

## 5. WORKPLAN

- a. **Project Title:** Reducing Nutrient and Chemical Impacts in the Great Lakes through expanded environmental management practices at Great Lakes golf courses, and development of an input tracking tool for the Michigan Turfgrass Environmental Stewardship Program
- b. **Total Project Funding:** \$73,315 (federal), \$22,000 (match)
- c. **Name and Address of Organization:** Michigan Turfgrass Foundation, P.O. Box 80071, Lansing, MI 48908
- d. **Benefit to Organization:** This proposed project will allow the Michigan Turfgrass Foundation (MTF) and the Michigan Turfgrass Environmental Stewardship Program (MTESP) to increase the breadth of environmental management tools for participating golf courses, by adding two new environmental modules and an input tracking tool. It will also expand the geographic scope of the MTESP, by partnering with other golf courses in the Lake Michigan basin to share information and resources for improving the environmental performance of golf courses in the basin.
- e. **Contact Name and Information:** Tom Smith, Executive Director, Michigan Turfgrass Foundation. P.O. Box 80071, Lansing, MI 48909. (517) 202-3019, [grassroots@voyager.net](mailto:grassroots@voyager.net)
- f. **Programmatic Capability:** MTF and MTESP have received state grant funds from the Michigan Department of Agriculture's (MDA) Groundwater Stewardship Program since the program began in 1998. In the last three years, MDA has provided MTF with the following grants to support the MTESP.

FY 2004 \$59,000  
FY 2005 \$80,000  
FY 2006 \$55,000

As Executive Director of the MTF, Tom Smith manages those grants and provides annual reports to the MDA on progress in meeting program goals. Debbie Swartz is the program coordinator for the MTESP, and is also responsible for annual reporting on program progress under the MDA grants. Mr. Smith's and Ms. Swartz's CVs are attached at the end of this proposal. The MTF annually reports to MDA on progress in achieving project objectives under these grants. A letter of support from the MDA for this project is attached.

In addition, MSU, as a partner in the MTESP, received the following grants in FY2005 and FY2006 (respectively):

- \$10,000 - from Project GREEN for an "Irrigation Best Management Practices for Non-Agricultural Irrigators in the Great Lakes Basin" grant. This has been distributed regionally by the MDEQ - Office of the Great Lakes. It has also received national

***EPA-GLNPO Project Application - submitted by the Michigan Turfgrass Foundation  
May 30, 2007***

recognition by the Irrigation Association and Golf Course Superintendents Association of America (GCSAA).

- \$25,000 - from the GCSAA for a “Stormwater Retainment for Golf Course Irrigation – Water Quality, Cost Benefit Analysis, and Water Conservation Potential” grant. Tom Smith and Debra Swartz are both listed as investigators on these projects.

- g. **Brief Project Description:** The purpose of this project is to prevent and reduce pollutant loading to Lake Michigan from golf courses by expanding the Michigan Turfgrass Environmental Stewardship Program’s environmental management tools and developing partnerships with other Lake Michigan basin states to share information on best environmental practices for golf courses.

The project has three primary elements: 1). development of two additional environmental modules for the Michigan Turfgrass Environmental Stewardship Program on nutrient best management practices and integrated pest management, 2). creation of an input tracking tool, and 3). export of Michigan Turfgrass Environmental Stewardship Program principles and resources, and sharing of environmental strategies among golf course managers in the Lake Michigan basin states.

- h. **Problem Statement:** After significant progress in reducing nutrient loads to Lake Michigan in the 1980s, there has been an increase in eutrophication and nuisance and harmful algae (e.g., *Cladophora*) in Lake Michigan in recent years. While the causes of this are not fully known, efforts to prevent and reduce nutrient loadings to the Lake will continue to play an important role in minimizing eutrophication and algae. Reduction and prevention of nutrient levels in the lake is identified as a priority action in the Lake Michigan LaMP.

In addition, chemical contaminants such as those found in pesticides, have historically impacted Lake Michigan’s aquatic ecosystem - contaminating sediments, and impacting fish and wildlife health and populations, as well as threatening the safety of consuming certain fish species. As with nutrients, the sources of chemical contamination in the Great Lakes are diverse and not always fully understood. Lakewide management plans for Lake Michigan have identified several chemicals as contaminants of concern, and have prioritized efforts to reduce chemical pollutant loading wherever possible.

