

Catalog of Nutrient Reduction Practices For North Carolina



Rainwater Harvesting Practice - Raleigh

Developed by the N.C. Division of Water Resources
Nonpoint Source Planning Branch

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Chapter 1: Introduction

1.1 Overview

North Carolina's nutrient management strategy (NMS) rules require nutrient loading reductions from various sectors. Each strategy establishes reduction goals, and those goals provide the foundation for watershed-specific nutrient reduction regulations governing these sectors. The ultimate purpose of these strategies is to restore targeted waterbodies, eliminating nutrient-driven impairments.

To support implementation under the rules, the Division of Water Resources, with significant support from other agencies and organizations, has developed this Catalog of Nutrient Reduction Practices. The purpose of this catalog is to provide a single, comprehensive listing of all currently approved nutrient practices, along with referencing to the applicable information sources for design standards and nutrient reduction credit accounting.

The Catalog is intended to provide a single reference for regulated parties and nutrient market participants considering their options for nutrient reductions under North Carolina's nutrient strategy rules. These options are referred to throughout this document as "nutrient reduction practices," or simply "practices." The Catalog also provides basic guidance and references to resources that can be used to assist with selecting the most suitable practice as well as a template and instructions for the approval of new practice types.

1.2 What is a "Nutrient Credit"?

While the specific term "nutrient credit" is not defined in North Carolina regulation, its use throughout this guidance reflects the common meaning of a DWR-recognized nutrient load reduction value assignment for a given practice; more specifically, the average annual total nitrogen or total phosphorus mass export reduction value estimated for a practice to a receiving waterbody or stormwater conveyance. Wherever the context in this document is credit produced for use in trading, the more specific phrase "nutrient offset credit" may be used. Unlike the meaning of nutrient credit, definitions and uses of nutrient offset credits are established in rule, specifically the *Nutrient Offset Credit Trading Rule* (15A NCAC 02B .0703) and *Nutrient Strategy Definitions Rule* (15A NCAC 02B .0701). For the purposes of both this Catalog and rule 2B .0703, nutrient reductions are calculated for an average annual basis, and it is understood there will be variability in actual nutrient reduction between years and between installations of the same type of practice. It is an abstract accounting of a real-life process. The nutrient reduction practice design specifications referenced in this Catalog are intended to produce on-the-ground reductions that vary as little as possible in effectiveness from their presumptive values while still being practicable to implement in heterogeneous settings and conditions.

1.3 Types of Nutrient Credit

As suggested above, nutrient credits can be divided into **tradable (nutrient offset credits) and non-tradable** forms. As specified in **Table 1** below, some practices are suitable for producing either form, depending on the procedures followed around their implementation. As noted above, the requirements

for establishing tradable credits are spelled out in the *Nutrient Offset Credit Trading* rule. Non-tradable credits are those used for directly meeting rule requirements by a regulated entity. Where they are discussed in this Catalog, non-tradable credits are referred to as such, or as “direct compliance credit”, or as “non-tradable nutrient reductions”. Non-tradable credit projects have one or more of qualifying conditions, design features, installation constraints, approval, reporting, credit release, operations, or maintenance specifics that make them unsuitable for trading.

Nutrient credits are also specified as “**permanent**” or “**term**” (**time-limited**) in nature, with associated requirements. For tradable credits, requirements associated with each duration are set out in the *Nutrient Offset* rule, as discussed below. For non-tradable credits, permanent or term credit duration varies by source rule requirements and by the nature of the individual practice as stipulated in practice specifications. The *New Development Stormwater* rules are currently the only strategy rule type requiring practices to provide permanent reductions. Other strategy rules provide latitude for permanent or term reductions. Certain practices by their nature are limited to producing term reductions, as identified in **Table 1**. A unique type of annually credited practice, provided for in *Appendix III, Nutrient Credit for Unique Practice Installations*, is innovative practices that lack sufficient research for presumptive credit, which may be monitored for annual, retrospective credit. The nature of this option limits its use to parties under the *Existing Development* rule.

1.3.1 Permanent Nutrient Offset Credit

A "Permanent Nutrient Offset Credit" is defined in rule 2B .0701 as:

“a nutrient load reduction credit that does not automatically expire. Permanent nutrient offset credits account for permanent nutrient load reductions resulting from permanently installed and maintained nutrient reduction practices. Permanent nutrient offset credits may be used for compliance with new development stormwater rules and may also satisfy other nutrient load reduction requirements as described in .0703. Nutrient offset credits are expressed in pounds of total nitrogen or total phosphorus per year.”

Permanent credit calculation methods have gone through an approval process to determine adequacy of scientific research to predict performance of comparable practices and situations. DWR has enough confidence in the calculation method to accept it as a prospective or predictive calculation of year-to-year nutrient reduction. The practice is designed to a standard where DWR expects long-term, essentially permanent, nutrient reduction provided at that estimated annual amount. Permanent nutrient offset credit projects must follow requirements set forth in .0703 and require inspection by DWR for suitability of the site prior to starting work.

1.3.2 Term Nutrient Offset Credit

A "Term Nutrient Offset Credit" is defined in rule 2B .0701 as:

“a nutrient load reduction credit that accounts for annual nutrient load for a finite period of time. Temporary nutrient offset credits are expressed in pounds of total nitrogen or total phosphorus.”

Term credit calculation methods have gone through a similar process of evaluation to permanent credits, and DWR accepts these methods for prospective, presumptive calculation of year-to-year nutrient reduction. However, unlike a permanent credit, these are considered “temporary” because of

the time-limited design, management, or performance of the practice. Many term credits may be renewed through re-inspection, rehabilitation, or other refreshment of practice function. Term nutrient offset credit practices must follow requirements set forth in .0703 and require inspection by DWR for suitability of the site prior to starting work.

1.4 Nutrient Practice Options

Generally, nutrient strategy rules each identify an information source for the practices that may be used to satisfy their requirements, and either the rule or the referenced source describes procedures associated with implementing those practices and methods for quantifying presumptive nutrient reductions assigned to installations of a practice type. **Table 1** provides a summary listing of all currently approved practices available under the range of nutrient strategy rules, and respective sources for design specifications and nutrient crediting. This list can be expected to continue expanding with time. DWR intends to add practices as resources permit, and will update the Catalog periodically to reflect new additions. The process for approving practices for nutrient credit is outlined in *Appendix II*. An approval process specific to SCMs is set out in DEMLR's Stormwater Design Manual, Part F, Guidance for New Stormwater Technologies. Additional information on the SCM approval process, including pending revisions to it, is provided in Section 2.2.2 below. The requirements associated with establishing a new practice are sufficiently involved and protracted that parties planning rule compliance in the near term are advised to work from the currently approved set. Parties subject to the *Existing Development Stormwater* rule have an additional potential option, for experimental practice installations, to monitor the practice for annual, retroactive credit. *Appendix III* outlines the process for approving the use of such innovative practices.

1.5 Regulations Supported

This Catalog serves as a reference compendium of nutrient practices used across all of North Carolina's nutrient strategy rules. **Table 1** provides a summary listing of all currently approved practices and, for each practice, identifies its applicability to each rule type in a strategy as well as its suitability for trading under the Offset rule.

1.6 Credit Development Partners

Collaboration is an important part of the practice development process. The list of DWR-approved practices in Table 1 includes several practices that were proposed, developed and/or reviewed by organizations that have worked in close partnership with the Division to expand the toolbox of creditable nutrient-reducing practices. Credit development partners that have engaged with DWR to date include the Upper Neuse River Basin Association (UNRBA), NC Division of Energy, Mineral, and Land Resources (NCDEMLR), the Nutrient Scientific Advisory Council (NSAB) and the Agriculture Watershed Oversight Committees (WOCs) in the Falls and Jordan Watersheds. The Division greatly values the efforts of these and other external parties to advance the nutrient management field through the expansion and improvement of practice options, and the practice approval processes noted above and described herein are designed to encourage those efforts and the science on which they rely.

