North Carolina's Nutrient Trading and Joint Compliance Framework

Discussion Draft #2

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N.C. Division of Water Resources, Nonpoint Source Planning Branch

Contents

Chapter 1: Introduction

1.1 Purpose

The primary purpose of this document is to provide guidance regarding nutrient trading options in North Carolina as presently authorized in legislation and rule. Some attention will also be given to potential improvements across trading programs. This framework is North Carolina's first effort to comprehensively assess the status and relationships of trading and joint compliance provisions and provide state guidance on several topic areas that are not squarely addressed in rule. North Carolina's nutrient strategy regulations contain many potential trading options, which were designed to provide flexibility and potential cost savings for regulated entities. Where applicable, references to specific rule provisions are incorporated and differences among basins characterized.

Historically, nutrient trading options have developed in an *ad hoc* manner in North Carolina, with the development of each new nutrient strategy providing opportunities for innovation and customization. The incorporation of trading-related rule provisions within nutrient strategies has outpaced agency efforts to characterize them and provide guidance regarding their use. Therefore, this framework also seeks to clarify many terms and concepts associated with nutrient trading in North Carolina. Many terms are used colloquially and have malleable interpretations, with "trading" itself being the prime example. To that end, existing terms are defined and new terms are introduced so that the variety of trading and joint compliance options available to the regulated community can be more clearly explained. Where definitions aren't provided in legislation or rule, they may be provided here to develop a common working vocabulary.

1.2 Context

Historically, North Carolina has been a national leader in developing and implementing nutrient trading approaches. A first attempt launched in 1990, a group cap exceedance offset design for point sources in the Tar-Pamlico River Basin, has never required a trade. However, its group compliance feature has allowed for continued compliance at lower cost than without the program and has proved instructive for subsequent efforts. Rules for certain types of nutrient trading have been in place since the adoption of the Neuse nutrient strategy in 1998. Nutrient strategies for the Tar-Pamlico estuary, Jordan Lake, and Falls Lake have all adopted and refined many of these approaches while also authorizing new opportunities for trading. Robust nutrient markets exist in these basins in accordance with wastewater, new development, and nutrient offset rules. These active markets provide important flexibility and economically efficient compliance options for regulated parties. Yet while new opportunities for trading have been authorized in successive strategies, trades have not always materialized. Rule implementation delays in the Falls and Jordan strategies are a significant factor because the demand for credits has not yet materialized. Another major consideration is the relative cost of these options in relation to alternate compliance options.

Each of North Carolina's nutrient strategy rules are presently undergoing review of some sort. Along with these reviews comes the opportunity to amend and improve the rules. The Neuse strategy, Tar-Pamlico strategy, and the nutrient offset rule are currently being proposed for readoption pursuant to G.S. 150B-21.3A.

Additionally, the Falls Lake strategy rules include various trading and joint compliance provisions for which guidance is necessary. Many analogous rule provisions exist in the Jordan Lake strategy, but implementation of new and existing development rules for that strategy have been delayed by the General Assembly. Both strategies are under study by the N.C. Policy Collaboratory. The readoption process for those rules has been

delayed by several years, and Collaboratory recommendations are also expected to inform future revisions to North Carolina's trading rules.

1.3 Overview of Existing Trading Authorities

Trading activity in North Carolina is guided and bounded by several federal, state, and contractual sources of authority. At the federal level, wastewater and some stormwater discharges are governed by the Clean Water Act through the National Pollutant Discharge Elimination System (NPDES). While the Clean Water Act and associated regulations are generally silent on the topic of point source trading, EPA policies have been developed to support trading by permitted sources as a compliance option.[1]

Regulatory approaches to nonpoint source pollution are largely the domain of the state. The Clean Water Responsibility and Environmentally Sound Policy Act, passed by the General Assembly in 1997, authorizes regulatory approaches to address nutrient-related point and nonpoint sources.[2] More recent session laws codified under G.S. 143-214.26 authorize the trading of nutrient offset credits among various parties.

