

A Critical Review of Water Quality Impacts by Golf Courses: Update and Trends

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Objectives:

1. Obtain, screen (quality control), and evaluate all relevant and valid water quality monitoring studies for North American golf courses, with a focus on pesticides, nitrate-N, and phosphorous.
2. Enter the data into a database that will be used for statistical analysis.
3. Conduct an analysis of detections and exceedances.
4. Expand this analysis to include contaminant trends.
5. Prepare a manuscript suitable for publication in a peer-reviewed journal.

Start Date: 2005

Project Duration: two years

Total Funding: \$50,000

Potential and documented impacts by golf courses on groundwater and surface water quality is an issue during the permitting and operational phases of golf course development and management, respectively. Historically, the perception by many members of the public has been that golf courses are significant sources of pesticide and fertilizer loading to ambient water.

The first national assessment of this issue - a metastudy - was supported by the GCSAA, with a grant issued to ETS in 1996. Work was performed with the GCSAA to identify all available golf course water quality monitoring studies. The nitrate, pesticide, and solvent results obtained indicated low frequencies of concentrations that exceeded human health and aquatic organism standards and guidelines. The update of this metastudy is being co-funded with USGA by the GCSAA's Environmental Institute for Golf.

One goal of this new study will be



As more and more samples are taken, ETS scientists will analyze the concentrations of nutrient and pesticide detections, identify when they exceed current environmental health standards, and use the analyses to identify trends.



Dr. Stuart Cohen takes a water sample as part of this study jointly funded by USGA and the Golf Course Superintendents Association of America, to assess water quality as affected by North American golf courses.

to use the water quality monitoring data from a greater number of North American golf courses and from a much wider geographical distribution. Scientists at ETS will analyze the concentrations of nutrient and pesticide detections, identify when they exceed current environmental health standards, and use the analyses to identify trends.

The results of this research will provide scientifically valid, updated information that can be used in public hearings, regulatory decisions on golf course permitting, and pesticide registration. Equally important, it will help the industry better understand the extent to which, if any, it is impacting water quality.

Potential contamination problems may be identified that indicate the need for improved or better informed turf management. It may be determined that certain costly analyses that rarely yield positive results should be excluded from monitoring programs, thereby providing money-saving advice. Trends may be identified that could be significant for national perspectives on the focus of water quality monitoring.

Summary Points

- Data files from the original water quality study (1996/1997) have been imported manually from Paradox into the Microsoft Access database.
- Requests have been made to superintendents and others to update monitoring data from the original studies included in the 1999 publication.
- Quality control procedures were developed for reviewers to follow during the study acceptance phase.
- A press release was sent to golf course magazines for inclusion in past issues and website postings.
- Letters were sent to the EPA regional offices, to the GCSAA chapter heads, and to the USGA regional agronomists, requesting help in procuring data.
- We have tentatively identified 18 studies that may be included in this update (in addition to the 1996/1997 studies), depending on whether they meet our quality control criteria.
- Water quality monitoring studies are being reviewed.