Chapter 2: Nutrient Reduction Practices & Resources

This chapter provides the current list of nutrient practices with state-approved design specifications and nutrient reduction credit methods. It identifies the rules under which each practice is applicable, and explains and provides references to the design specifications and credit methods used for each practice. The chapter also provides planning-level information to help affected parties evaluate practice options.

2.1 Table of Approved Nutrient Practices

Table 1 includes the list of all currently approved practices that can be implemented to achieve nutrient reductions toward compliance with the range of NC nutrient strategy rules. For each practice:

- a reference is provided to the applicable design specifications and nutrient credit method,
- the rules are identified under which it can be used for direct compliance;
- its suitability as a nutrient offset practice is identified; and
- its suitability as either a permanent or term practice, or either is indicated.

Subsections following the table explain the basis for each of the determinations provided for each type of practice. Links are also provided to referenced design and credit information.

Table 1. State-Approved Nutrient-Reducing Practices

Practice Name	Design Specifications	Credit Method	Applicable Direct Compliance Rules				Trading/Offset	Duration P/T ⁶
			New Dev't	Existing Dev't	Waste-water	Agriculture		
Stormwater Control Measures (SCMs)								
Infiltration System	SDM / MDC ¹	SNAP ²	X	X			X	P, T
Bioretention Cell	SDM / MDC ¹	SNAP ²	X	X			X	P, T
Wet Pond w/ Floating Wetland Isl.	SDM / MDC ¹	SNAP ²	X	X			X	P, T
Wet Pond	SDM / MDC ¹	SNAP ²	X	X			X	P, T
Stormwater Wetland	SDM / MDC ¹	SNAP ²	X	X			X	P, T
Permeable Pavement	SDM / MDC ¹	SNAP ²	X	X			X	P, T
Sand Filter	SDM / MDC ¹	SNAP ²	X	X			X	P, T
Rainwater Harvesting	SDM / MDC ¹	SNAP ²	X	X			X	P, T
Green Roof	SDM / MDC ¹	SNAP ²	X	X			X	P, T
Disconnecting Impervious Surface	SDM / MDC ¹	SNAP ²	X	X			X	P, T
Level Spreader-Filter Strip	SDM / MDC ¹	SNAP ²	X	X			X	P, T
Pollutant Removal Swale	SDM / MDC ¹	SNAP ²	X	X			X	P, T
Dry Pond	SDM / MDC ¹	SNAP ²	X	X			X	P, T
Proprietary Stormwater Control Measures								
Silva Cell Suspended Pavement with Bioretention	SDM / MDC ¹	SNAP ²	X	X			X	P, T
Filterra	SDM / MDC ¹	SNAP ²	X	X			X	P, T
Other Development Site Activities								
Treatment of Redevelopment	n/a	SNAP ²	X	X				P, T
Overtreatment of New Development	n/a	SNAP ²	X	X				P, T
Impervious Surface Conversion	n/a	SNAP ²		X				P, T
Reforestation of Developed Land	n/a	SNAP ²		X				
Upfitting Existing SCMS	SDM / MDC ¹	SNAP ²		X				P, T
Developed Lands Activities								
Remediating Discharging Sand Filters	DWR Practice ³	DWR Practice ³		X				P
Remediating Illicit Discharges	DWR Practice ³	DWR Practice ³		X				T
Soil Improvement	DWR Practice ³	DWR Practice ³		X				T
Storm Drain Cleaning	DWR Practice ³	DWR Practice ³		X				T
Street Sweeping	DWR Practice ³	DWR Practice ³		X				T
Wastewater Activities								
Creation of Surplus Allocation	15A 2B .0279	15A 2B .0279		X	X		X	P, T
Surplus Allocation via Regionalization	15A 2B .0279	15A 2B .0279		X	X		X	P, T
Rural Practices								
Cattle Exclusion ⁸	DWR Practice ³	DWR Practice ³					X	T
Riparian Reforestation on Ag Land	15A 2B .0703	DWR Practice ³					X	P, T
Water Control Structure	SWCC/NRCS ⁵	NLEW ⁴				X		T
Riparian Buffer: 20'; 30'; 50'; 100'	SWCC/NRCS ⁵	NLEW ⁴				X		P, T ⁷
Scavenger Crop: Rye/Triticale; Oats/Barley; Wheat	SWCC/NRCS ⁵	NLEW ⁴				X		T
Livestock Exclusion: 10'; 20'; 30'; 50'; 100' Setback	SWCC/NRCS ⁵	NLEW ⁴				X		T
Fertilizer Management	SWCC/NRCS ⁵	NLEW ⁴				X		T
Conservation Till, Piedmont Corn	SWCC/NRCS ⁵	NLEW ⁴				X		T

Legend (see corresponding subsections below for further information):

¹ SDM/MDC – Stormwater Design Manual / Minimum Design Criteria

² SNAP – Stormwater Nitrogen and Phosphorus Tool

³ DWR Practice – DWR-approved nutrient practice

⁴ NLEW – Nitrogen Loss Estimation Worksheet

⁵ SWCC/NRCS – Soil and Water Conservation Commission / USDA-NRCS applicable practice standards

⁶ P/T – Permanent Duration, Term Duration or Either

⁷ – Riparian buffer widths up to 50', once established, are required by watershed Buffer Protection rules to be left permanently. Widths greater than 50' may be replaced with other land cover once the terms of a cost-share contract are met.

⁸ Cattle Exclusion – this practice received conditional approval. As explained in the practice document, it will only be available for use once the condition, which requires establishment of an agreeable trading framework between parties subject to the *Agriculture* rule and others, is established specific to the practice.

⁹ – Design specifications would be useful for these practices and will be established. Credit can be calculated with the SNAP Tool. In the interim, the practice can be approved for *Existing Development* rule use on a case-specific basis. Once design standards are established, the practices will be available for New Development direct compliance as well.

2.2 Supporting Information for Stormwater Control Measures (SCMs)

Stormwater Control Measures involve engineered structural practices that convey and treat stormwater runoff on developed lands. These characteristics lend themselves to consistent design specifications and relatively easily instrumented and reproducible research study. As a result, North Carolina has established a robust set of SCMs with associated nutrient crediting that involves less uncertainty than credit estimation for other nonpoint source practices. These practices, covered by the first three groups in **Table 1** – (public domain) *SCMs*, *Proprietary SCMs*, and *Other Development Site Activities* – are all available for both *New Development* and *Existing Development* rule compliance, and while to date it has only been done on an experimental basis early in the nutrient offset program, they could also be used to generate offset credits. The following subsections provide references to fuller details on the design and nutrient accounting associated with the range of SCMs.

2.2.1 NCDEMLR Stormwater Design Manual / Minimum Design Criteria

The NCDEMLR Stormwater Design Manual provides the design specifications for SCMs to meet the Minimum Design Criteria (MDC) that are codified in the state stormwater rules (02H .1001 through 02H .1062), which went into effect on January 1, 2017. The Design Manual includes full, practice-by-practice information on SCM maintenance, inspection and repair requirements.

As noted in the Introduction, the Manual also sets out the process for approval of new SCM types in Part F. An internal-external stakeholder workgroup is currently revising this process, including an expansion to establish a predictable framework for periodically revising nutrient credits and associated credit accounting methods for existing SCMs. It appears likely that this entire process, both for approving new SCMs and for revising credit for existing ones, will be relocated to the DEMLR SCM Credit Document as part of the Workgroup's improvements. The results of their work will be shared with all interested parties.

