UNIVERSITY OF MICHIGAN – ANN ARBOR

SUSTAINABILITY GOAL REPORTING GUIDELINES

GOAL #5

PROTECT HURON RIVER WATER QUALITY BY REDUCING RUNOFF FROM IMPERVIOUS SURFACES AND REDUCING THE VOLUME OF SYNTHETIC LAND MANAGEMENT CHEMICALS USED ON CAMPUS BY 40%

SECTION 1: Introduction

In September of 2011, University of Michigan (U-M) President Mary Sue Coleman announced Sustainability Goals for the University, including one to "Protect Huron River water quality by reducing runoff from impervious surfaces and reducing the volume of synthetic land management chemicals used on campus by 40%."

U-M's *Sustainable Land Management Guidelines* were developed by staff with assistance from the Office of Campus Sustainability. The guidelines were developed to better define sustainable land management practices, as well as to clearly define what materials and practices are to be considered sustainable. The university will seek to use land management materials and practices aligned with these guidelines whenever possible and appropriate.

These guidelines will be shared with all units responsible for managing university property to clearly communicate U-M's preference for sustainable land management methods.

SECTION 2: Defining Sustainable Land Management Practices

In order to reach its goal of protecting the water quality of the Huron River, U-M must implement actions which reduce the use of land management chemicals, encourage more water infiltration, and reduce surface runoff.

Stormwater runoff from urban areas has been identified as a leading cause of pollution of waterways. Pollutants such as organic material, suspended solids, metals, nutrients, bacteria and chemicals such as pesticides and spilled fuels have the ability to adversely affect the health of natural water systems. Additionally, stormwater runoff must be managed properly to prevent flooding and maintain groundwater quality and recharge rates. Continuing and expanding efforts to minimize stormwater runoff and the discharge of pollutants from campus

into the stormwater drainage system and adjacent receiving waters can help the University limit the negative impacts of development and land management.

The application of land management chemicals is costly, poses potential risk to people, and can be detrimental to water quality and wildlife. Furthermore, reducing these chemicals can help build soil health and promote healthy ecosystems. Healthier soils in turn increase the ability of stormwater to infiltrate, avoiding chemicals on the surface being transported to surface water. Thus water quality is protected.

This philosophy of sustainable land management maintains certain principles: biodiversity, ecological balance, sustainability, natural plant fertilization, natural pest management, and soil integrity.

U-M defines sustainable land management practices as:

- Practices which take into consideration the local climate and environment, and require minimum resource inputs.
- Practices which preserve resources, reduce waste and prevent air, water and soil pollution.
- Practices which reduce stormwater runoff as well as pollutants entering water bodies, by limiting or avoiding the creation of new impervious surfaces, (when possible), and increasing the campus's natural ability to infiltrate and/or filter water prior to entering the Huron River or its tributaries.
- Maintenance practices which avoid or minimize the use of chemicals through:
    - Prioritizing less harmful land management chemicals (which for this document refers to all herbicides, fungicides, insecticides and algaecides). Employing the minimum amount and toxicity necessary to discourage pests and invasive, exotic and non-desired plants, and assist ecological restoration and natural areas stewardship.
    - Improving soil and ecosystem health. Prevention is the primary strategy for disease, weed and insect control. By building healthy soils and promoting healthy ecosystems, U-M land will better resist disease and insects.
    - Establishing naturalize areas or buffer areas.
    - Implementing Integrated Pest Management (IPM).
    - Selecting plants well adapted for the climate and site, and encouraging native plants that attract beneficial insects or other wildlife specifics. If the number of defoliating insects becomes undesirable, options like insect predators, mating disruption, traps, and barriers should be prioritized. If necessary, botanical or other non-persistent pest controls should be used under restricted conditions.
    - Irrigation efficiency.
- Ongoing review and evaluation of products and practices to find the most sustainable options suitable to specific sites on campus.

SECTION 3: Land Management Overview

The University of Michigan Ann Arbor campuses occupy 2,997 acres. Of that, 2,350 acres (78%) is green space, and 1,000 acres is maintained campus lawns, golf courses and woodlands managed by a team of departments/units.

Ground Services

As part of Plant Operations, Grounds Services (GS) is responsible for a majority of the green space on campus. Grounds Services includes horticultural, forestry and turf management crews. Staff responsibilities include fertilizing, aerating, and preventing and treating disease on grassed areas, tree care including trimming and disease prevention, and maintaining landscaped beds. Grounds Services also maintains the stormwater basins on campus which minimize the impact of storm events on water quality. Some general efforts to adopt sustainable land management techniques have included managing a composting area, reducing irrigation needs by 60% through increased efficiency, and piloting compost tea as a replacement for synthetic fertilizer.

Athletics

Athletics is responsibility for the ongoing maintenance of landscaped land as well as turf and playing fields. Two golf courses make up a large portion of this acreage, both of which have taken notable steps toward sustainability. Radrick Farms Golf Course is one of only four courses in the state with both Michigan Turfgrass Environmental Stewardship Program (MTESP) and Audubon Cooperative Sanctuary certifications, and is also Clean Stream Certified. The University of Michigan Golf Course is also Clean Stream certified and is currently pursuing MTESP certification.