North Carolina's nutrient strategy rules provide more context for trading, whether in relation to specific regulated sectors or through stand-alone nutrient offset and trading rules:

- **Wastewater** treatment facilities are authorized to trade allocation among themselves through compliance associations and may purchase offset credits to increase load allocation. Wastewater compliance associations may also be required to purchase nutrient offset credits if group cap exceedances occur.[3]
- **New development** regulations authorize the purchase of off-site nutrient offset credits after meeting specific criteria.[4]
- **Agricultural** rules are structured such that farmers are not required to purchase offset credits, but the rules do provide a potentially important trading role for agricultural oversight committees in each watershed.[5]
- Finally, **existing development** rules in the Jordan and Falls watersheds generally reference several trading and joint compliance approaches.[6]

The cross-strategy nutrient offset rule is the primary rule governing the creation of nutrient offset credits, and it also includes provisions governing nutrient offset credit transactions.[7] In addition, the Jordan and Falls Lake strategies contain stand-alone trading rules, explicitly authorizing trading for all regulated parties according to specific conditions.[8] These two trading rules function as an overlay on the nutrient offset rule,

[1] See https://www.epa.gov/npdes/water-quality-trading for more information regarding EPA trading policy and guidance.
[2] See S.L. 1997-458.
[3] Nutrient-related wastewater regulations include 15A NCAC 02B .0229 (Tar), .0234 (Neuse), .0270 (Jordan), and .0279 (Falls).
[4] Nutrient-related new development regulations include 15A NCAC 02B .0235 (Neuse), .0258 (Tar), .0265 (Jordan), and .0277 (Falls).
[5] Nutrient-related agriculture regulations include 15A NCAC 02B .0238 (Neuse), .0255, .0256 (Tar), .0264 (Jordan), and .0280 (Falls).
[6] Nutrient-related existing development regulations include 15A NCAC 02B .0266 (Jordan) and .0278 (Falls).
[7] 15A NCAC .02B .0240
[8] See 15A NCAC .02B .0273 (Jordan) and .0282 (Falls).

and are primarily intended to add criteria to guide trades under the Existing Development Stormwater rules in those two watersheds.

Finally, contractual sources of authority often govern trading activity. These generally include the banking instruments, project plans and conservation easements required by state regulators to generate nutrient offset credits. The bylaws of wastewater compliance associations also provide a source of authority to govern nutrient allocation trading between members of the association.

Chapter 2: Key Concepts

2.1 Organizing Nutrient Transactions

Before discussing forms of nutrient transactions, it will be useful to distinguish them from compliance involving no transactions. Credit generation generally describes the process of creating and documenting nutrient load reductions in compliance with a nutrient strategy. Many credits generated by regulated entities are likely to be used for compliance purposes by the party that generated them. Guidance for demonstrating such direct compliance is provided elsewhere, depending on the nutrient strategy rule. This framework focuses on credit generated and used in nutrient-related transactions.

This framework describes several types of nutrient-related transactions. This chapter characterizes basic principles that appear in North Carolina trading programs. Applicability will vary depending on the governing rule. Often multiple transaction options are available for a party seeking to meet its needs. Some options may have clear advantages or disadvantages, including differences in cost.

Two questions can be used to help distinguish among these options. First, does the state regulate the transaction? Second, what is the nutrient-related asset that is being exchanged? Key differences arise depending on the answers to these questions. The state-regulated exchange of nutrient offset credits, or credit trading, is reviewed in chapter 3. The state-regulated exchange of nutrient allocation, or allocation trading, is reviewed in chapter 4. Joint compliance provides an avenue for unregulated nutrient transactions among parties, and different joint compliance options are discussed further in chapter 5. Each chapter will include tie-ins to relevant rules language governing aspects of that form of trading.

