



# Recommended Best Management Practices for Nutrients (Includes Phosphorus, Nitrogen, & Ammonia)

## Total Maximum Daily Load Fact Sheet

### **About Nutrients**

Nutrients like phosphorus, nitrogen, and ammonia are needed by all plants and animals, but excessive amounts of nutrients in our water harm ecosystems, economies, and community health.

In Ohio, nutrient pollution causes many problems such as:

- Harmful algal blooms in Lake Erie and inland lakes
- Public health warnings to avoid swimming
- Widespread nuisance growths of aquatic vegetation
- Increased water treatment costs for clean public water supplies
- Changes in aquatic ecosystems and declining fisheries
- Renewed concern over the increased size of anoxic areas or “dead zones” in Lake Erie
- Fewer dollars being spent on water based recreation and tourism

Approximately 48% of Ohio's watersheds are degraded by nutrient loading.

### **Sources of Nutrients**

Excessive nutrients wash into waterbodies and are often the direct result of human activities. The primary sources of nutrient pollution are:

- **Agriculture**  
Animal manure, over-application of fertilizer, and soil erosion are some of the largest sources of nitrogen, phosphorus, and ammonia pollution in the country.
- **Storm Water**  
Storm water is precipitation from rain or snowmelt that flows over the ground. Impervious surfaces like driveways, roofs, sidewalks and streets prevent storm water from soaking into the ground where it is filtered and cleaned naturally. Instead, storm water flows over impervious surfaces, picks up pollutants like phosphorus, nitrogen, or ammonia and carries them into a storm sewer system or directly to a lake, stream, river, wetland, or other waterway. Anything that enters a storm sewer system flows untreated into waterbodies that may be used for swimming, fishing and drinking water. Nutrients in storm water comes from many sources like pet waste, lawn fertilizers, failing home sewage treatment systems, combined sewer overflows, and construction activities.

- **Wastewater**

Properly designed, operated, and maintained sanitary sewer systems are meant to collect and transport all of the sewage that flows into a publicly owned treatment works (POTW) facility. However, occasional unintentional discharges of raw sewage from municipal sanitary sewers occur in almost every system. These types of discharges are called sanitary sewer overflows (SSOs). SSOs have a variety of causes, including but not limited to blockages, line breaks, sewer defects that allow storm water and groundwater to overload the system, lapses in sewer system operation and maintenance, power failures, inadequate sewer design, etc. Our sewer and septic systems are responsible for treating large quantities of waste, and these systems do not always operate properly or remove enough nutrients before discharging into waterways.

**Best Management Practices that Address Nutrient TMDLs**

The following summarizes BMPs your community will be required to include in your revised Storm Water Management Program (SWMP) to meet the minimum performance standards of NPDES Permit #OHQ000003, and suggests means by which a community can tailor their SWMP to specifically address nutrient TMDLs.

**MCM 1: Public Education and Outreach BMPs**

Your program must reach at least 50% of your population. To do so, your community is required to implement more than one mechanism and target at least five different storm water themes or messages over the permit term, at least one of which must be targeted to the development community.

<b>To address nutrients, choose at least one of the following themes:</b>
<ul style="list-style-type: none"><li>• Protection and maintenance of natural vegetative buffers along waterways</li><li>• Management of manure and pet wastes</li><li>• Reduction and management of residential and agricultural fertilizers</li><li>• Reduction of soil erosion on residential and agricultural land uses</li><li>• Reduction of impervious surfaces and increase on-site infiltration</li><li>• Composting and management of grass clippings and yard wastes</li><li>• Operation &amp; Maintenance of on-site sewage treatment systems</li><li>• Construction site erosion and sediment control practices</li><li>• Pond maintenance education (e.g., manage waterfowl, install aerators, maintain vegetative buffers, etc.)</li></ul>

**MCM 2: Public Participation and Involvement**

Your program shall include a minimum of five public involvement activities over the permit term.

