

U-7 ADVANCED MS₄ NUTRIENT DISCOVERY PROGRAM CREDIT

Note: The Advanced MS₄ Nutrient Discovery Program credit was developed as a temporary option that could not be reported after 2017. The Urban Stormwater Workgroup may choose to extend the Advanced Program credit beyond 2017 or to fully transition to the Individual Discharge Elimination Credit (See Fact Sheet U-6) in January 2018.

PRACTICE AT A GLANCE

- Dry weather nutrient discharges can collectively account for as much as 20 to 40% of the annual nutrient load in urban watersheds, depending on the age and condition of their grey infrastructure.
- More than a thousand Bay communities are already required to have an Illicit Discharge Detection and Elimination (IDDE) program, which can be used to find the dirty discharges.
- Watershed groups and citizens can be enlisted to help find these discharges and reduce nutrients and sewage in local waters.
- The advanced program credit is available immediately to Bay communities that go above and beyond the minimum MS₄ permit requirements for IDDE.
- The advanced program credit extends up to 5 years, at which time the community is encouraged to report load reductions based on the elimination of individual nutrient discharges (Fact Sheet U-6).

PRACTICE DESCRIPTION

"Nutrient Discharges" refers to a complex mix of non-stormwater flows that deliver nutrients and other pollutants from grey infrastructure into urban waters during dry weather conditions. These discharges are created by the interaction of aging grey infrastructure (sanitary sewers, drinking water pipes and storm drains) with stormwater runoff and groundwater.

Most communities in the Bay watershed maintain thousands of miles of pipes to move drinking water, sewage and stormwater runoff. Many segments of this network of urban infrastructure are prone to leaks, spills, and overflows. Under certain conditions, they can produce high nutrient discharges to local streams and are responsible for high nitrogen loads observed in urban watersheds.

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Communities that invest in strategic upgrades to reduce or eliminate nutrient discharges from their infrastructure are eligible for nutrient reduction credits toward meeting the Chesapeake Bay Pollution Diet.

The **Advanced MS4 Nutrient Discovery Program Credit** is available to localities that shift to a more nutrient-targeted approach to upgrading their grey infrastructure. This involves shifting their local IDDE programs away from traditional visual outfall screening methods required in the past.

To be eligible for the “advanced program credit”, communities must go above and beyond the minimum MS4 permit requirements for an IDDE program. Communities must:

1. Analyze dry weather stream monitoring data to prioritize catchments and/or sewersheds with the highest risk for nutrient and bacteria discharge for targeted investigation
2. Identify the number of outfalls located in the priority catchments/sewersheds
3. Subject outfalls in priority catchments/sewersheds to nutrient testing, using the Flow Chart Method (Brown et al 2004) or equivalent
4. Test outfalls of ALL pipe diameters
5. Conduct annual nutrient testing on at least 10% of flowing outfalls
6. Track suspect illicit discharges back to their source in the storm drain network
7. Record and report the number and type of illicit discharges that are discovered and eliminated each year



In addition, localities must conduct **at least two** of the following activities to be eligible to receive credit:

1. Conduct GIS assessments of their storm and sanitary sewer network to identify segments at high risk for cross-connections or exfiltration
2. Use dry weather stream monitoring to prioritize the stream segments with the highest nutrient and bacteria levels for further investigation
3. Employ video inspections, dye testing or other recommended methods to search for sewer leaks in problem storm drain systems

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4. Implement targeted inspection and outreach to businesses or industrial sites that have a high risk for illicit discharges or sewer clogging (e.g. restaurants, car rental agencies, etc.)
5. Conduct a detailed field assessment of the sewer network to identify segments with high risk of nutrient discharge due to exfiltration and/or dry weather overflows (i.e., sewer modeling and metering tools)

Fixing leaky infrastructure can reduce the sewage and other pollutants reaching the storm drains or urban streams. This can help to:

- Keep toxics and harmful bacteria out of our local waterways
- Improve public health and safety
- Improve stream habitat and aquatic life
- Inform and engage the public in pollution sources
- Incentivize the systematic restoration of leaky infrastructure

TIPS FOR GETTING STARTED IN YOUR COMMUNITY



Don't reinvent the wheel! Learn from other local governments who already have robust IDDE programs, and borrow their tips and techniques to find and fix illicit discharges. The IDDE Manual in the Resource section is another great place to start, especially if you are just beginning to set up your program.