- The Design Manual and rules can be downloaded from the NCDEMLR website at <https://deq.nc.gov/sw-bmp-manual>

2.2.2 NCDEMLR SCM Credit Document

The SCM Credit Document provides a table of all DEMLR-approved SCMs with their primary or secondary rating, hydrologic fates of influent, and nutrient effluent concentrations. A second table provides qualitative ratings on other SCM benefits for all of the approved SCMs. These tables are useful for facilitating comparisons between SCMs. It was developed through a joint effort between NCDEMLR, DWR, stormwater researchers, and the SCM Crediting Team stakeholders. As noted in the Stormwater Design Manual section above, it appears likely that an expanded SCM approval and credit revision process will be added to this document once completed.

- The Document can be downloaded from the NCDEMLR website: <https://deq.nc.gov/sw-bmp-manual>

2.2.3 Stormwater Nitrogen & Phosphorus Accounting Tool (SNAP)

North Carolina's Stormwater Nitrogen and Phosphorus Tool (SNAP Tool) is a Microsoft Excel-based spreadsheet that uses the Simple Method to estimate annual runoff volume and associated nutrient loading generated by a user-defined catchment area. The Tool also allows users to estimate reductions in runoff volume and nutrient load produced by different SCMs. The type and location of SCMs can be customized by users to optimize reduction of stormwater runoff from a site. The flow and pollutant load reduction provided by a given SCM is calculated using the effluent Event Mean Concentration (EMC) metric. Most of the SCMs that follow DEMLR's Minimum Design Criteria (MDC), as well as custom SCMs, can be modeled with this tool.

For many of the listed SCMs, design variants, undersizing or oversizing are available options, relying on modeling tools developed by North Carolina State University researchers. These options are described in the SCM Credit Document, and the SNAP Tool provides these choices and the associated nutrient credit calculations. All of these options may be used toward compliance with *Existing Development Stormwater* rules, while *New Development Stormwater* rule compliance is restricted to those options that meet MDC.

- The latest version of the tool can be downloaded from the DWR website here: <https://deq.nc.gov/about/divisions/water-resources/planning/nonpoint-source-management/nutrient-offset-information#stormwater-nutrient-accounting-tools>

2.2.4 Other Development Site Activities - Procedural Practices

Treatment of redevelopment projects and the overtreatment of new development projects are two procedural practices that can be credited through the use of the SNAP Tool. Because they are primarily procedural credits, and the necessary design steps are already established, further design specifications are not required for these practices. The following are three scenarios describing how these procedural practices could be implemented by local governments to generate nutrient-reductions that count towards their *Existing Development* rule requirements:

- Redevelopment projects that exceed land disturbance thresholds and increase built-upon area are required by state new development rules to reduce loads. In these cases, by implementing state requirements loads are being reduced from existing developed lands, and affected parties may credit those net reductions towards their *Existing Development* needs.
- A local government could, by ordinance, set more stringent loading rate targets for new development than those required by the state and retain the ‘extra’ reductions toward *Existing Development* needs. This would include obtaining treatment on development projects that fall below the state’s new development loading rate targets without treatment.
- A local government could adopt ordinances that require treatment on other new development that is not required to treat under the state’s new development rules. This would include development that does not exceed land disturbance thresholds or projects that would be vested under the state’s implementation timeframes.

2.2.5 Other Development Site Activities - Land Cover Modification Practices

Land modification practices such as removing impervious surfaces (referred to as Impervious Surface Conversion in **Table 1**) or reforesting developed land are also credited using the SNAP Tool and can generate significant nutrient reductions that would count towards meeting *Existing Development*, and potentially *New Development*, requirements. As footnoted, design specifications would be useful for these practices and DWR intends to establish design/credit documents for them as resources permit. Currently, nominal credit values can be calculated with the SNAP Tool. Until standardized design specifications are established for these practices to better ensure they achieve the reductions attributed by the Tool, local programs under the *Existing Development* rule can work with DWR to obtain approval for such installations on a case-specific basis. Once design standards are established, the practices will be made available for New Development direct compliance as well. The following are two examples of these land modification practices:

- Removal of existing impervious cover or replacement of existing pavement with permeable pavement would decrease runoff and increase infiltration, decreasing nutrient loading. Local governments could seek such opportunities on lands they control or on private lands. To facilitate such projects, communities could revisit parking requirements in existing ordinances for the potential to reduce mandates, to allow for shared parking, or other approaches.
- Reforestation of managed open space on developed lands combined with protection through conservation easement or other protective instrument could decrease runoff and nutrient loading.

2.3 Supporting Information for DWR-Approved Nutrient Practices

The DWR Director has approved a set of practices developed primarily to expand the toolbox of load-reducing options for local governments implementing *Existing Development* stormwater rules. Each of these practices is outlined individually in **Chapter 3**, and:

- Approved practice documents detailing design specifications, nutrient accounting methods, and operation, maintenance, and repair can be downloaded at <https://deq.nc.gov/about/divisions/water-resources/planning/nonpoint-source-management/nutrient-offset-information> .

In **Table 1**, these practices are all those appearing under *Developed Lands Activities* and *Wastewater Activities*, and the first two under *Rural Activities*. These practices are typically developed by DWR staff in close consultation with the Nutrient Scientific Advisory Board, taken through public comment, revised, and endorsed by the NSAB before receiving Director approval (*see Practice Approval Process, Appendix II*). Staff and the NSAB have developed and periodically update a list of potentially creditable candidate practices, which they have prioritized based on member input on overall utility and potential cost-effectiveness. DWR staff uses this prioritized list to guide their efforts in developing additional practices for crediting. All manner of nonpoint and point source practices are considered under this process, and DWR expects to continue completing additional [practices over time as resources permit and data support credit establishment \(see Appendices I-III\)](#).

The two *Wastewater Activities* in **Table 1**, ways of achieving surplus allocation, can provide dischargers greater comfort in their future ability to maintain compliance with permit limits. Alternatively, they can be used toward direct *Existing Development* rule compliance through either a joint or combined compliance approach or through trading as an offset.

The first two *Rural Practices* in **Table 1** can be used as offsets. The *Agricultural Riparian Buffer Reforestation* practice has been used virtually exclusively to date as the offset practice for *New Development* rule compliance in Neuse and Tar-Pamlico River Basins. Credit for the *Cattle Exclusion* practice is contingent upon the development of an acceptable trading framework for the exchange of credits between parties.

2.4 NLEW Practices

The remaining *Rural Practices* in **Table 1** are the BMPs given nitrogen reduction efficiency assignments in the *Nitrogen Loss Estimation Worksheet, NLEW*, the accounting tool used for compliance with watershed *Agriculture* rules. These BMPs differ from all other practices in **Table 1** both substantively regarding reduction estimates and procedurally regarding the credit assignment process used. Substantively, the NLEW accounting method does not yield load reduction estimates to receiving waterbodies for these practices; instead, they are assigned percent removal efficiencies that contribute to the NLEW tool's estimates of reduction in nitrogen loss from edge-of-management unit. For this reason, these agricultural practices cannot currently be used for trading purposes, since the Offset rule requires estimates of the former. Where sufficient research results become available to support such load reduction estimates for agricultural practices, they have the potential to be considered for offset credit development. The first two *Rural Practices* are examples of this outcome.

Procedurally, NLEW BMP credit values are not approved by DWR; rather, they are developed and approved by an informal committee, the NLEW committee, formed in about 1997 to support implementation of the original *Neuse Agriculture* rule. The Committee has been headed by NCSU Soil Science Dept. researcher Dr. Deanna Osmond, and has included participation from other NCSU research faculty, NRCS, DSWC, DWR and environmental interests. It has been reconvened periodically on an ad hoc basis to support various revisions to the Tool and address emerging rule implementation issues.