This project seeks to reduce the contribution of nutrients and chemicals to Lake Michigan from golf courses and other managed turfgrass areas, through improved environmental management tools, additional information on the effectiveness of various management measures, and expanding the number of golf courses which manage their turf in accordance with best environmental principles.

- i. **Proposed Work:** The proposed project has three primary elements aimed at reducing potential negative water quality impacts from golf courses and other managed turf areas in the Great Lakes region: 1). development of two additional environmental modules for the

***EPA-GLNPO Project Application - submitted by the Michigan Turfgrass Foundation  
May 30, 2007***

Michigan Turfgrass Environmental Stewardship Program on nutrient best management practices and integrated pest management, 2). creation of an input tracking tool, and 3). export of Michigan Turfgrass Environmental Stewardship Program principles and resources, and sharing of environmental strategies among golf course managers in the Lake Michigan basin states.

While the project elements will be applicable to the larger Great Lakes basin, the project team proposes to focus the work on the Lake Michigan basin as a “case study” in order initially to address some of the problems identified in section “H” above. However, the project team plans to expand the application of the tools and information developed through this grant to other Great Lakes basins in the future. The project team will coordinate a partnership with 8-12 “case study” courses, covering a representative cross section of type (e.g., public, private, resort) and location (Michigan, Indiana, Illinois, Wisconsin) of courses within the Lake Michigan basin, in completing the project objectives. A tentative list of courses and turf managers who have expressed a willingness to participate are included in attachment A.

Element #1: Development of two (2) new MTESP modules

The first element of the project seeks to prevent and reduce nutrient and chemical pollution loads to Lake Michigan from managed turfgrass areas in the basin through the development of two new MTESP modules - nutrient best management practices (BMPs) and integrated pest management (IPM). Based on existing IPM and nutrient BMPs from other regions or types of land use, and the extensive research regarding fate and transport from managed turf areas done by Michigan State University (MSU) in partnership with the MTF, the project team will develop the two new modules (there are already nine environmental program modules) for the MTESP which, when implemented, will help to further reduce the impacts of golf course runoff on the quality of Lake Michigan and other Great Lakes surface waters. The project team proposes to:

- Review existing nutrient BMPs for application to the nutrient and IPM module. There are examples of BMPs for controlling nutrient runoff from golf courses, but these are from other parts of the country. There are also nutrient BMPs from the Michigan and Great Lakes region, but they are largely for other types of land use.
- Work with MSU turfgrass researchers and faculty from the other land grant universities in the Lake Michigan Basin to identify unique issues related to nutrient and pesticide applications and runoff on turfgrass in the Great Lakes region. The MTF and the turfgrass research program at MSU have conducted extensive research on nutrient and chemical fate and transport from managed turfgrass areas in Michigan.
- Meet with golf course superintendents in the MTESP and a select group from the surrounding states – focusing on courses in the Lake Michigan basin - to identify key nutrient and pesticide application issues, BMPs that have already been used effectively, barriers and incentives for implementing a nutrient and IPM management modules.

*EPA-GLNPO Project Application - submitted by the Michigan Turfgrass Foundation  
May 30, 2007*

- Develop draft IPM and nutrient BMP modules which will include an overview of nutrient and pest management issues in the Great Lakes, regulatory and programmatic issues for states in the Lake Michigan Basin, summary of specific BMP measures which could be implemented to reduce nutrient and pest management impacts, and a checklist of BMP activities and follow-up. The modules will be reviewed by industry experts, MSU and other university researchers, golf course superintendents, and state and federal non-point source water quality staff.
- Seek input on the modules from case study partners, and “test run” the modules at those golf courses when it is complete.
- Publish and print the final nutrient management IPM modules as part of the MTESP workbook.
- Provide training on the modules to the MTESP case study courses through a workshop and individual course site visits. Work with courses to prioritize implementation of applicable BMPs in the modules, and input nutrient and pest management information as the first step in implementing the proposed tracking tool (below)
- Provide outreach and training on the module for other courses in Michigan and other Great Lakes states through ongoing MTESP activities and events (e.g., spring workshop), and individual meetings.