<b>To address nutrients, implement at least one of the following activities:</b>
<ul style="list-style-type: none"><li>• Streamside plantings and cleanups</li><li>• Have residents pledge to a “no-fertilizer” lawn program</li><li>• Construct a rain garden with assistance from the public</li><li>• “Green” workshops where residents make environmentally-friendly lawn care and cleaning supplies</li></ul>

### **MCM 3: Illicit Discharge Detection and Elimination (IDDE)**

*All communities should have an applicable IDDE code in place and have developed an MS4 map, as required by previous generations of the MS4 permit.*

<b>Required BMPs that directly address nutrients:</b>
<ul style="list-style-type: none"><li>• Maintain and continue updating the MS4 map on an annual basis (i.e., outfalls, names and locations of surface waters that receive discharges from those outfalls, catch basins, pipes, ditches, flood control facilities (retention/detention ponds), post-construction water quality BMPs and private post-construction water quality BMPs which have been installed to satisfy Ohio EPA's NPDES Construction Storm Water general permit and/or your local storm water management code requirements)</li></ul>
<ul style="list-style-type: none"><li>• Develop and maintain a list and map of Sewage Treatment Systems (STS)<sup>1</sup> that discharge to your MS4; work with the local health department to identify and prioritize solutions to failing</li></ul>
<ul style="list-style-type: none"><li>• Based upon data collected from previous screenings, establish a prioritization schedule for ongoing dry-weather screening of outfalls</li></ul>
<ul style="list-style-type: none"><li>• Develop an IDDE plan that clearly defines the department(s) and/or agency(s) responsible for investigating and resolving confirmed sources of illicit discharges</li></ul>
<ul style="list-style-type: none"><li>• Develop an enforcement escalation plan that outlines how your community will address illicit discharges<ul style="list-style-type: none"><li>○ Clearly define escalation enforcement roles between affected agencies</li><li>○ Work with local health department to identify and eliminate failing sewage treatment systems</li><li>○ Establish timeframes for investigation and elimination</li></ul></li></ul>
<ul style="list-style-type: none"><li>• Document in the SWMP how community emergency spill response and cleanup plans are communicated and coordinated between applicable agencies and/or departments</li></ul>
<ul style="list-style-type: none"><li>• Train street, service, public works, building, and parks and recreation staff to identify sources of illicit discharge</li></ul>
<b>BMPs that will enhance your community's ability to address nutrients:</b>
<ul style="list-style-type: none"><li>• Establish an IDDE surveillance plan focused on sources of nutrients such as:<ul style="list-style-type: none"><li>○ Sewage treatment systems</li><li>○ Cross-connections and infiltration &amp; inflow (I/I)</li><li>○ Animal waste (agricultural and pet)</li><li>○ Grass clippings and yard waste</li></ul></li></ul>
<ul style="list-style-type: none"><li>• Ensure that your IDDE surveillance program includes commitments to perform annual dry-weather screening in areas where at least one previous test indicated elevated bacteria levels</li></ul>
<ul style="list-style-type: none"><li>• Perform at least one screening of all outfalls per permit term</li></ul>
<ul style="list-style-type: none"><li>• Establish a schedule for regular meetings or other communications between third-party service providers (e.g., health department, SWCD, etc.) and the MS4 manager</li></ul>

### **MCM 4: Construction Site Runoff**

*All communities should have an applicable construction runoff control code in place as required by previous generations of the MS4 permit.*

<sup>1</sup> STS also includes home sewage treatment systems (HSTS) as referenced by the MS4 NPDES OHQ000003.

<b>Required BMPs that directly address nutrients:</b>
<ul style="list-style-type: none"> <li>• Update your existing construction runoff control code to meet or exceed the requirements of the NPDES Construction General Permit (OHC000004), including the federal effluent limitations in Part II</li> </ul>
<ul style="list-style-type: none"> <li>• Ensure most current erosion, sediment and non-sediment control BMP standards are required to be utilized (e.g., Rainwater &amp; Land Development)</li> </ul>
<ul style="list-style-type: none"> <li>• Complete Storm Water Pollution Prevention Plan (SWP3) reviews and approvals prior to construction commencement</li> </ul>
<ul style="list-style-type: none"> <li>• Conduct monthly site inspections throughout construction, as well as a final site inspection to ensure correct implementation of erosion, sediment and non-sediment control BMPs in the approved SWP3</li> </ul>
<ul style="list-style-type: none"> <li>• Develop an enforcement escalation plan that outlines how and when your community will address noncompliance with approved erosion, sediment and non-sediment control plans</li> </ul>
<ul style="list-style-type: none"> <li>• Establish a standard operating procedure to respond to complaints</li> </ul>
<b>BMPs that will enhance your community's ability to address nutrients:</b>
<ul style="list-style-type: none"> <li>• Include the following in your code: <ul style="list-style-type: none"> <li>○ Require on-site protected areas (i.e., wetlands, riparian areas, other valuable resources) to be physically marked in the field prior to commencement of earth disturbing activities</li> <li>○ Require 50-ft natural vegetative buffers to be maintained between the limits of disturbance and water resources</li> <li>○ Maintain wetlands in their natural states wherever feasible</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• Ensure portable toilets are maintained and emptied without spills</li> </ul>
<ul style="list-style-type: none"> <li>• Ensure proper storage of landscape materials on construction sites</li> </ul>
<ul style="list-style-type: none"> <li>• Require MS4 compliance inspectors to provide a written report of findings to construction site operators for every site inspection; the report would summarize compliance and non-compliance matters</li> </ul>
<ul style="list-style-type: none"> <li>• Establish a Sediment and Erosion Control bond equivalent to the cost to stabilize (vegetate) disturbed areas of the sites in cases of nonperformance (i.e. developer foreclosure/bankruptcy)</li> </ul>