Chapter 3: DWR-Approved Practices for Existing Development

While most of the practices in **Table 1** are available for use toward *Existing Development Stormwater* rule compliance, either through direct compliance or as offsets, this chapter compiles brief summaries on the subset that has been developed by both the Division and the UNRBA and approved by DWR with *Existing Development* compliance specifically in mind, as described in *Section 2.3* above.

3.1 Remedying Illicit Discharges to Surface Waters or Stormwater Systems

Remedying Illicit Discharges is the practice of preventing future non-stormwater discharges and associated pollutants from entering surface waters or stormwater systems and requires programs to prevent new sources of the same type. This practice is actually a collection nine individual types of illicit dischargers that can be remedied for reduction credit. Credit is based on the reduction or elimination of nutrient loading relative to the strategy's baseline period and is calculated using either monitored or default concentration, flow rate and duration, or flow volume. Credit is calculated on an annual basis and depending on the type of discharge may either be retrospective or temporary in nature.

This is a programmatic practice that can be implemented by local governments for reduction to count towards *Existing Development* rule requirements, but is not suitable for trading purposes. The practice document provides example credit calculations, but the local government is responsible for providing design specifications for individual remedies to the Division for approval.

Design Specifications and Nutrient Accounting Document on DWR Website:

<https://files.nc.gov/ncdeq/Water%20Quality/Planning/NPU/Nutrient%20Offset%20Rule/Remedying%20Illicit%20Discharges%20Practice%20Signed%2004%2005%202017.pdf>

3.2 Storm Drain Cleaning

Storm Drain Cleaning is the practice of periodic removal of gross solids (organic debris, litter, or coarse sediments) and associated material from storm drain catch basins. The combined material is collected from unaltered catch basins or catch basins with a collection device installed. Temporary annual credit is directly quantified based on the cumulative amount of material collected and converting the weight of material collected to a representative weight of nitrogen and phosphorus removed from the system.

This is practice can be implemented by local governments for reductions to count *towards Existing Development* rule requirements, but is not suitable for trading purposes. There are no specific design requirements for this practice, but the practice document does provide design recommendations.

Design Specifications and Nutrient Accounting Document on DWR Website:

<https://files.nc.gov/ncdeq/Water%20Quality/Planning/NPU/Nutrient/2019.10.14-Storm-Drain-Cleaning-Nutrient-Credit-FINAL.pdf>

3.3 Street Sweeping

Street Sweeping is the practice of periodically cleaning roadway surfaces that have curb and gutter and collecting the sweepings. These sweepings or gross solids may include organic debris, litter, and a range of sediment sizes. To determine the temporary annual nutrient removal credit for the practice, the cumulative weight of combined material prevented from entering the stormwater system is converted to a representative weight of nitrogen and phosphorus, totaled annually, and compared to an estimate of amounts collected during a strategy's baseline time period.

This practice can be implemented by local governments for reduction to count towards *Existing Development* rule requirements, but is not suitable for trading purposes. There are no specific design requirements for this practice, but the practice document does provide design recommendations.

Design Specifications and Nutrient Accounting Document on DWR Website:

<https://files.nc.gov/ncdeq/Water%20Quality/Planning/NPU/Nutrient/2019.10.14-Street-Sweeping-Nutrient-Credit-FINAL.pdf>

3.4 Soil Improvements

Soil Improvement is the practice of increasing the storage capacity of soil and promoting infiltration, storage, and evapotranspiration to achieve runoff volume and related nutrient reductions from existing, managed pervious areas associated with residential, commercial, industrial, institutional, and public open areas. The practice may include tillage or scarification with the addition of topsoil in addition to pervious area nutrient management to establish and maintain healthy vegetation. Soil storage capacity and nutrient credits vary depending on the depth of soil that is improved. A default option and a site-based monitoring option are included to provide flexibility to practitioners applying for nutrient credits.

This practice may be implemented by local governments for reduction to count towards *Existing Development* rule requirements. This practice may also be applicable to new development requirements but would require approval by the local government permitting authority as well as the NCDEMLR Stormwater Permitting Program, but it is not suitable for trading purposes.

The entity applying for nutrient credits is responsible for verifying the practice continues to be maintained as justification for continued crediting. The verification procedures and maintenance required are established in the local program. Credit for this practice is temporary to be renewed at least every five years.

Design Specifications and Nutrient Accounting Document on DWR Website:

[https://files.nc.gov/ncdeq/Water%20Quality/Planning/NPU/Nutrient%20Offset%20Rule/Soil%20Improvements%20Practice%20Standard Approved%20by%20DEQ%20with%20signature%2003%2010%202017.pdf](https://files.nc.gov/ncdeq/Water%20Quality/Planning/NPU/Nutrient%20Offset%20Rule/Soil%20Improvements%20Practice%20Standard%20Approved%20by%20DEQ%20with%20signature%2003%2010%202017.pdf)

3.5 Remedying Discharging Sand Filters

Remedying Discharging Sand Filters is the practice of replacing or upgrading discharging sand filter onsite wastewater systems serving single family residences with alternatives to reduce nutrient loading to surface waters. Discharging sand filter systems are typically found in areas where drainage issues make soils unsuitable for conventional onsite septic systems. As discharging systems, they are treated on an individual basis, not a programmatic basis and credit is given for each system improved. Credit varies depending on the type of system being replaced, the type of improvement or remedy, and the number of bedrooms served by the system.

This practice may be implemented by local governments for permanent reduction credit for meeting *Existing Development* rule requirements, but is not suitable for trading. The onsite wastewater systems installed to replace discharging sand filters must comply with the inspection, maintenance, and reporting requirements in the applicable Department of Health rules references in the practice document.

Design Specifications and Nutrient Accounting Document on DWR Website:

<https://files.nc.gov/ncdeq/Water%20Quality/Planning/NPU/Nutrient/2019.04.18.Remedying.Discharging.Sand.Filters.FINAL.with.Memo.pdf>

3.6 Cattle Exclusion with Nutrient Management

Cattle Exclusion is the practice of installing fencing along a stream as a physical barrier to animals entering open water and degrading stream banks. This practice prevents the trampling of stream banks and cattle-induced erosion, reduces direct deposition of animal waste in the stream, and allows for re-establishment of a buffer zone. The crediting method provides nutrient reduction credits for cattle exclusion with or without reductions in stocking rates and establishes to-stream load reduction credit for use in meeting nutrient rules with comparable load requirements.

The credit for this practice is contingent upon development of an acceptable trading framework for the exchange of credits between the agricultural community and local governments. Once implemented this is a 5-year term practice that requires re-verification of performance. Design, operation and maintenance must meet the NRCS standards references in the DWR-approved practice document.

Design Specifications and Nutrient Accounting Document on DWR Website:

<https://files.nc.gov/ncdeq/Water%20Quality/Planning/NPU/Nutrient%20Offset%20Rule/Cattle%20Exclusion%20Practice%20Signed%2004-05-2017.pdf>

3.7 Riparian Reforestation on Agricultural Land

Riparian reforestation on agricultural land is the practice of restoring or enhancing vegetated ecosystems adjacent to surface water bodies, where trees, grasses, shrubs, and herbaceous plants function as a filter to remove pollutants from overland stormwater flow, runoff, and shallow groundwater flow prior to discharge to receiving waters. The scope of this practice is limited to the restoration and enhancement of riparian buffers on agricultural lands that qualify as suitable restoration

or enhancement sites and meet specific design criteria. The nutrient reduction credit method used results in a single per-acre credit value applied to the restored or enhanced buffer footprint combining the removal of nutrients achieved by way of throughput treatment, deposition of nitrogen from overbank flooding and footprint of land conversion from agricultural use to forest.