Element #2: Input Tracking Tool

The second component of the project will improve golf courses’ ability to prevent and reduce their contributions of pollutants to Lake Michigan and other Great Lakes through the development of an interactive, secure web-based input and management tracking tool. Gaslight Productions will be contracted to create the database (Microsoft Access or similar), and a secure web page for the database on the MTESP home page which will be used as a tool for tracking inputs and management measures (e.g., fertilizer and pesticide use, energy and water use, habitat creation) at participating MTESP golf courses. The tracking tool will be available to individual courses for managing their resources and improving environmental protection measures, and as it is populated by participating courses over time, data from the tracking tool will be aggregated by the MTESP to evaluate environmental management practices implemented by courses which participate in the MTESP and adopt the program’s environmental principles. The MTF proposes to:

- Work with golf course superintendents, environmental partners, and government agencies to get input for the design and development of a secure, searchable database for tracking various golf course inputs and measures which impact the environment. MTF will work with partners to identify what types of measures golf courses are currently tracking and what information they would like to be able to include in a database in the future.
- Potential information/indicators that would be initially included as layers in the tracking database include: a). amount, type (i.e., granular v. liquid), and costs of fertilizer; b). amount, types and costs of pesticides; c). total water/irrigation use; d). BMPs and other pollution prevention actions implemented; e) habitat created, and f). energy use and costs.

“Test run” the tracking device at the participating case study courses in the Lake Michigan basin. Initial implementation of the tracking tool will focus on collecting baseline data on nutrient practices in conjunction with the first part of this project. However, when the tracking tool is finalized, courses will be able to input all baseline data that they have and will continue to populate the database each year.

### III – Expanding the Geographic Scope of the MTESP program and principles

The third element of the project is expanding the geographic scope of the MTESP program and principles to additional courses within Michigan, as well as other golf courses within Lake Michigan basin states. The purpose is to encourage additional participation in the MTESP, particularly within the Lake Michigan basin, and partner with neighboring Lake Michigan basin states to share best practices and tools for improving the environmental performance of golf courses and other managed turf areas within the basin.

As part of the project, the MTF and MTESP program staff will work with golf course and other turfgrass management partners in our neighboring states to export some of the tools and resources of the highly successful, volunteer MTESP program to those states. In addition, we will partner with turf managers in the other states to seek their input and assistance in refining the MTESP program in ways which might further improve the environmental performance of golf courses in all of our states.

The project will include two meetings/workshops with partner courses, presentations by participants in the MTESP on the program’s goals and benefits; information from partners in neighboring states regarding their efforts to reduce pollutant loadings from their golf courses or other managed turf areas; and training on specific elements of the MTESP, as relevant and requested. In addition, the project team will work with these partners as a “case study” group to review and get input on the two new MTESP modules and the input tracking tool. MTF has identified and, in some cases, already contacted and received initial interest from the following courses and organizations in the Lake Michigan basin:

- Crystal Downs Country Club – Michigan
- Arcadia Bluffs – Michigan
- Bay View Country Club – Michigan
- Charlevoix Golf Club - Michigan
- Grand Traverse Resort – Michigan
- Traverse City Country Club – Michigan
- The Meadows at Grand Valley State University - Michigan
- Wuskowhan Players Club - Michigan
- Sweetgrass – Michigan
- Pottawattomie Country Club – Indiana
- Greater Chicagoland Golf Course Superintendents Association – Illinois
- North Shore Country Club – Illinois
- Chicago Golf Club - Illinois
- Whistling Straights – Wisconsin

- Milwaukee Country Club - Wisconsin

- j. **Environmental Results:** Development and implementation of a nutrient best management practices (BMP) and integrated pest management (IPM) module through this project will enable participating MTESP courses, as well as other golf courses or managed turf areas who implement the module, to reduce the amount of nutrients and chemicals leaving their golf courses and entering the surface waters of the Great Lakes.

While the level of pollutant reductions by each course will vary based on several factors such as feasibility of BMP implementation, site design, course age, soils, slope, proximity to surface waters, climate, and total acreage, the widespread implementation of nutrient BMPs and IPM on participating MTESP courses, as well as other interested courses, will result in decreased pollutant loading to the Great Lakes.