2.1.1 Trading vs. Joint Compliance

This framework introduces a key distinction between trading and joint compliance. Both transaction types ultimately allow "trading" to occur in its broadest economic sense: the exchange of one thing for another. In this broad sense, a nutrient-related asset is typically exchanged for financial or other consideration.

Hereafter, **trading** will be defined in a more limited way, with respect to the current nutrient rules, to mean the state-regulated exchange of nutrient allocation among point source dischargers or the exchange of nutrient offset credits. When nutrient offset credits are being exchanged, the state retains an oversight role in the generation, transaction, and retirement of these credits. Likewise, if a permit modification is a necessary element of the transaction, state oversight is also required.

In contrast to trading, **joint compliance** is hereafter defined as a voluntary strategy where regulated entities choose to merge individual nutrient reduction requirements to create a larger compliance "**bubble**." So long as the terms of the compliance bubble are met, the individual nutrient reduction requirements comprising the bubble are not enforced. In such an arrangement, members of the compliance bubble are free to negotiate the terms by which joint compliance are met, including the terms of any financial compensation among parties. The state's interest is generally limited to ensuring compliance with the terms of the bubble. Transactions may be relative to nutrient allocation, in the case of point sources, or nutrient compliance credit in the case of local governments under existing development stormwater rules.

2.1.2 Credits vs. Allocation

A **nutrient offset credit** is a nutrient load reduction credit that is generated in compliance with the nutrient offset rule, 15A NCAC 02B .0240 (proposed for readoption as 15A NCAC 2B .0703). Nutrient offset credits are expressed in pounds of total nitrogen or total phosphorus and may be traded. Once acquired, nutrient offset

credits may be redeemed with the regulating authority to demonstrate compliance under new and existing development stormwater rules. Nutrient offset credits may also be converted into nutrient allocation for point source dischargers.

Nutrient allocation represents the allowable nutrient load that can be discharged from a wastewater facility. A facility's allocation is applied in its NPDES permit to establish an enforceable permit limit. Nutrient allocations are set for many wastewater facilities during the initial implementation of a nutrient strategy. Larger facilities then receive permit limits based on those allocations. After that time, new or expanding facilities must secure nutrient allocation from other wastewater facilities or offset credits for their discharges prior to permit issuance. Allocation trades may occur via permit modifications as described in chapter 4, or a joint compliance bubble may be utilized to facilitate allocation transactions as described in chapter 5.

2.2 Trading Ratios

Nutrient transactions may be subject to various trading ratios depending on the strategy, type of transaction and relationship between trading parties. Many of these ratios are not explicitly defined as such in North Carolina's rules, but they are defined here to provide statewide consistency in interpretation.

2.2.1 Delivery Factors and Transport Factors

Delivery factors and **transport factors** are both applied to account for the relative position of nutrient reduction practices and nutrient-increasing activities in a nutrient strategy watershed. The impacts of pollution and restoration are both lessened by natural instream processes upstream from the lake or estuary. From a general compliance perspective, transport or delivery factors reduce the total "to-lake" or "to-estuary" load reduction requirements for regulated parties but they also reduce the potential to-lake or "to estuary" credit received for upstream practices installed. If a regulated nutrient source and offsetting restoration activities occur within the same delivery zone, the delivery factors cancel out.

TABLE 1: USE OF DELIVERY AND TRANSPORT FACTORS IN NORTH CAROLINA'S NUTRIENT STRATEGIES

	Delivery Factors (NPS)	Transport Factors (PS)
Falls	N	N
Jordan	Y	Y
Neuse	N	Y
Tar-Pamlico	N	N

While the two terms are conceptually similar, the term "transport factor" has long been used with regard to point source nutrient allocation limits and for point source allocation trading purposes. Transport factors are applied in the Neuse and Jordan Lake nutrient strategies. Meanwhile, the term "delivery factor" is currently used in a nonpoint source context, including for new development, existing development, joint compliance, and nutrient offset credit trading. Delivery factors are currently applied only in the Jordan Lake watershed.