Map your storm sewer system! Developing a map of your storm drains is one of the basic IDDE program requirements under the MS4 permits. That said, the requirement only applies to outfalls greater than 36 inches in diameter. Communities with effective IDDE programs have learned that mapping the locations of

ALL outfalls, including where the storm drain and sanitary systems cross each other (often a good opportunity for cross contamination) is extremely valuable. Identifying potential discharge generating land uses is another helpful technique for finding potential illicit discharges.

Walk your streams! Getting into the stream and walking its extent is a sure-fire way to get those outfalls mapped. It is also a good opportunity to assess and discover any potential discharge problems.

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Volunteers work with watershed group staff to screen outfalls in Baltimore City, MD

Partner with local watershed groups! It's a great way to engage the public and outsource some of the requirements associated with an advanced program. Volunteers can be the eyes and ears of the local government when it comes to illicit discharges. They can contribute by walking the stream with staff, learning what to look for, helping to locate stormwater outfalls (of all sizes), and collecting water quality samples. Some municipalities may opt to partner with watershed groups and other non-profits to outsource their sampling requirements as long as volunteers are trained in the appropriate methods of water quality monitoring.

But it doesn't stop with stream walks and outfall screening. In fact, one of the best ways to involve the public is to set-up a citizen hotline to report stream pollution, ongoing spills, dumping and sewage overflows.

WHAT DEGREE OF TECHNICAL SUPPORT IS NEEDED

Given the high nutrient levels detected in dry weather flow, there is a need for more widespread use of nutrient-based indicators for outfall screening. This may require more intensive training and outreach for local government staff, more refined outfall monitoring protocols and upgrades to technology and sampling equipment. Guidance on how to do the field and desktop work to find illicit discharges are provided in the Resources section.

TECHNIQUES TO FIND ILLICIT DISCHARGES

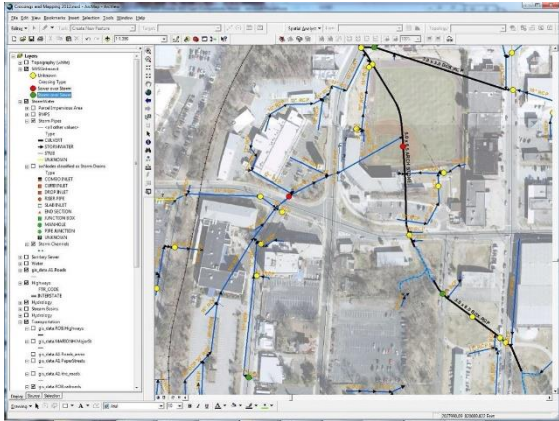
Outfall screening is effective for finding suspect outfalls and sewer pipes, but much more sleuthing is often required to track down and find the specific nutrient discharge location. This process is often the most difficult and costly part of discharge investigations.

Many new methods have been tested in the last decade to discover nutrient discharges from the storm drain and sewer network. Some methods are summarized in Table 1, but more detailed guidance can be found in the Resource section.

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Table 1. Methods to Discover Major Nutrient Discharges

GIS Risk Analysis



Mapping locations where sanitary and storm sewer lines cross to target areas where discharges could occur.

Visual Inspection and Outfall Screening



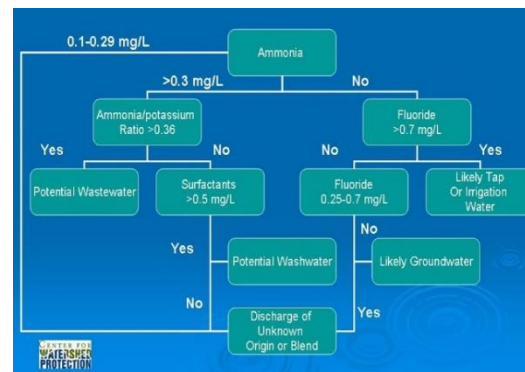
Visual inspections are used to look for any signs of flow discharges in storm drain manholes or outfalls. If found, samples are taken to measure flow, color, odor, oils, floatables and water quality parameters.