This practice may be implemented by local governments for permanent or temporary reduction credit for meeting *Existing Development* rule requirements. It is also applicable to *New Development* rule requirements and is suitable for trading. Implementation of this practice must follow the standards and procedures established in the *Nutrient Offset Credit Trading* rule (.0703), which includes requirements for the establishment, maintenance, and long-term stewardship and credit release schedule for the practice.

Nutrient Accounting Document on DWR Website:

<https://files.nc.gov/ncdeq/Water%20Quality/Planning/NPU/Nutrient%20Offset%20Rule/Ag-Buffer-Credit.pdf>

Chapter 4: Practice Implementation Guidance

The following subjects have arisen primarily during implementation of *New Development Stormwater* rules and development of a model program for the Falls *Existing Development Stormwater* rule. Their applicability relates consistently to the *Existing Development* rule. That said, a majority of the content appears more universal in applicability across nutrient rules, or is proving to have at least some applicability beyond existing development. Thus, this content is included in the Catalog with the recognition of broader applicability. Discussion of rule-specific applications does not connote a limitation in applicability unless it is stated as such.

As a foundation for this discussion, the following threshold criteria are recognized for use of nutrient credit under NC nutrient strategies:

- Any practice installed subsequent to the Baseline time period is potentially eligible for nutrient credit, subject to further universal or rule-specific restrictions.
- As with credit-seeking under the *Nutrient Offset* rule, credit used to comply with one rule of a nutrient strategy are not eligible for use under another rule,
- Nor are practices done for compensatory mitigation purposes eligible for credit under a strategy nutrient rule.
- Finally, to be eligible for providing credit, a practice needs to qualify as one of the approved nutrient practice types either included in Table 1, approved but not yet incorporated in a Catalog revision, or meeting the process set out in *Appendix III*.

4.1 Credit Stability and Revision of Credit Values

Predictability and reliability of practice credit value are important principles for regulated parties and are supported by DWR. The following concepts are offered to provide mutual understanding about credit expectations for various settings. These concepts apply to a given installation of a practice under a given nutrient strategy.

Across nutrient rules, individual practice installations that were awarded presumptive nutrient credit at the time of their installation, and are maintained according to practice requirements, retain that credit for the agreed life of the practice, provided catchment runoff assumptions used to size the practice are not altered, so even if other nutrient reduction projects are subsequently implemented in the catchment the presumptive credit for the original practice does not change.

Where the lifespan of a Term practice expires, if the responsible party seeks to renew the use of that installation for another term, then both the practice design specifications and the credit assignment are subject to the applicable requirements in place at that time. For installations used as offsets, the elements of this principle are established in the *Nutrient Offset* rule, 15A NCAC 02B .0703.

This credit stability concept relates to presumptive credit and does not apply to practices that receive credit year-to-year based on monitoring, such as Street Sweeping, Storm Drain Cleanout and monitored experimental practices.

The nutrient reduction credit awarded for a type of practice may be reevaluated as additional research becomes available and sufficiently improves the state of knowledge on design or quantified performance of an approved type of practice. In such cases, the Division will conduct an open, consultative review process on contemplated revisions to the practice. Resulting practice design or credit revisions would not apply retroactively to any existing installations nor any pending ones where substantial planning had been done based on current specifications. Once approved, revised practice specifications would apply only to future installations. Thus, for example under the *Existing Development* rule, where DWR issues a revised practice document with crediting changes, a local government will not obtain either an increase or a decrease in the credit rate of an active installation of that practice, either retroactively or for the remainder of its agreed lifespan.

4.2 Crediting Older Installations

Under *Existing Development* rules, local governments may seek nutrient credit for projects that were installed under an older design standard that has subsequently been changed. Within the category of adequately maintained older practices, two primary scenarios are recognized: where an SCM was installed to meet a state or local regulation that preceded nutrient requirements, DWR will work with the local government to assign appropriate credit, guided by assessment of its design relative to current standards. Where designs are reasonably close to current specifications, DWR would prefer to award current crediting for simplicity.

In the second scenario, where the SCM was installed to comply with a nutrient stormwater rule, the local government may either use the credit assigned at the time of the development or, where the SCM is in reasonable compliance with current MDC, then the SNAP Tool may be used to calculate its credit under the *Existing Development* rule. This option does not violate the credit stability principle described above since the local government is a different party seeking initial credit for a practice installed under a different rule within a different nutrient strategy. Use of the newer tool would also be expected to provide a better estimate of actual performance. This option would be particularly useful if the original credit assignment is not available.

In the situation where an older practice installation deviates significantly from current standards, or where the installation has degraded and function is compromised, the local government may elect to modify or renovate the SCM to current standards for the current credit. If current design is not achievable, DWR will work with the local government to assign appropriate credit based on the design followed. It is possible that the original SCM design is determined to be uncreditable for nutrients and requires upfitting to receive credit.

4.3 Nested Credit

As alluded to in Section 4.1 above, when a new nutrient reduction project is nested in the catchment of an existing project, above or below, the existing project retains its credit value. Where new SCM projects are installed for new development (i.e. adding catchment BUA), it should be assumed that the

new SCM is installed to treat only the new runoff and new nutrient load and does not alter the nutrient reduction function of any downstream SCMs.

Where new SCM retrofits are installed toward *Existing Development* rule compliance, two basic conceptual nesting scenarios are recognized. The first scenario would involve a new retrofit located below and receiving drainage from a currently treated catchment, and possibly also from additional drainage area. The second scenario would involve a new retrofit placed within the drainage catchment of an existing SCM, resulting in added “pre-treatment” for a sub-catchment. For both cases, the first step is to calculate the nutrient reduction provided by the two SCMs in series as if they were installed together. Then the nutrient reduction assigned to the older SCM is subtracted from the total reduction, and the difference is the credit awarded to the newer SCM(s). Credit assignment for the older SCM would follow the guidance described in Section 4.2 above.

Nutrient credit calculation for previously installed SCMs that are modified to improve their performance is handled similarly to newly nested SCMs. That is, nutrient reduction is first calculated for the upfitted or improved SCM as if it were being newly installed. Then the previously assigned credit is subtracted to determine what additional nutrient reduction is provided by the upfit or improvement. This applies both to SCMs being improved for Existing Development retrofit as well as to modification of existing SCMs to accommodate new BUA/development.

Where the nested practices are not SCMs, or only one is, the same basic policy logic described above would still apply. That is, reductions attributed to the pre-existing practice are not altered by the introduction of the new practice, and the crediting award for the new practice would be the difference in loading outcomes between the combined performance and the old practice credit.

4.4 Crediting for Practices Not Meeting Design Standards

Practices implemented to meet *Existing Development* rule requirements may be modifications or upfits to existing SCMs or installations on lands with limited BMP footprint space. As a result, the sizing and design of these practices are afforded additional flexibility as they cannot always strictly adhere to established design standards for a given practice type. In cases where it is not feasible to meet existing design standards for a proposed installation of a practice, DWR will work with the local government and consult with stormwater subject matter experts to assign appropriate credit based on the design followed. A comparative analysis against established design standards or considering the applicable nutrient removal mechanisms or processes may also be considered where applicable.

4.5 Delivery Factors and Transport Factors

The terms delivery factor and transport factor both describe the fraction of a nutrient load that is attenuated instream between a given source or source area and the waterbody of concern. These values are developed through watershed modeling. They are used to support trading between different areas in a watershed to ensure that delivered loads are appropriately offset.

The use of these factors is watershed-specific, requiring establishment of both technical and regulatory foundations to be in place. Currently, each of the state’s four major nutrient strategies has a different

status regarding use of delivery or transport factors. Additional discussion of this subject is provided in DWR's draft Nutrient Trading Framework.