2.2.2 Point to Nonpoint Source Trading ratios

A **point to nonpoint source trading ratio** is utilized to account for the relative and unavoidable uncertainty of nonpoint source nutrient reduction practices in comparison to, and when used to offset, increased nutrient loading from point sources. Examples of this uncertainty include underlying nonpoint source practice assumptions, availability of supporting scientific data, unmonitored environmental variability, practice performance variability between installations and over time, and other considerations. The value and

application of point to nonpoint source ratios vary nationwide and in North Carolina, but the default value in most nutrient trading programs is 2:1 or greater.[9] The application of this ratio in specific watersheds is discussed further in section 3.4.

No specific point to nonpoint source trading ratio is required by state or federal law. Yet when nutrient offset credits are used to justify additional NPDES-permitted point source discharges in impaired watersheds, federal law and guidance pertain. EPA's 2003 Water Quality Trading Policy provides that, for states to have "credible" trading programs, several approaches may be used to compensate for nonpoint source uncertainty, including:

> "… monitoring to verify load reductions, the use of greater than 1:1 trading ratios between nonpoint and point sources, using demonstrated performance values or conservative assumptions in estimating the effectiveness of nonpoint source management practices, using site- or trade-specific discount factors, and retiring a percentage of nonpoint source reductions for each transaction or a predetermined number of credits."

Applying these criteria in North Carolina, a default point to nonpoint source ratio is both desirable and necessary because the other listed mechanisms to address this uncertainty are not in place. Reviewing the other criteria in turn, nutrient monitoring of nonpoint sources is not required and to do so would likely be cost prohibitive. As described in the following section, uncertainty factors and conservative crediting methodologies have not been utilized to date during the establishment of practice crediting values. Site- or trade-specific discount factors are not presently used in North Carolina, nor are reserve or retirement ratios.

Ultimately, a new or expanding NPDES-permittee seeking to increase nutrient discharges into an impaired water body retains the burden to demonstrate that such a permit complies with the Clean Water Act by ensuring no net pollutant increase occurs. A credible state nutrient offset program, as that term is used in EPA guidance, can relieve that burden by providing a clear and efficient pathway to fully offset nutrient loads.

2.2.3 Uncertainty Factors and Conservative Crediting Assumptions

Credit values for nonpoint source nutrient reduction practices are subject to various sources of uncertainty that vary across practice types. However, this is also true for nonpoint source impacts. During its practice development process, North Carolina seeks to define a credit value based on a central measure of tendency as identified by literature reviews, modeling, or other approaches. For all practices currently credited by the Division, a practice-specific **uncertainty factor** was not used to establish a credit value.

As new practice standards are developed, it may become necessary to incorporate uncertainty factors or conservative crediting approaches. To the extent that is done, it should be used to reflect relative confidence in the practice in relation to other nonpoint source practices.

Regarding conservatism in crediting, North Carolina's predominant crediting methodology for agricultural buffer restoration has been in place since 1998 and provides an extremely generous credit in comparison to

[9] Representative examples outside of North Carolina include the Chesapeake Bay Program (2:1), Bear Creek, CO (2:1), Chatfield Watershed Authority, CO (2:1), Delaware Inland Bays (2:1), Florida (2:1 or 3:1), Rahr Malting Co., MN (2.6:1), Princeton WWTF, MN (2.6:1), New York City (3:1), Ohio (2:1 or 3:1), Pennsylvania (3:1), Virginia (2:1), and Fox River WI (2:1). Specific references available upon request.

more recent literature estimates.[10] Likewise, for SCMs neither past site-specific engineering calculations nor the North Carolina Stormwater Control Measure Credit Document[11] specifically address issues of relative uncertainty. Instead, a measure of central tendency is used to establish event mean concentrations (EMCs), which are then used to model SCM nutrient performance.