Recreation Sports

Recreation Sports manages recreation facilities including Elbel, Mitchell and Palmer Fields, as well as a soccer field on north campus, totaling approximately 39 acres of land. Duties include ongoing maintenance of these fields including applying fertilizers and turf-builder, and irrigation of fields. Some general efforts to reduce chemicals and to adopt sustainable land management techniques include maintaining an application-free buffer along the Huron River, and installing an underground storage tank at Elbel Field for stormwater management.

Matthaei Botanical Gardens & Nichols Arboretum

The Matthaei Botanical Gardens and Nichols Arboretum manages 854 acres of gardens, research areas, and natural preserves around the Ann Arbor area, including a public conservatory and five research and production greenhouses. The program collaborates with Project Grow for an organic garden and is working with students to create a central campus farm facility. The program is involved in several on-going and grant funded initiatives including invasive species management, prescribed burns, native plant propagation, erosion control and stormwater management. The program has adopted Integrated Pest Management approaches, reducing pesticide use and promoting sustainable land and greenhouse management techniques.

UPO/OSEH: The University Planner's Office (UPO) and the Occupational Safety and Environmental Health (OSEH) units have collaborated in their efforts to reduce stormwater runoff from campus hardscapes. In addition to a comprehensive Storm Water Management Program Plan, the offices have developed and are promoting Best Management Practices to encourage both structural and non-structural methods of reducing runoff and therefore contamination of waterways.

SECTION 4: Reaching U-M's Sustainability Goal

Goal: Protect Huron River water quality by reducing runoff from impervious surfaces and reducing the volume of synthetic land management chemicals used on campus by 40%.

Some methods to reach this goal are:

1. Stormwater runoff reduction by limiting the effects of urbanization.
2. Reducing frequency and rates of applications.
3. Prioritizing more environmentally friendly options.
4. Reducing maintenance area and levels.

1. Stormwater Runoff Reduction by Limiting the Effects of Urbanization.

Reducing stormwater runoff from U-M's urban campus can in turn reduce pollution of our community's waters. As U-M develops and redevelops areas of campus, the nature, design and location of the development will be planned in such a way to avoid additional contribution to the stormwater system or additional runoff. Innovative structural and nonstructural best management practices (BMP's) can help reduce runoff and improve water quality, and are evaluated on a project specific basis. In addition to evaluating the addition of new impervious surfaces, existing areas for infiltration will be protected and managed in order to increase stormwater infiltration and filtering capabilities. Sensitive areas such as wetlands and riparian areas will be protected during construction, and open space will be maintained and increased when possible.

2. Reducing Frequency and Rates of Application.

Reducing the amount of chemical applied to an area of ground can be achieved by reducing the number and rates of applications, reducing drift, more accurate placement and calibration, supporting soil health, and considering alternative control methods. Encouraging healthy soils reduces the amount of fertilizer and land management chemicals needed for lawn maintenance. Aeration and the addition of compost or compost-tea are methods for increasing soil health.

Modifying application equipment can improve application efficiency and reduce risk to both the operator and the environment. There are a number of technological advances in chemical application equipment design which can improve efficiency and reduce risk including: sprayers with in-line injection systems which eliminate leftover tank mixtures (water and pesticide are in separate tanks), and ultra-low volume (ULV) applications which use electrostatic nozzles. For fertilizers, the use of a drop spreader rather than broadcast spreader can allow for more accurate placement. In natural areas restoration the use of alternative and careful timing can be effective in reducing the amount of herbicides applied and reducing harmful environmental effects. For example, using cut stem applications of herbicide instead of foliar applications to control exotic shrubs reduces chemical drift and residual damage to desired plants.

3. Prioritizing More Environmentally Friendly Options

Chemicals are used to control undesirable plants, diseases or insects and can be a valuable tool. However, the chemicals can find their way to water sources and pollute waterways, having a negative impact on both wildlife and human health. As stewards of the land and natural resources, U-M will continue to use land management chemicals properly, and prioritize less toxic versions in order to minimize environmental risks.

Chemicals vary in their impact on the environment and on nontarget organisms. A chemical's persistence after application is a characteristic that directly affects its ability to move through groundwater and potentially harm organisms inhabiting streams. Chemicals are designated as high- or

low-risk based on the potential impact to: 1) human health 2) nontarget organisms or 3) the environment. Low-risk options are those which use growth regulators, enzymes, hormones, oils, soaps, pheromones, and minerals should be prioritized. The lowest risk chemical necessary to accomplish task should be used, and the need for treatment should be evaluated regularly. In some cases biological controls, which are living organisms, can also be used to help control pests.