4.6 Credit Tracking and Reporting

Nutrient crediting requires regular reporting regarding the upkeep status and conditions of installed practices. The exact details of what is reported and when depends on the rule under which the credits were generated. Credits generated for offset trading purposes must meet reporting requirements set forth in their DWR approved nutrient banking instrument pursuant to the *Nutrient Offset* rule 15A NCAC 2B .0703 (e)(1) and pursuant to the maintenance requirements detailed in Subparagraph (g) of that rule. Nutrient reduction projects installed to meet *Existing Development* Rule requirements have reporting requirements described in the *Existing Development* Model Program.

4.7 Use of Federal or State Grant Funds

The ability of a regulated party to use grant funds to implement practices toward rule compliance is controlled first by each granting entity through its funding limitations. Where a grant allows use of its funds toward rule compliance, rules may limit such use. The only rule-based limitation currently in place in NC nutrient strategies is found in the *Nutrient Offset* rule, 15A NCAC 2B .0703 (f)(3), which bars the awarding of offset credits to any project funded in whole or in part by state or federal grant funds.

Appendix I: Template for Proposed Practice Design Specifications & Nutrient Accounting

Design Specifications & Nutrient Accounting for <Practice Name>

I. Summary [Be succinct - best if entire summary is one page]

A. Description:

Short description of the practice, including variations or differences from other practices.

B. Utility:

Explain appropriate settings and the role of the practice.

C. Applicability

State whether this practice intended for meeting New and/or Existing Development Rules and any limitations on what entities may generate credits.

D. Credit Overview

Summary of how credits are calculated and of the range of unit load reductions to be expected.

II. Practice Design and Implementation

A. Qualifying Conditions and Limitations

1. Applicability

A fuller explanation of 1C (Applicability section of summary). State whether this practice intended for meeting New and/or Existing Development Rules and any limitations on what entities may generate credits

2. Preconditions

Describe any preconditions, particularly site preconditions, that must exist for this practice to be applicable

3. Constraints

Describe any situations or conditions where this practice is not allowable or creditable, or any other limitations on how this practice is implemented.

B. Design Guidance

1. Required Elements

List out the required design elements, and/or reference external design documents.

2. Recommended Elements

Optional section - put any design guidelines or references to design guidelines, and/or references to external documents, that are not required for implementation of this practice.

C. Installation/Implementation

1. Required Elements

List out required installation, construction, and implementation steps and elements, and/or reference external design documents.

2. Recommended Elements

Optional section - put any installation, construction, or implementation guidelines, and/or references to external documents, that are not required for implementation of this practice.

D. Operation and Maintenance

1. Required Elements

List out the steps to properly operate and maintain the practice, the required frequency, and any limitations on who does the work.

2. Recommended Elements

Optional section - put any operation and maintenance guidelines, and/or references to external documents, that are not required for implementation of this practice.

E. Credit Award and Renewal

Describe when the credit is awarded; include a credit award schedule here if appropriate. Describe any required monitoring, inspection, or verification of design or implementation. State the length of time this credit lasts before any renewal is required and the steps for credit renewal. If this practice has verification implemented through the NPDES program it is sufficient to state that, as compared to a retrofit situation where instructions should be more explicit.

III. Nutrient Credit Estimation

A. Credit Method Description

Describe the basis for this practice generating nutrient credits. Include any lookup tables or reference charts needed for credit calculation here.

B. Calculation Instructions

In this section give step-by-step instructions on calculating the credit, including instructions for the SNAP Tool or its descendant. If part of implementation includes collecting data, include the collection instructions here.

IV. Supporting Technical Information

A. Reductions Obtained

Describe the range of nutrient reductions that could be obtained based on the practice options and site conditions.

B. Example Calculation

Describe one or more implementation scenarios and provide attendant credit assumptions, calculations and results.

C. Credit Basis and Relative Confidence

Describe the scope of studies used to design this credit, the applicability of studies (such as geographic location), and the quality of studies. Based on this information, describe the confidence in this practice for reducing nutrients by the amounts estimated.

D. Cost Analysis

Optional section for planning-level cost analysis.

E. Risks and Benefits

Optional section for a summary of ecosystem and other benefits and potential risks and situations where this practice may not be appropriate or desirable.

F. References & Resources

Put the list of references here, including annotated references.

G. Credit Development Documentation

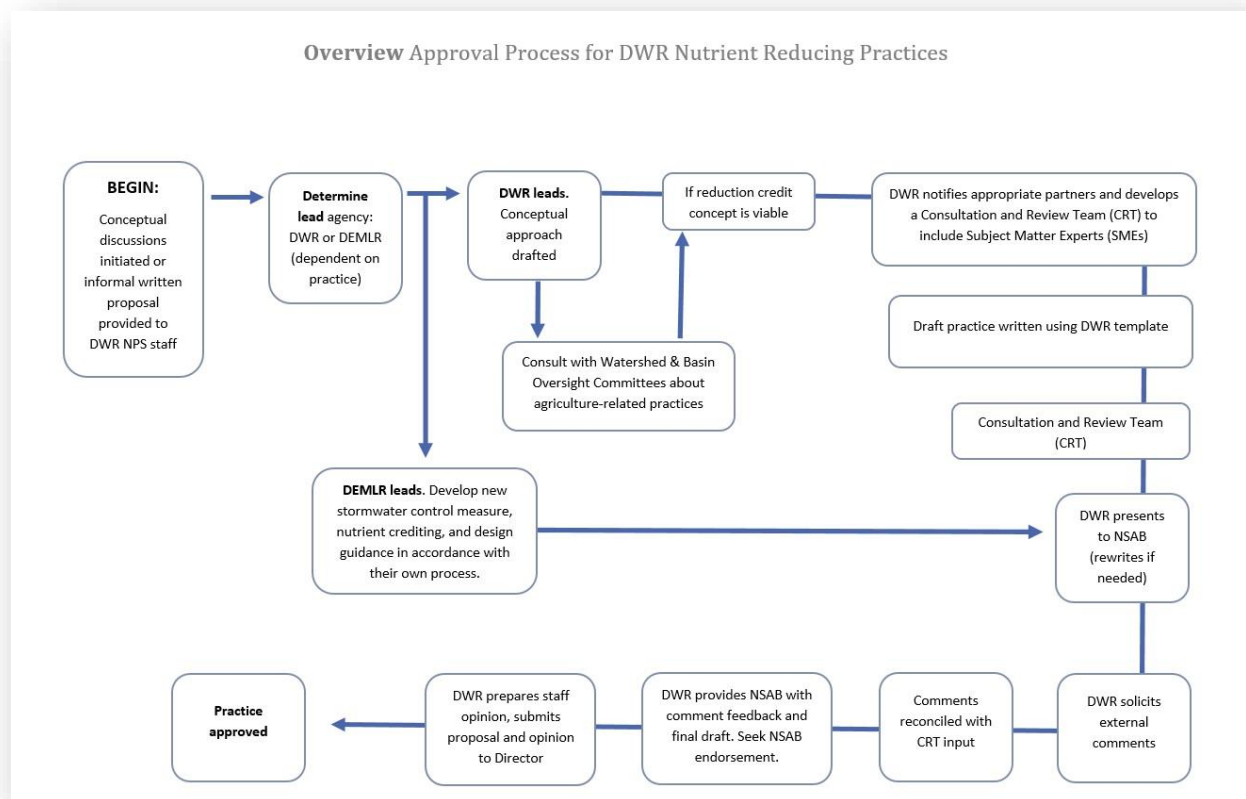
Optional section in which to place technical documentation and analysis of available studies as part of developing the credit method.