The relationship between point to nonpoint source ratios and other uncertainty ratios is potentially confusing and concerns about duplicative accounting for uncertainty have been raised by the regulated community. Moreover, concerns about a "double standard" have also arisen. It is worthwhile to recognize that neither of these is occurring, and instead that a separate standard is considered necessary and appropriate for point-to-nonpoint trades. NPDES permits are ultimately governed by federal law and are subject to EPA oversight. The burden to prove compliance with the Clean Water Act's permitting provisions is unique to the point source sector. Meanwhile, nutrient strategy regulations for new and existing development have their foundations in state authority. The alternative of applying a conservative nonpoint source credit assignment approach in lieu of applying a point to nonpoint source trading ratio risks making the credit more expensive for developers, for whom credit acquisition is routine, and for local governments as their existing development requirements mature.[12]

2.2.4 Other ratios

A comparative review of other jurisdictions and national guidance reveals other types of ratios that are not presently applied in North Carolina. For example, retirement ratios are often used to secure a net water quality benefit for trades. North Carolina's trading framework does not include a retirement ratio, instead being designed to promote cost-efficient trades that are nutrient neutral relative to direct compliance options. Likewise, insurance ratios are also sometimes utilized to account for the risk of project failures during the life of the credit.

2.3 Credit Stacking

Credit stacking is commonly defined as the establishment of more than one credit type on spatially overlapping areas.[13] For the reasons described below, nitrogen and phosphorus credits (collectively nutrient credits) may be stacked with one another. Stream mitigation credits and nutrient credits are presently allowed to be stacked. However, nutrient may not be stacked with buffer or wetland compensatory mitigation credits that are commonly generated in North Carolina for water quality purposes.

The evaluation of whether stacking is appropriate relies heavily on the impacts and benefits under consideration in various trading and mitigation programs. Wetland, stream, and buffer credits all represent **bundled credits**, which generally account for all services provided by a particular ecosystem. For example, wetlands can provide habitat for fish, shellfish, migratory birds and endangered species; flood protection; erosion control; and water quality benefits including but by no means limited to nitrogen and phosphorus

[10] North Carolina's agricultural buffer restoration credit is 75.77 pounds/acre/year total nitrogen and 4.88 pounds/acre/year total phosphorus. But see D.E. Line and W.F. Hunt, Cost Effectiveness of Agricultural and Urban BMPs for NC, 2007, at 14-15 and 32 (22.2 pounds/acre/year nitrogen, 4.4 pounds/acre/year total phosphorus.)

[11] See https://deq.nc.gov/sw-bmp-manual

[12] Developers are the primary users of nutrient offset credit, with local governments subject to existing development rules also expected to increase demand upon the implementation of local existing development programs in the Falls and Jordan watersheds.

[13] Jessica Fox, Gardner R.C. and Maki T. Stacking Opportunities and Risks in Environmental Credit Markets. 41 Environmental Law Reporter 10121. Feb. 2011.

attenuation. As wetlands are damaged through development, they are replaced elsewhere through mitigation which seeks to restore these functions in whole. Importantly, the destruction of wetlands, buffers, and streams within nutrient strategy watersheds would likely result in additional nutrient loading if not for mitigation requirements designed to restore an area equal to or greater than the area impacted.

On the other hand, nutrient offset credits represent an **unbundled credit**, where only one among many ecosystem services is being accounted for. All nutrient reduction practices generate nutrient reduction credit, but many also have additional benefits that are not accounted for. So long as the various unbundled credits resulting from a nutrient reduction project are discrete, they may be stacked and sold separately to offset distinct impacts without **double counting**.