Likewise, non-synthetic fertilizers are typically more environmentally friendly and should be prioritized over synthetic options. Excess fertilizer increases nutrient leaching, encourages excess top growth and makes lawn grass more prone to certain diseases. Before applying fertilizer, soil should be tested to determine the optimal amount and type of fertilizer to be applied. Additionally, fertilizer containing phosphorous should not be applied unless the soil is found to be deficient in phosphorous in order to be consistent with the local phosphorus ordinance. Other considerations such as release time and application timing can further protect the health of the Huron River watershed.

Sustainable Materials Criteria

Sustainable Materials (Herbicides, Pesticides, Fungicides, Algaecides and Fertilizers) must meet one of the following criteria:

- Chemical-free, natural or organic. 'Chemical-Free' is meant to mean zero synthetic amendments.
- Be certified through an accredited certifying agent.
- Is deemed sustainable by the Office of Campus Sustainability based on the recommendation of our experts in the field.

Responsibility for verifying, tracking and reporting will fall to the relevant unit responsible for purchasing and sub-sequential use of product.

4. **Reducing Landscape Maintenance Area and Levels, shifting high to low priority, and low-priority sites to Natural Areas Stewardship.**

Evaluate U-M property for potential to reduce high-maintenance landscape and lawn areas by reclassifying zones in the Grounds Maintenance Plan. The reclassification of appropriate zones would reduce the need for mowing and for the application of soil amendments such as land management chemicals and fertilizers. Eliminating traditional landscape maintenance requirements in these zones would save energy, reduce fuel use and emissions and offer the potential to restore natural habitats.

Additionally, woodlots and other natural areas on campus should be evaluated for expansion as these require less fuel and pesticides to maintain than traditional urban landscapes. In the case of lawn areas being shifted to Natural Areas Preservation property, the use of herbicides may still be necessary to encourage desired native species and remove invasive species. "Down-shifting" these zones in concert with implementing stormwater best management practices identified by the UPO and OSEH can improve Huron River water quality.

In most cases, land management chemicals are used for aesthetic purposes, and as such, the reduction of both maintenance areas and intensity of chemical applications will require a shift in the expectations of the campus community. As the university evolves its practices toward sustainability, there must be a

parallel effort to increase environmental education highlighting the ecological, health and economic benefits of reducing chemical applications.

SECTION 5: Data Tracking and Goal Reporting

The portion of the sustainability goal referring to runoff reduction is not intended to be measured against a set baseline. The University of Michigan has a comprehensive Stormwater Management Program Plan (SWMPP) in place, as required by the University's DEQ issued stormwater NPDES permit. Both the NPDES permit and the SWMPP are administered by the UM OSEH Environmental Protection and Permitting Program (EP3) area. This portion of the goal is to be met through adherence to the SWMPP and NPDES permit requirements. The status of compliance with the storm water management program is documented through NPDEQ required reporting prepared by the EP3 office. These reports are available on-line at: http://www.oseh.umich.edu/environment/reports.shtml.

Unlike the other Sustainability Goals for U-M which are tracked by fiscal year, land management chemicals will be tracked by calendar year. This difference is appropriate for a number of reasons. First, each department with grounds maintenance responsibilities plans operations and tracks data by calendar year. Additionally, new products and methods are tried and assessed by calendar year. Keeping the resulting data in one calendar year rather than splitting across fiscal years allows for clearer consideration of variables such as weather and season use, and enables straightforward measuring of results. Finally, each chemical product includes a limit on how much can be applied per year, so tracking amount used by calendar year more closely aligns with industry standards for monitoring and ensuring applications are kept within the recommended range.

Land management chemicals are defined as the active ingredient portion of all herbicide, insecticide, fungicide, algaecide, and fertilizers applied during grounds maintenance activities associated with the departments as described in section 3. Data will be collected annually following final autumn application. The 2006 baseline for this 2025 goal is 45,950 pounds. The target for this goal is a 40% reduction of the 2006 baseline. To achieve this goal U-M must reduce chemical applications to 27,600 pounds/year. Data will be stored and reported through the University of Michigan Annual Sustainability Report and will be available to the public via the Office of Campus Sustainability web site: http://sustainability.umich.edu/ocs/goals/water.

SECTION 6: Land Management Team

The Land Management Team is composed of staff from key units at U-M. This group will annually review these sustainability criteria and definitions, revise them as necessary, and make them publicly available. The team will also work with the Office of Campus Sustainability to track performance and report progress with regard to annual land use management practices that meet the sustainable land management criteria. At the time of writing, U-M Land Management Team Members include:

Tony Cachot, Architecture, Engineering and Construction
Marvin Pettway, Plant Building and Grounds Services
Rob Doletsky, Plant Building and Grounds Services
Kenn Rapp, Office of University Landscape Architecture

Jeff Plakke, Matthaei Botanical Gardens and Nichols Arboretum
Scott Rockov, Athletics, U-M Golf Course & S. Campus Soccer
Tony Pell, Athletics, Baseball, Softball, Track, Football Practice fields
Corbin Todd, Athletics, Radrick Farms
Dan Mausolf, Athletics, Radrick Farms
Jason Miller, Rec Sports
Anya Dale, Office of Campus Sustainability