## **MCM 5: Post-Construction Runoff Control**

*All communities should have an applicable storm water management code in place as required by previous generations of the MS4 permit.*

<b>Required BMPs that directly address nutrients:</b>
<ul style="list-style-type: none"> <li>• Update your existing storm water management code to meet or exceed the requirements of NPDES OHC000004, including the federal effluent limitations in Part II</li> </ul>
<ul style="list-style-type: none"> <li>• Ensure most-current post-construction BMP standards are required to be utilized (e.g., Rainwater &amp; Land Development)</li> </ul>
<ul style="list-style-type: none"> <li>• Complete Storm Water Pollution Prevention Plan (SWP3) reviews and approvals prior to construction commencement <ul style="list-style-type: none"> <li>○ Ensure SWP3 includes an executed Maintenance Agreement and Long-Term Maintenance Plan for post-construction BMPs</li> <li>○ Review 100% of SWP3s where the larger common plan of development/sale disturbs one or more acres</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• Conduct monthly site inspections throughout construction, as well as a final site inspection to ensure correct implementation of post-construction BMPs in the approved SWP3</li> </ul>
<ul style="list-style-type: none"> <li>• Establish a program to ensure long-term maintenance of post-construction BMPs including a protocol for enforcement escalation of your storm water management codes</li> </ul>
<ul style="list-style-type: none"> <li>• Prior to commencing earth disturbing activities, ensure 100% of applicable sites have a fully</li> </ul>

executed Maintenance Agreement for the site, including an approved Maintenance Plan for each post-construction BMP
<b>BMPs that will enhance your community's ability to address nutrients:</b>
<ul style="list-style-type: none"> <li>• Update the design specification for bioretention to require internal water storage whenever feasible for additional nitrogen treatment (as recommended by ODNR's Rainwater Manual).</li> </ul>
<ul style="list-style-type: none"> <li>• Include at least one of the following in your storm water management code: <ul style="list-style-type: none"> <li>○ Require on-site protected areas (i.e., wetlands, riparian areas, other valuable resources) to be physically marked in the field prior to commencement of earth disturbing activities</li> <li>○ Prioritize and incentivize the following types of post-construction BMPs: <ul style="list-style-type: none"> <li>▪ Infiltration basins and trenches</li> <li>▪ Dry extended detention basins</li> <li>▪ Bioretention with internal water storage</li> <li>▪ Constructed wetlands</li> <li>▪ Permeable pavement with internal water storage</li> </ul> </li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• Require MS4 compliance inspectors to provide a written report of findings to construction site operators for every site inspection; the report would summarize compliance and non-compliance matters and establish a deadline for corrective action</li> </ul>
<ul style="list-style-type: none"> <li>• Establish a performance bond for post-construction BMPs and require community Engineer (or Engineering Department) to generate documentation of acceptance before releasing bond</li> </ul>
<ul style="list-style-type: none"> <li>• Require submittal of as-built drawings for post-construction BMPs to ensure installation and/or conduct a physical inspection of BMPs at least once during the NPDES permit term</li> </ul>
<ul style="list-style-type: none"> <li>• Adopt at least one of the following planning and development codes: <ul style="list-style-type: none"> <li>○ Conservation development</li> <li>○ Riparian and wetland setbacks</li> <li>○ Downspout disconnections (redirect flow to rain gardens, rain barrel systems, and/or filter strips)</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• Incentivize the following within existing developed areas: <ul style="list-style-type: none"> <li>○ Retrofitting of storm water management control systems to increase infiltration and to function as constructed wetlands</li> <li>○ Encourage commercial, industrial and institutional land owners to reduce impervious surfaces and replace them with storm water practices that infiltrate, capture and reuse, or otherwise reduce storm water runoff such as permeable pavement, cisterns, infiltration basins and trenches, bioretention with internal water storage, etc.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• Allow or require vegetative practices (taller native grasses, etc.) around storm water management ponds that discourage waterfowl</li> </ul>
<ul style="list-style-type: none"> <li>• Require an applicable community department (e.g., service, engineering) to annually inspect public and private post-construction BMPs, or require private property owners to submit an annual maintenance report. Ensure corrective actions are performed as needed by the applicable party.</li> </ul>