Nitrogen and phosphorus are individual pollutants and reductions in these nutrients represent distinct benefits. Nutrient reduction practices have differing nutrient reduction capabilities, both in absolute terms and in their relative efficiency in treating nitrogen and phosphorus. Likewise, entities regulated through nutrient strategy rules must often meet both nitrogen and phosphorus reduction requirements. In sum, because double counting is not occurring, it is generally appropriate to stack nitrogen and phosphorus offset credits with each other.[14]

The case for stream and nutrient credit stacking is more complex, and a greatly simplified summary is provided here. Development projects that impact streams and adjacent forested buffers often trigger separate mitigation requirements under federal mitigation rules and state buffer rules. Generation of stream credits involves both stream channel restoration and the establishment of adjacent forested riparian buffers, while state buffer rules separately require establishment of forested riparian buffers. Because the impacts to a forested buffer have the potential to be double-counted in this scenario, double counting is also allowed during the generation of mitigation credits by allowing stream and buffer credits to be stacked. Because nutrient offset credits are typically generated by creating forested riparian buffers, it follows that stream and nutrient offset credits may also be stacked.

2.4 Compensatory Mitigation vs. Nutrient Offsets

Compensatory mitigation and offsets both generally describe environmental restoration projects meant to alleviate or nullify environmental impacts. However, important distinctions exist in practical usage and in underlying statutory authorities regarding these activities. This passage from Cooley and Olander reflects the practical distinction well:

> "Offsets and mitigation credits are distinct from one another in that offsets are typically meant to offset emissions of a single pollutant, such as carbon dioxide emissions or discharge of nitrogen to a waterway, whereas mitigation typically refers to credits to offset impacts to whole ecosystems, such as wetland or endangered species habitat."[15]

[14] Section 2.3 provides a superficial overview of credit stacking concepts. In addition to the prior reference, other notable publications on this topic include David Cooley and Olander L, Stacking Ecosystem Services Payments: Risks and Solutions, September 2011 and Olander, Lydia, "Managing Risk in Environmental Markets," NI WP 16-02, Durham NC, Duke University, 2016.

[15] David Cooley and Olander, Lydia, Stacking Ecosystem Services Payments: Risks and Solutions at 10. September 2011.

The primary statute governing nutrient offset credits in North Carolina is G.S. § 143-214.26. In contrast, compensatory mitigation is primarily governed by G.S. § 143-214.11. However, the nutrient offset statute does reference the compensatory mitigation statute to limit the geographic offset credit trading area[16] and to define the term "governmental entity."[17] Another related source of authority is G.S. § 143-214.20, which establishes compensatory mitigation options for forested buffer impacts.

The nutrient offset market for new development is well established and its authority is relatively clear. However, as new trading options are developed and implemented, questions are likely to arise regarding the interpretation and application of these statutory authorities. The Division will seek to address these questions, in concert with regulated parties and in a transparent manner, as specific needs arise.

[16] § 143-214.26(a)(2)
[17] § 143-214.26(b) and (c)

Chapter 3: Nutrient Offset Credit Trading

3.1 Nutrient Offset Credit Trading Overview

All forms of credit trading under state nutrient strategies are covered by the requirements of the nutrient offset rule. A robust market for these credits serves developers in nutrient strategy watersheds, and one short-term credit purchase by a point source in the Neuse basin has been recorded. Local, state, and federal government entities with existing development requirements are anticipated to be another source of credit demand in future years.

Key features of the nutrient offset approval process are the following. Nutrient offset credits are generated by working with DWR's Nutrient Offset Program, organizationally housed within the 401 and Buffer Permitting Branch of DWR. Prior to the installation of a nutrient reduction project, DWR staff provides a site viability assessment to determine eligibility for nutrient offset credit generation. DWR and potential credit providers proceed under the terms of a mutually signed mitigation banking instrument (MBI), which describes the specific legal conditions by which nutrient offset credits are approved for sale. This includes all project milestones that are associated with a credit release by DWR. A bank parcel development package (BPDP) provides project-specific details of the restoration site, including information about the existing land use and the proposed nutrient reduction practice. A conservation easement and financial assurances are also required. Once these arrangements are in place, the nutrient reduction practice is implemented and an "as-built" report is provided to DWR. DWR then confirms site conditions are as described in the as-built report, and monitoring is also conducted to ensure project success in subsequent years.