Stream Walks



Walk streams in the watershed to inventory all outfalls in the MS4, visually assess and collect samples to identify possible high nutrient discharges.

Flow Chart Method to Sample Suspect Outfalls



A relatively simple method uses indicator parameters to help fingerprint specific discharge types.

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COMPUTING THE ADVANCED PROGRAM CREDIT

The advanced program credit provides incentives for communities to re-focus their existing IDDE and SSO abatement programs toward greater nutrient reductions.

The program credit is only available to localities that go above and beyond the minimum requirements set forth under their MS4 permit and/or SSO consent decree and needs to be technically supported by program metric data.

The annual credit is equivalent to a maximum of 1% of the dry weather nutrient load within the jurisdiction, which in turn, is defined as 20% of the total annual N and P load discharged from the urban pervious land in which advanced nutrient discovery programs are targeted. This translates into a 0.2% reduction in the annual nutrient load discharged from urban pervious land targeted by an advanced program.

In order to calculate the actual reduction for an advanced nutrient discovery program, a community would follow 3 steps:

Step 1: Determine the unit area nutrient load for pervious land in their jurisdiction (using CAST or other state-approved model) and multiply by 0.20.

Step 2: Multiply the unit loads by the qualifying acres of pervious land within the catchments that are being targeted by the advanced program.

Step 3: Multiply these loads by the 0.01 to determine final nutrient reduction credit for the program.

The program credit is not additive, though a MS4 can increase the acreage subject to targeted nutrient discharge investigations from year to year.

HOW TO REPORT THE PRACTICE TO THE STATE

Localities should check with their state stormwater agency on what data to report to obtain the credit. It is recommended that the following data be reported:

- Pervious acres and locations of catchments and/or sewersheds treated by the program
- Calculation of the dry weather nutrient load for the urban pervious land
- Justification that the local program meets the eligibility criteria for the credit
- Year in which the nutrient credit is first earned

WHAT IS REQUIRED TO VERIFY THE PRACTICE OVER TIME

The locality must certify the pervious acres subject to the credit in its annual MS4 permit report and provide documentation that clearly shows how they meet the qualifying program conditions. This should include a map showing the locations of the specific problem catchments and/or sewersheds being targeted for investigation. In addition, the state

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agency may require a locality to provide additional supporting data before granting the credit.

The program credit extends for up to 5 years and cannot be renewed.

RESOURCES

The following resources are available to help you implement the practice:

Type of Resource	Title of Resource	Web link
Expert Panel Report	Recommendations of the Expert Panel to Define Removal Rates for the Elimination of Discovered Nutrient Discharges from Grey Infrastructure (2014)	http://chesapeakestormwater.net/wp-content/uploads/dlm_uploads/2014/11/GREY-INFRASTRUCTURE-Expert-Panel-Report_FINAL_LONG.pdf
Archived webcast on Practice Accounting	Crediting Nutrient Discharges from Grey Infrastructure Webcast (2015)	http://chesapeakestormwater.net/events/nutrient-discharges-from-grey-infrastructure/
Archived webcast on Practice Techniques	Discharge Discovery Techniques (2015)	http://chesapeakestormwater.net/events/webcast-discharge-discovery-techniques/
IDDE Manual	Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments (2004)	http://chesapeakestormwater.net/wp-content/uploads/downloads/2012/06/final_idde_manual.pdf
Additional Training Module(s) on the Illicit Discharge Detection and Elimination	Illicit Discharge Detection and Elimination: Technical Appendices (2004)	http://chesapeakestormwater.net/wp-content/uploads/dlm_uploads/2015/02/IDDE - Technical-Appendices.pdf
	Multiple resources	http://chesapeakestormwater.net/training-library/urban-restoration-techniques/illicit-discharge-prevention/