Appendix II: Practice Approval Process

Introduction and purpose

The practices approval process is a policy intended to provide a thorough and fair vetting of potential nutrient reduction practices. Developed through extensive consultation with stakeholders in the Jordan and Falls Lake watersheds, the process ensures input from multiple stakeholders, provides ample opportunity for public comment, and seeks to provide clarity and efficiency for all engaged parties. A flowchart for this process is provided in figure 1, with further explanation provided throughout this section.

Figure 1. Flowchart of DWR Approval Process for Nutrient Reducing Practices



Timeline for New Practice Adoption

The process outlined here provides a guide for a necessarily flexible and iterative review process. To cite just a few examples, proposed practices may be subject to wide variation regarding the availability of supporting implementation and nutrient calculation information, the parties engaged in review, and applicability of other laws and rules to the practice’s implementation.

Generally, DWR is committed to fulfilling its role in the practice approval process in a professional and timely manner, and adoption of new practices remains a high priority for the division. However, the

pace at which practice development occurs is subject to other factors and parties outside of DWR's control. Practice proponents can help the process move expeditiously by developing high quality work and committing to timely reconciliation of comments as they are received.

To describe timelines, it helps to differentiate stages in the process, specifically separating practice development from practice approval. The research needed to support establishment of design specifications and credit methods and values could be considered part of practice development, but typically requires years of time. Once sufficient research is assembled, the flowchart above depicts potential pathways to approval. The process of drafting practice specifications and credit methods into a document can be time-consuming and may require months, or in some cases years, to complete. From the point of having a draft practice document developed, from the initial consultation, proponents may expect the practice approval process to require a minimum of four to six months, assuming a well-documented technical basis for the credit, no significant legal or policy hurdles, and a group of experts committed to expediting review of the practice under development. More typically, the process may take six months to a year or more as the proponent, DWR, and external experts thoroughly vet iterative drafts of the proposals and then reconcile new comments received through the public review process.

Practice Approval Process

Initiating the process

Any party responsible for developing a nutrient reduction practice is designated as a practice proponent. While there are no qualifications required to begin the practice approval process, proponents may be third-party consultants, interest groups, Division of Water Resources staff, or staff experts from another North Carolina state agency.

Prospective proponents are encouraged to contact DWR's Nonpoint Planning Branch as early as possible to discuss their ideas. If the practice appears promising, DWR will assign a staff liaison to the practice proponent for the duration of the project.

DWR shares jurisdiction over stormwater nutrient-reducing practices with a sister division, the Division of Energy, Mineral, and Land Resources. The rules and approval processes for these divisions are different but compatible. Where jurisdiction is shared, DWR and DEMLR will determine which division is best suited to work with proponent. When DEMLR is designated as the lead agency, DWR staff will retain a supporting role. DEMLR will likely assume lead role where the practice meets the definition of a stormwater control measure, or SCM, set out in rule 15A NCAC 02H .1002. The approval process and substantive criteria for SCM crediting are currently set out in DEMLR's Stormwater Design Manual, Part F, Guidance for New Stormwater Technologies. Section 2.2 provides additional information on this subject.

DWR would serve as the lead agency for cases involving credit establishment for trading purposes for agricultural nutrient-reducing practices, and will engage and work closely with the agriculture Watershed Oversight Committees, Basin Oversight Committees and NLEW Committee as appropriate throughout the development process of such practices. This includes consulting with the agriculture committees when an agricultural practice is first proposed to determine if the practice is appropriate for

use in North Carolina. The Division will also rely on the committees for input on proper design specifications and nutrient accounting methods for agricultural practices in accordance with the *Agriculture* rules. This process is distinguished from approval of practices for use toward *Agriculture* rule compliance as described in Section 2.4 of the Catalog, which follows requirements set out in the various *Agriculture* rules and is not led by DWR.

Once the proper processes have been identified and a liaison has been assigned, for DWR-approved practices the proponent is encouraged to develop the specific practice standards according to the template provided in Appendix I. Consistent communication between the proponent and DWR liaison is encouraged, particularly in the early conceptual stages.

Viability check

A viability check has been included in the practice approval process to conserve limited staff resources as well as to preserve the valuable time and goodwill of third parties, subject matter experts, other agency representatives and DWR leadership. Preliminary conceptual discussions and early proposal drafts are likely to illuminate the key issues to be resolved during consultation with subject matter experts and interested agency representatives. In some cases, these issues may be fatal to the credit sought.

DWR staff will only determine that a practice is “not viable” when insurmountable technical, logical, policy or legal concerns are identified in a conceptual proposal and attempts to resolve these issues with the proponent are unsuccessful. Proponents will be given ample opportunity to adapt their proposal to address these concerns. The proponent bears the burden of proof that a proposed practice is viable. However, this should generally be considered a light burden. Any credible approach to resolving key issues should be sufficient to engage additional subject matter experts and reevaluate these concerns in later stages.

Determination that a practice is “viable” by Division staff does not imply that approval of the practice will be recommended in later stages of the practice approval process. Conversely, a staff determination that a practice is “not viable” is subject to review by DWR’s director upon request.

Collaboration and practice standard development

Upon agreement that a practice is viable, the proponent and DWR staff will provide notice to identified stakeholders and committees that a new nutrient reduction practice is under development. The Nutrient Scientific Advisory Board will be notified and independent subject matter experts (SMEs) should be identified and invited to participate in the development of the practice.

As stated above, DWR would serve as the lead agency for cases involving credit establishment for trading purposes for agricultural nutrient-reducing practices, and will engage and work closely with the agriculture Watershed Oversight Committees, Basin Oversight Committees and NLEW Committee as appropriate throughout the development process of such practices. Again, this process is distinguished from approval of practices for use toward *Agriculture* rule compliance as described in Section 2.4 of the Catalog, which follows requirements set out in the various *Agriculture* rules and is not led by DWR.

If DWR is identified as the lead agency for a stormwater practice, DEMLR will be informed that the practice has passed the viability check stage and will be invited to advise upon the practice.

After notifying and working with these parties, the proponent will engage with subject matter experts and Division staff to form a Consultation and Review Team (CRT). The CRT should also include (at a minimum) independent subject matter experts, representatives from Basin/Watershed Oversight Committees for agricultural practices, and representatives from DEMLR for stormwater control practices. Utilizing feedback from the CRT, the proponent will draft and refine the practice standard according to the substantive guidance provided in chapter 2. This process is necessarily iterative and should result in the collaborative resolution of technical differences underpinning the practice standard.

At this stage, the proponent is the final arbiter of whether and how input from subject matter experts and the Division is incorporated into the practice standard. However, it is strongly encouraged that the proponent resolve any concerns raised by DWR or NCDEMLR or Agriculture Watershed Oversight Committees before moving on to the next step in the process. Upon completion of this process, the proponent will notify the Division of its intention to move forward to public comment.

Confidence Evaluation Factors

The following matrix helps evaluate confidence in the available science used to determine nutrient credits. It is intended to lend structure and consistency to a qualitative evaluation process and can help determine the need for incorporating conservatism into final credit assignments. In addition, it can guide further research. The matrix focuses mainly on the studies behind estimates, but also on the estimation methods themselves.

The matrix is a structured decision-making tool, designed to help compare different options by choosing one of the confidence levels for each of the eleven factors. Some factors may be more relevant to certain practices and studies. Lack of information or a low-confidence result for a factor does not connote disapproval.