DWR's Nutrient Offset Program releases credits for all nutrient reduction projects after confirming that the requirements of the nutrient offset rule and the terms of a project's banking instrument have been met. Credit is periodically released as project-specific milestones are met during implementation. Credits are awarded for a 30-year duration. Agricultural buffer restoration presently earns 75.77 lbs. N/acre/year and 4.88 lbs. P/acre/year, which translates over 30 years to a total of 2273 lbs. N/acre and 146.4 lbs. P/acre. A buffer restoration project typically accrues all credits over a period of 5-7 years.

Once nutrient offset credits are released by DWR, providers record them on a ledger. Ledgers provide critical information regarding the creation of nutrient reduction credits by the provider and show when and to whom they have been sold. Credits may then be sold to regulated parties. Nutrient offset credit sales (or trades) are documented by the providers, who submit updated ledgers to DWR on a recurring basis. The DWR website acts as a central repository of these ledgers for all existing private banks, providing market transparency and advertising the existence of nutrient offset credits for purchase. Ledgers submitted to DWR are periodically audited by the Nutrient Offset Program.

Once acquired by a regulated party, nutrient offset credits are redeemed with the permitting authority to satisfy a regulatory obligation. For developers using offsets, local government project approval is predicated on proving that sufficient credit was purchased. Those nutrient offset credits are then retired on the credit provider's ledgers.

When used for existing development purposes, nutrient offset credits will not be retired. Instead, they will be transferred to a local government's nutrient ledger that is submitted to demonstrate existing development rule compliance. Unlike a third-party provider's ledger, these local government ledgers will remain active indefinitely as the jurisdictions' means of demonstrating progress under and compliance with Existing Development rules.

In the wastewater context, nutrient offset credits may be redeemed with the Division and retired on the provider's ledger in exchange for permit allocation in accordance with nutrient strategy wastewater rules.

3.1.1 Eligible Nutrient Reduction Practices

The nutrient offset rule does not limit the type of practices that may be used to generate nutrient offset credit. However, it does place the burden of calculating load reductions upon the provider.[18] To ease this burden, the Division maintains and seeks to expand a suite of Division-approved nutrient reduction practices. These pre-approved practice standards include design criteria, calculation methods, and the scientific basis for generating nutrient reduction credit. Buffer restoration on agricultural landscapes is the practice that presently generates nearly all nutrient offset credits. Other nutrient reduction practices including stormwater control measures are also eligible. These documents will soon be compiled and published as the N.C. Catalog of Nutrient Reduction Practices. DWR and local governments have been working in partnership to expand the number of nutrient reduction practices available for existing development rule compliance, and in some cases these nutrient reduction practices may also be suitable for generating nutrient offset credits.

3.1.2 Eligible Credit-Generating Entities

G.S. 143-214.26 clearly defines a credit-generating role for Division of Mitigation Services by allowing payment of an in-lieu fee to the Department.[19] Beyond that, it does not clearly address the organizational status required to establish a nutrient offset bank. The nutrient offset rule provides little additional context except for allowing "other public or private parties" to "implement projects for nutrient offset purposes."[20] The role of private mitigation banking companies in generating nutrient offset credits is well established in practice. However, other entities may also be eligible to generate nutrient offset credits.

As private parties, agricultural producers[21] in the Neuse and Tar-Pamlico basins may generate credits if they meet the requirements of the offset rule. However, no producers have established a nutrient offset bank in those watersheds.

