

Environmental Best Management Practices for Virginia's Golf Courses

The Virginia Golf Course Superintendents Association (VGCSA) has published *Environmental Best Management Practices for Virginia's Golf Courses*. This document provides summary best management practices (BMPs) and accompanying recommendations specifically adapted for golf courses in Virginia, using the results of current research, the experience of golf course superintendents in implementing BMPs, golf industry representatives, and State regulators.

Implementation of BMPs specific to Virginia's environment minimizes nutrient loading to waterways, decreases pesticide runoff and conserves water while preserving the quality experience Virginia's golfers are accustomed to. Furthermore, the voluntary adoption of the published BMPs by Virginia golf courses helps to achieve Total Maximum Daily Load goals established by the US Environmental Protection Agency for the Chesapeake Bay.

The BMPs in *Environmental Best Management Practices for Virginia's Golf Courses* are divided into chapters covering all aspects of golf course design, construction, and operation:

- planning, design, and construction
- irrigation
- surface water management
- water quality monitoring
- nutrient management
- cultural practices
- integrated pest management
- pesticide management
- maintenance operations

These summary statements emphasize the protection of Virginia's water quality. In addition to providing information relevant to understanding and implementing these BMPs, each chapter provides a summary of relevant federal, state, and local regulatory information.

Incentives for Virginia golf courses to implement BMPs are numerous and include the following:

- reduced environmental impacts
- improved turf quality
- improved golf outing experiences
- improved worker safety
- efficient allocation of resources
- reduced maintenance expenditures.

Golf course superintendents, current and prospective golf course owners, golfers, other stakeholders, and regulators will find the information contained within this document to be useful in understanding the use of BMPs for the protection of environmental quality.

VGCSA developed the document in cooperation with representatives of Virginia Tech, Virginia governmental agencies, allied associations of the Virginia Golf Council, and private sector partners. *Environmental Best Management Practices for Virginia's Golf Courses* is available for download on the VGCSA web site: <http://www.vgcsa.org/BMPs/>. Hard copies are available upon request from David Norman at dnorman@vgcsa.org.





Summary BMP statements for the protection of water quality

Summary BMP Statements

Planning (Chapter 2)

- Assemble a team of qualified professionals.
- Develop project goals and objectives.
- Conduct a feasibility study.
- Identify site opportunities and constraints.
- Evaluate site data and develop project alternatives.

Design (Chapter 2)

- Avoid or minimize environmental impacts.
- Manage stormwater using proper drainage and stormwater management devices.
- Select appropriate turfgrass species and/or cultivars.
- Develop a comprehensive master plan.
- Prepare detailed golf course construction documents.

Construction (Chapter 2)

- Plan for construction.
- Implement environmentally sound construction techniques.
- Implement a construction monitoring program.

Irrigation (Chapter 3)

- Conduct water supply analysis to verify quantity and quality of water supply.
- Plan for water conservation, integrating practices and technology for precision irrigation control and uniform coverage.
- Design the irrigation system for the efficient and uniform distribution of water.
- Program and schedule the irrigation system to conserve water.
- Know the drought resistance differences between turfgrass species.
- Conduct an audit of the irrigation system.

Surface Water Management (Chapter 4)

- Reduce sedimentation and nutrient enrichment to surface waters.
- Reduce chemical runoff near surface waters.
- Maintain dissolved oxygen levels.
- Use native aquatic plants.
- Manage aquatic plants by implementing an IPM strategy, considering non-chemical means of control first.

Water Quality Monitoring (Chapter 5)

- Conduct periodic water quality sampling.
- Follow recommended sample collection and analytical procedures.
- Interpret water quality reports and take corrective action as needed.

Nutrient Management (Chapter 6)

- Base all fertilization practices other than standard N fertility needs on a soil test.
- Supplement soil tests with plant tissue tests when necessary.
- Optimize nutrient use efficiency and reduce leaching potential of readily available nitrogen sources.
- Use Enhanced Efficiency (slow release or stabilized) N sources to optimize nutrient use efficiency and reduce nutrient leaching potential.
- Use iron as a supplement to standard nitrogen programs to promote turfgrass greening without flushes of shoot growth.
- Maintain appropriate soil pH in order to optimize nutrient availability.
- Apply nitrogen during periods of optimal turfgrass growth.
- Consider site-specific conditions before making a fertilizer application.

Cultural Practices (Chapter 7)

- Choose the appropriate species or cultivar within a species to match the mowing height needed for use.
- Raise height of cut slightly during summer to improve stress tolerance.
- Consider rolling to maintain green speeds in the summer.
- Raise height of cut and lower inputs on shaded turf
- Vary the direction of mowing to improve aesthetics and quality of cut.
- Return clippings to recycle nutrients.
- Cultivate and topdress to dilute organic matter on putting greens.

Integrated Pest Management (Chapter 8)

- Use biological controls when possible.
- When needed, select the appropriate conventional pesticides and use judiciously.
- Manage turfgrasses for reduced disease pressure.
- Identify problems that limit turfgrass competitiveness for weed control.

Pesticide Management (Chapter 9)

- Select the least toxic pesticide with the lowest exposure potential.
- Select pesticides that have a low runoff and leaching potential.
- Consider the impact of site-specific and pesticide-specific characteristics before applying a pesticide and time applications to avoid heavy rain or prolonged irrigation.
- Minimize off-target drift potential by using properly-configured application equipment and appropriate methods and timing.
- Store, mix, and load pesticides at least 100 feet away from sites that directly link to surface water or groundwater.
- Apply pesticides according to label directions, paying careful attention to application site conditions, methods, equipment calibration, and rates specified on the label.
- Prepare only the amount of pesticide mix needed for the immediate application.
- Keep records of all pesticide use to meet legal requirements, evaluate pest control efforts, and plan future management tactics.

Maintenance Operations (Chapter 10)

- Store and handle all chemicals appropriately using secondary containment as required.
- Store fertilizers and pesticides separately and away from other chemicals.
- Store pesticide and fertilizer application equipment in covered areas to protect from rainfall.
- Remove grass from grass-covered equipment before washing.
- Dispose of or recycle wash water appropriately and never discharge to surface waters or septic systems.
- Store wastes separately and dispose of according to legal requirements.