Quantifiable data on changes in golf course management, improved environmental performance, and baseline versus post-BMP implementation has not been available for participating MTESP courses. The tracking tool developed through this project will allow the golf courses to evaluate the effects of their various management measures on the environmental performance of their course. MTESP will use the tracking tool to evaluate the environmental improvements/benefits of the program in aggregate. It will also be used as a tool to encourage additional participation by other golf courses in Michigan, and to facilitate the adoption of the MTESP practices by additional golf courses in the Great Lakes Basin.

Finally, providing training, information sharing, and tools/resources from the MTESP to a wider geographic scope than Michigan will lead to an even greater protection of surface waters potentially impacted by turfgrass management practices. The MTESP represents a collaborative project between governmental agencies, the turfgrass industry, MSU, and environmental advocacy groups. It is designed to make fundamental advances toward environmental protection on golf courses. The program was developed at MSU with assistance from the Michigan Department of Agriculture, Michigan Department of Environmental Quality (MDEQ), MTF, Michigan Golf Course Owners Association and the Golf Association of Michigan.

The mission of the MTESP is:

- to advance the environmental stewardship of Michigan's golf industry by maximizing the protection of natural resources;
- to engage the golf industry, regulatory agencies, Michigan State University, and environmental groups in productive communication;
- to clearly identify environmental laws and regulations and advance compliance;
- to enhance wildlife habitat, indigenous vegetation, and protect water resources;
- to recognize, promote, and award environmental stewardship achievements.

The MTESP was launched in June 1998. There are currently two hundred thirty four (234) golf courses participating in the program. Program members have documented significant improvements toward increased compliance and resource protection. The MTESP has received local, national and international recognition. This past September (2006), the

***EPA-GLNPO Project Application - submitted by the Michigan Turfgrass Foundation  
May 30, 2007***

program was granted the Most Valuable Pollution Prevention award by the National Pollution Prevention Roundtable in Washington D.C. It was also selected for the 2001 President’s Environmental Leadership Award from the Golf Course Superintendents Association of America.

**k. Measuring Progress:** Progress on this project will be measured by:

- Completion, printing and distribution of the nutrient and IPM modules to all MTESP courses, and other interested stakeholders
- Completion of a ready-to-use tracking database made available to all interested MTESP and Lake Michigan Basin courses. This project will design and create the database, and work with case study courses to input baseline data related to nutrient inputs and management (in conjunction with the first part of the project). Participating golf courses will be able to add any other baseline data available on the tracking tool measures as well, and will continue to populate the database over time. MTESP will annually monitor how many courses are using the database and what types of data is most commonly tracked. That information will be used to refine the database in the future and target outreach/education efforts.
- Completion of one meeting with 8-10 Lake Michigan case study courses, aimed at expanding the understanding and implementation of MTESP tools and resources at additional golf courses within the Lake Michigan basin. In addition, the project team will conduct one group meeting and individual site visits to the participating courses to provide training and information on the implementation of the nutrient and IPM modules and tracking tool.
- Completion of other outreach activities. At a minimum, the project team will meet with DEQ LaMP and non-point source staff, EPA-GLNPO to provide information and seek input on the project, and a case study group of 8-10 Lake Michigan basin golf courses/ organizations. In addition, the project team intends to contact, and hopefully meet with, the Lake Michigan Forum, and will present project information and findings at least two other Great Lakes/Lake Michigan/Golf-related conferences or meetings.

**l. Project Tasks/Schedule:**

<b>Task</b>	<b>Schedule</b>
Review literature on existing nutrient and IPM BMPs from other regions of the country, as well as IPM and nutrient BMPS from other land use types for applicability to the turfgrass module	July, 2007
Meet with MSU and other Lake Michigan Basin land grant university turfgrass faculty, MTESP steering committee, MDEQ non-point source and LaMP staff to get input on applicable BMPs/strategies to include in the module and needs/interests for measures to include in the tracking tool.	July to October, 2007
Host meeting with small group (8-10) of superintendents from courses within the Lake Michigan Basin to share overall information on the value of the MTESP and its management principles, get input on nutrient management	October, 2007

