs terminology and concepts can be used to avoid confusion. Thus, BMPs for each environmental issue of concern are combined to form section 5 of an EMS, thereby resulting in an environmental management approach or plan for all environmental issues at a facility. The building blocks (individual BMPs) are combined to form the whole site plan (EMS). If the BMPs terminology is not used for each environmental issue, then terminology expands and can become confusing.

Already, at least one golf facility, Colonial Acres in New York, has worked with the EPA to explore the adoption of EMS, using their program participation in the Audubon Cooperative Sanctuary Program as a framework. As a part of the EPA's National Performance Track Program, which relies heavily on the adoption of an EMS for

facilities, there has been early study and learning by the EPA, along with Audubon International and the golf sector, on the effectiveness of EMS adoption. This first *experiment* helped to clarify the applicability of the EMS tool for enhanced environmental performance, when coupled with effective golf course BMPs.

## AN INITIAL ACTION PLAN

BMPs and EMS approaches encourage stakeholder involvement with regulatory agencies and the political process. Stakeholder involvement for a component of the turfgrass industry at the state level (or other levels) in environmental stewardship normally starts with educated leaders followed by development of *talking points* that they wish to take forward within the regulatory and political realms.

**Environmentally Educated Leaders.** Effective industry involvement begins with leaders who arise



The golf course maintenance facility itself is an important component in the overall environmental management system.

out of a component of the turfgrass industry and who are well versed in environmental aspects. However, a major hindrance to leaders coming forth can be due to the complexity of environmental issues and the lack of a systematic environmental management system that can be articulated in simple terms.

Since BMPs and EMS are systematic environmental management approaches, the first step is for potential leaders to become familiar with these two concepts. The Environmental/Water section of the [www.georgiaturf.com](http://www.georgiaturf.com) Web site has been developed for this purpose. Articles are from basic to in-depth. One critical issue is water conservation, and the site contains a template that can be used to develop a BMPs plan for water conservation of golf courses or other sites (see “BMPs and Water Use Efficiency/Conservation Plan for Golf Courses: Template and Guidelines”).

**Talking Points.** Leaders must have a message. The most common pathway for turfgrass industry leaders to become involved in the political process as stakeholders has been to proactively develop contacts and relationships in the political and regulatory realms. To facilitate communication and to formulate a consistent, ongoing message, brief *talking points* should be developed. Talking points are often presented verbally as well as with written materials and should include at least three elements:

- **Information on the nature of the industry** — jobs, services, economic impact, and importance. Surveys or documented materials related to these aspects are useful.
- **Commitment statement of the particular industry component to “environmental stewardship” and “sustainability.”** The environmental stewardship commitment may be in the form of an official mission statement. Sustainability should be presented as a commitment to: a) sustainability of our natural resources,



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including the particular issue of concern; and b) economic sustainability of the industry and state economy.

- **A proposed environmental management plan** based on BMPs and EMS concepts that uses terminology accepted by regulatory and political groups, has proven to be highly effective, and can be presented

in a systematic manner. If the environmental concern is a single issue (such as water conservation), then the BMPs approach is appropriate; however, if there is more than one environmental concern, then the EMS approach is useful.

The last talking point that has often been omitted in turfgrass industry

contacts with regulatory and political groups is that an effective environmental plan is not proactively presented. Communication has much more impact when the turf industry can proactively bring forth an environmental management plan that is based

## REFERENCES

Carrow, R. N., and R. R. Duncan. 2007. Best management practices for turfgrass water resources: Holistic systems approach. M. Kenna and J. B. Beard (eds). *Water Quality and Quantity Issues for Turfgrasses in Urban Landscapes*. CAST Special Publication. CAST, Ames, Iowa. In press. [www.cast-science.org](http://www.cast-science.org).

Environmental Literacy Council (ELC). 2005. About us. What is environmental literacy? *About ELC page*, [www.enviroliteracy.org](http://www.enviroliteracy.org).

Rawson, J. M. 1995. Congressional Research Service Report to Congress: Sustainable agriculture. CRC Report for Congress, 95-1062 ENRD. Congressional Research Service, Committee for the National Institute for the



on BMPs and their inherent characteristics — i.e., the premier approach for complex environmental issues and one that has evolved out of 30 years of the EPA BMPs for sustainability of clean surface and subsurface water. For a single environmental issue, the industry representative should present a summary list of individual strategies that make up the BMPs, since the regulatory or political entities may not be familiar with all the potential options they have for water quality issues.

In summary, we go back to some modification of Henry Ford's quotes:

- Coming together on a common environmental management approach is a beginning. Keeping together is progress. Working together is success.
- If everyone is moving forward together with the same plan, then success takes care of itself.

Carrow, R. N., and K. A. Fletcher. 2007. The devil is in the details: Environmental management systems (EMS) and golf courses. *USGA Green Section Record* 45(5):26-31.

Department of Environmental Protection (DEP). 2002. *Best management practices for protection of water resources in Florida*. Dept. of Environmental Protection, Orlando, Fla. <http://www.dep.state.fl.us/central/Home/MeetingsTraining/FLGreen/FLGreenIndustries.htm>.

Gold, M. V. 1999. *Sustainable Agriculture: Definitions and Terms*. Special Reference Briefs Series No. SRB 99-02, Updates SRB 94-05. National Agricultural Library, Beltsville, Md. [http://www.nal.usda.gov/afsic/AFSIC\\_pubs/srb9902.htm](http://www.nal.usda.gov/afsic/AFSIC_pubs/srb9902.htm).

Environmental Institute for Golf (EIFG). 2006. Environmental Institute for Golf. Web portal with links to published documents relating to BMPs for water management, integrated plant management, wildlife and habitat management, energy and waste management, and environmentally sound siting/design/construction of golf courses. Documents range from site-specific to state levels. EIFG, Lawrence, Kans. <http://www.eifg.org>.

Environment, Washington, D.C. [www.ncseonline.org/NLE/CRSreports/Agriculture/ag14.cfm?&CFID=962773&CFTOKEN=76886153](http://www.ncseonline.org/NLE/CRSreports/Agriculture/ag14.cfm?&CFID=962773&CFTOKEN=76886153).

U.S. Environmental Protection Agency (EPA). 2003. *National Management Measures to Control Nonpoint Source Pollution from Agriculture*. EPA 841-B-03-004. U.S. EPA, Office of Water, Washington, D.C.

U.S. Environmental Protection Agency (EPA). 2005. *National Management Measures to Control Nonpoint Source Pollution from Urban Areas*. EPA-841-B-05-004. U.S. EPA, Office of Water, Washington, D.C.

U.S. Environmental Protection Agency (EPA). 2006. *Introduction to the Clean Water Act*. EPA Web site for water, <http://www.epa.gov/watertrain.cwa/>.

Piasecki, Bruce. *Corporate Environmental Strategy: The Avalanche of Change Since Bhopal*. John Wiley & Sons, New York.

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