**MCM 6: Pollution Prevention/Good Housekeeping**

*As required by previous generations of the MS4 permit, all applicable community-operated facilities should have an SWPPP developed in accordance with the requirements of Ohio EPA's Industrial Storm Water General Permit.*

<b>Required BMPs that directly address nutrients:</b>
<ul style="list-style-type: none"> <li>• Update and implement facility SWPPPs to reflect minimum requirements of the Ohio EPA General NPDES Permit for Storm Water Associated with Industrial Activities (OHR000005) <ul style="list-style-type: none"> <li>○ Perform inspection requirements <ul style="list-style-type: none"> <li>▪ quarterly routine facility inspections, quarterly visual assessment of storm water</li> </ul> </li> </ul> </li> </ul>

discharges, and an annual comprehensive site inspection with annual report
<ul style="list-style-type: none"> <li>○ Complete an annual training for applicable employees on any combination of the topics listed below</li> </ul>
<ul style="list-style-type: none"> <li>● Your community is required to implement Pollution Prevention &amp; Good Housekeeping practices at the following municipally-operated facilities: <ul style="list-style-type: none"> <li>○ Streets, roads and highways</li> <li>○ Municipal parking lots</li> <li>○ Maintenance and storage yards, including, but not limited to, municipal composting facilities and leaf collection yards</li> <li>○ Golf courses, parks, and related maintenance facilities</li> <li>○ Waste transfer stations, compost facilities, solid waste facilities (e.g. municipal solid waste (MSW) landfills, and construction and demolition (C&amp;D) landfills)</li> <li>○ Marinas</li> <li>○ Fleet and/or maintenance shops</li> <li>○ Salt/sand storage locations</li> <li>○ Snow disposal areas</li> </ul> </li> </ul>
<b>BMPs that will enhance your community's ability to address nutrients:</b>
<ul style="list-style-type: none"> <li>● Programs which can be implemented to address nutrients from the above sources include: <ul style="list-style-type: none"> <li>○ Street and parking lot sweeping</li> <li>○ Catch basin cleaning</li> <li>○ Ditch cleaning or trash collection program for open channel MS4s</li> <li>○ Timely stabilization of disturbed soils and soil stockpiles at the service yard, landfills and on municipal construction activity</li> <li>○ BMPs for fertilizer storage and application, reduction of overall fertilizer use</li> <li>○ Establish wash stations directed to sanitary sewers or utilize dry cleanup methods for lawn care equipment, golf carts, and other community vehicles and equipment used in parks and golf course maintenance</li> <li>○ Locate snow disposal areas where there are wide vegetative buffers or within berms</li> <li>○ Integrated Pest Management (IPM) and reduction of fertilizer use</li> <li>○ Implement low-mow or no-mow practices that preserve buffer areas around streams, wetlands and storm water basins</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>● At community-owned and operated facilities (maintenance garages, golf courses, parks, community gardens, cemeteries, etc.) maintain, protect and restore permanent natural vegetative buffers between developed areas and water resources</li> </ul>
<ul style="list-style-type: none"> <li>● Relocate stockpiles of waste materials and erodible materials away from stream banks and steep slopes</li> </ul>
<ul style="list-style-type: none"> <li>● Establish "pick-up pet waste" stations in community parks and open space</li> </ul>
<ul style="list-style-type: none"> <li>● Identify locations where green infrastructure such as bioretention, permeable pavement, cisterns, and infiltration trenches or basins can be installed at municipal facilities</li> </ul>
<ul style="list-style-type: none"> <li>● Implement a road-kill program and properly store collected carcasses or take to a compost facility licensed to accept road-kill</li> </ul>