***EPA-GLNPO Project Application - submitted by the Michigan Turfgrass Foundation  
May 30, 2007***

practices, needs/interests for measures to include in the tracking tool, and	
Write and send semi-annual progress report to EPA project officer (E. Marie Wines)	January, 2008
Draft nutrient management and IPM modules and send out for technical review (to case study courses, MSU faculty, MTESP partners, MDEQ, MDA)	January, 2008
Present initial findings/overview of project at Great Lakes Trade Expo and Illinois Park Managers meetings	January, 2008
Draft version of tracking tool/database completed and provided to Lake Michigan case-study courses and other MTESP partners for input	April, 2008
Final Draft of nutrient and IPM modules completed and given final review by project team and MTESP Board.	May - June, 2008
Write and send semi-annual progress report to EPA project officer (E. Marie Wines)	June, 2008
Final draft of input tracking tool completed and given review by project team and MTESP Board.	August, 2008
Meeting with Lake Michigan case study courses on implementing the nutrient and IPM modules and use of the tracking tool.	October, 2008
Site visits to individual Lake Michigan cast study courses to provide site-specific training on implementing the new modules and tracking database	October - December, 2008
Write and send semi-annual progress report to EPA project officer (E. Marie Wines)	January, 2009
Nutrient and IPM modules and tracking tool refined based on lessons learned from implementation at case-study courses, finalized, and published/made available to all MTESP courses	February, 2009
Final Report to EPA	March, 2009

\* pending discussions with the Forum re: interest in this project.

m. **Description of coordination and leveraging of project matching support:** The project will be coordinated by the MTF, with Tom Smith as the project manager, and Debbie Swartz as the MTESP coordinator.

The project team will also include three members of Michigan State University's turfgrass research faculty – Ron Calhoon, Joe Vargas, and Kevin Frank. These faculty will provide initial input into the development of the two modules and the tracking database, will provide peer review of those projects when completed, and will help present information to, and train representatives of the case study courses in the use of the modules. Time devoted to the project by these three faculty will be provided through funds from the MSU-MTESP earmarked research fund for MSU faculty research and extension activities. The MTF was

***EPA-GLNPO Project Application - submitted by the Michigan Turfgrass Foundation  
May 30, 2007***

able to leverage this additional support to augment funds from EPA to include an integrated pest management element to the project.

**n. Project Budget:**

The MTF is requesting a total of \$73,315 From U.S. EPA-GLNPO to support this project. The MTF/MTESP programs will contribute \$22,000 in matching funds and have leveraged and additional \$40,000 from MSU (see note below) for a total project budget of \$135,315.

	Requested Budget	MTF/MTESP Match
<b>Personnel/Salaries</b>		
Debbie Swartz, MTESP Coordinator		\$ 10,000
Tom Smith, Project Coordinator	\$ 20,000	\$ 10,000
MSU Turf Faculty (Ron Calhoun, Joe Vargas, Kevin Frank) <sup>1</sup>		
<b>Fringe Benefits</b>		
<b>Travel</b>	\$ 8,000	\$2,000
<b>Equipment</b>		
<b>Supplies &amp; Printing</b>	\$ 6,000	
<b>Contract Costs – Consultant &amp; Labor</b>	\$ 26,095	
<b>Other – Soil Testing</b>	\$ 1,000	
<b>Total Direct Costs</b>	\$ 61,095	\$22,000
<b>Indirect Costs (20%)</b>	\$ 12,220	
<b>TOTAL BUDGET</b>	<b>\$ 73,315</b>	<b>\$22,000</b>

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<sup>1</sup> Additional funding of \$40,000 will be available from the MSU-MTESP earmarked research fund for MSU faculty research and extension activities related to this project (e.g., providing initial input on the nutrient and IPM modules and relevant materials, faculty peer review of the completed modules and database,). This is not reflected in the budget, because the exact amount of time needed from each of these faculty has not been determined, but the money has already been approved for use on this project as needed. An additional \$25,500 from this fund is held in reserve and can be used for this project if needed. Faculty funded as part of this match includes Kevin Frank, Ron Calhoun, and Joe Vargas.