Table. Studies Confidence Matrix for Practice Credit Assignment

Individual Study Factors	Confidence Level		
	High	Medium	Low
Applicability			
Setting	Study done within a regulated geography; or climate, physiography, soils, & biology match a regulatory setting well	Reasonable degree of study site match or similarity to a regulated geography across site attributes	Significant differences between more than one aspect of study setting and the regulated geography
Loading source, dynamics	'Natural' vs. simulated, range of expected conditions captured	Some artificiality vs. expected conditions but reasonably similar	Entirely simulated design, partial to poor similarity to expected
Practice type	Well-described design that matches proposed nutrient design features	Some design differences from proposed nutrient conditions; learning-stage design; or details unclear but reasonably similar	Significant design differences studied from proposed here

Nutrient measurement	Reports TN, TP annual mass load changes to surface water	Some assumptions required to determine TN, TP load changes or regarding delivery	Limited N, P species, concentrations only; or delivery uncertainties
Data Scope and Depth			
Sampling frequency and project timespan	Robust characterization of events, > 1 annual cycle, varied meteorology &/or source management	Captures an annual cycle, reasonable intra-event representation and total <i>n</i>	< 1 annual cycle; or low sample frequency and total <i>n</i>
Sampling scheme	Fully captures of effects via pre/post, up/down, paired watershed	Adequate capture of practice effects; some data limitations	Partial capture of practice effects; incomplete picture

Individual Study Factors	Confidence Level		
	High	Medium	Low
Data Quality			
Field methods / lab analysis	Approved state or federal methods used; or certified lab	Other well-documented protocol and methods	Unapproved methods; or inconclusive documentation
Data analysis	Methods sound, relevant; conclusions well-supported by statistics	Methods sound, conclusions plausible but not fully supported by data; moderate unexplained variability	Methods not the most relevant, inconclusive; insufficient evidence, substantial uncertainty
Peer review	Published in peer-reviewed journal	Published/reported with some level of professional or expert review	Minimal or no critical review

Set of Studies Factors	Confidence Level		
	High	Medium	Low
Number, diversity of studies	Good body of literature	Small number of studies, some diversity captured	One or two studies, significant gaps in range of conditions
Variability across studies	Variability well-understood, defensible	Some unexplained variability	Range of unexplained variability; poorly understood function

Public comment

At the proponent’s request, DWR will coordinate the solicitation of NSAB and public comments on behalf of the proponent. The comment period should be open no less than 30 days, and notification should be provided through appropriate DWR mailing lists. DWR staff may also offer comments during this period if important issues appear unresolved at this stage of the approval process. After each comment period has passed, proponents are encouraged to work with the CRT to reconcile or otherwise address the substantive comments provided. While this process is intended to be informal, the failure of the proponent to adequately address substantive public comments will be taken into consideration

by DWR staff as they determine whether to recommend approval of the proposed practice to the Director.

Director approval

Once the practice proponent reconciles all comments, they may submit the proposed practice to their DWR staff liaison for DWR Director approval. The proposed practice will be initially routed for approval through the DWR Planning Section Chief and comparable agency authority over any staff utilized for subject matter expertise. DWR staff will then submit the completed proposal to the DWR Director along with a staff opinion recommending the practice for approval or rejection. If rejection is recommended, a justification for that recommendation will be included as part of the staff opinion. If approval is recommended, the practice proposal itself will serve as the justification.

The Director will make the final agency determination regarding approval or rejection of the practice standard.

If a practice is rejected, DWR staff or other parties may assume the role of practice proponent and offer amendments to the original practice approach. The new proponent would begin the practice approval process anew.

Appeal of approval decisions

A practice proponent may appeal the decision not to approve the practice standard. Informally, a proponent may seek review of the Director's determination through the executive agency hierarchy. Such an appeal should be directed to the Secretary of the Department of Environmental Quality. Proponents may also seek appeal according to the provisions of the N.C. Administrative Procedure Act.

Publication

Unless specifically noted in the practice itself, credit for the practice will become available immediately upon the signature of the DWR Division Director. The practice standard will also be temporarily posted to the Division's website. Eventually, the practice standard will be incorporated as a new chapter in subsequent editions of this document. Other supporting materials will be kept on file with DWR according to its records retention schedule.

Updating practices

Existing practice standards may be updated utilizing the same practice approval process.

Appendix III: Nutrient Credit for Unique Practice Installations

Introduction and purpose

A party subject to an *Existing Development Stormwater* rule may consider installation of a practice type that has not been approved by the Division for annual, retroactive nutrient reduction credit based on direct monitoring of performance. Where a practice's nutrient performance is insufficiently documented to successfully navigate the more rigorous practice approval process for presumptive crediting, a regulated party subject to an *Existing Development Stormwater* rule may seek to generate annual, retrospective reductions toward compliance from an individual installation of such an untested practice. This option requires direct monitoring of annual load reduction. Possible examples include larger-scale, capital-intensive, actively operated technologies that are largely untested at scale by parties unaffiliated with the manufacturer. Practices studied through this monitoring process may later be considered for general practice type approval as their capabilities become better understood through experimentation and monitoring.

Monitoring requirements

A party planning for partial *Existing Development* rule compliance from such an experimental practice installation will want to provide a monitoring framework to the Division in advance of practice installation. The framework should include identification of monitoring timeframes that could support establishment of presumptive annual, lifetime credit values for the practice. A five-year monitoring period may be a reasonable default timespan, but can be discussed on a case-by-case basis. The framework should also propose design standards for the practice and estimate credit values sought. Factors that could bear on the framework's monitoring timespan may include the complexity of the practice, the nutrient processes involved, and the intensity of human operation required. A key factor in forming a decision to reduce, end or extend monitoring is the reliability of the installation's performance in achieving predicted nutrient removals.

Awarding credit

During the trial period, the load reduction award would be annual and retroactive, based on DWR's acceptance of monitoring results for the preceding year. To better assure the maximum degree of credit, any party considering the individual practice option is advised, prior to initiating a project, to engage DWR for input on, and review of, draft monitoring plans. A monitoring plan and quality assurance project plan is recommended in advance of the project to allow DWR to judge the sufficiency and quality of monitoring data.

Limitations

Because reductions can't be assigned ahead of time, unique/experimental nutrient reduction practices may only be used for meeting *Existing Development* rule requirements, direct or joint compliance. Such reductions are not eligible for trading.

Appendix IV: Applicable Rules

Cross-Strategy Rules

.0701 Definitions

<http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/15a%20ncac%2002b%20.0701.pdf>

.0703 Nutrient Offset Credit Trading

<https://deq.nc.gov/about/divisions/water-resources/planning/nonpoint-source-management/nutrient-offset-information#about-nutrient-offsets-and-trading>

Falls Lake Rules

.0277 New Development

<http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/15a%20ncac%2002b%20.0277.pdf>

.0278 Existing Development

<http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/15a%20ncac%2002b%20.0278.pdf>

.0279 Wastewater

<http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/15a%20ncac%2002b%20.0279.pdf>

.0280 Agriculture

<http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/15a%20ncac%2002b%20.0280.pdf>

.0281 State & Federal Stormwater

<http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/15a%20ncac%2002b%20.0281.pdf>

Neuse Rules

.0711 New Development

<http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/15a%20ncac%2002b%20.0711.pdf>

.0712 Agriculture

<http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/15a%20ncac%2002b%20.0712.pdf>

.0713 Wastewater

<http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/15a%20ncac%2002b%20.0713.pdf>

.0714 Buffers

<http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/15a%20ncac%2002b%20.0714.pdf>

Tar-Pamlico Rules

.0731 New Development

<http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/15a%20ncac%2002b%20.0731.pdf>

.0732 Agriculture

<http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/15a%20ncac%2002b%20.0732.pdf>

.0733 Wastewater

<http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/15a%20ncac%2002b%20.0733.pdf>

.0734 Buffers

<http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/15a%20ncac%2002b%20.0734.pdf>