Producers in the Falls and Jordan watershed are subject to additional procedural limitations on ability to generate credits. In the Jordan agriculture rule, producers may only generate credits for sale if their subwatershed has met its nitrogen reduction goal.[22] Furthermore, any trades involving these credits must be approved by the Watershed Oversight Committee (WOC).[23] In both the Jordan and Falls agriculture rules, the

[18] 15A NCAC 02B .0240(C)(6)(B)
[19] G.S. 143-214.26(b)(1) and (c)(1).
[20] 15A NCAC .02B .0240(a)
[21] Nutrient strategy agriculture rules several different terms for the parties regulated. The Falls agriculture rule alone refers to "farmers" (.0280(2)), "producers" (.0280(2), "persons engaging in agricultural operations" (.0280(4)), and "agriculture" ((.0280(5)(a)) in generally synonymous terms.
[22] 15A NCAC 02B .0264(6)(c)
[23] For Falls Lake, see 15A NCAC .0280 (7)(b)(viii). ("The Watershed Oversight Committee shall: Quantify the nitrogen and phosphorus credits generated by such practices for the purpose of selling or buying credits; establish criteria and a process as needed for the exchange of nutrient credits between parties subject to this rule with each other or with parties subject to other nutrient strategy rules in the Falls lake watershed pursuant to the requirements of 15A NCAC 02B .0282; obtain approval from the Division for this trading program pursuant to the requirements of Rule .0282; approve eligible trades; and ensure that such credits traded for purposes of meeting this Rule are accounted for and tracked separately from those contributing to the objectives of other rules of the Falls nutrient strategy.") For Jordan Lake, see 15A NCAC .02B .0264(7)(b)(vii). ("The Watershed Oversight

WOC is charged with several prerequisite duties before producers can trade credits with each other or other regulated parties, including quantification of nitrogen and phosphorus credits for nutrient reduction practices, establishment of a process for trading credits to other regulated parties, and approval of trades.[24] The practical effect of these limitations is a de facto prohibition for producers generating credits in these watersheds at present because neither the Division nor the WOCs have investigated these issues in depth. When and if such issues are resolved, this guidance will be updated.

Nutrient strategy agriculture rules do not restrict agricultural producers' ability to sell land or easements, and the rule limitations described above only apply to the producers themselves. Property rights to riparian buffer areas are routinely transferred from farmers to private mitigation banking companies or DMS, where they are then used to generate credits through agricultural buffer restoration.

Local governments, utilities, nonprofit institutions, and some state institutions other than DMS have expressed varying levels of interest in establishing nutrient offset banks. DWR's general interpretation of existing authorities does not preclude these entities from establishing a nutrient offset bank. Case specific legal determinations will be made during the drafting and evaluation of an applicable nutrient offset banking instrument.

3.1.3 Assigning nutrient offset credit

Nutrient offset credit will be awarded to any eligible entity that establishes a nutrient offset bank with the Division and otherwise complies with the requirements of 15A NCAC 02B .0240. The initial assignment of nutrient offset credits by DWR may not be split among entities, but nutrient offset credits may be traded among entities once they have been generated.

3.2 Provider to Developer Credit Transfer (New Development Rules)

Applicable basins: Neuse, Tar-Pamlico, Jordan, and Falls

Each nutrient strategy rule has provisions allowing developers to purchase nutrient offset credits in specific cases. In the Neuse and Tar-Pamlico rules, new development stormwater rules apply to developers in named counties and municipalities. In the Jordan and Falls rules, different rules or rule provisions govern private or local government development, road development by NCDOT, non-road development by NCDOT, and development by other state and federal entities.[25]

North Carolina has a robust program of nutrient offset credit trading to facilitate compliance with new development regulations. Private providers and the N.C. Division of Mitigation Services routinely generate nutrient offset credits in accordance with 15A NCAC 02B .0240. To date, these credits are almost exclusively generated by agricultural riparian buffer restoration projects. Providers then sell nutrient offset credits to

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Committee shall: Investigate and, if feasible, develop an accounting method to equate implementation of specific nitrogen-reducing practices on cropland or pastureland to reductions in nitrogen loading delivered to streams. Quantify the nitrogen credit generated by such practices for purposes of selling or buying credits. Establish criteria and a process as needed for the exchange of nitrogen credits between parties meeting the criteria of either Sub-Item (5)(b) or Sub-Item (6)(c) of this Rule with parties subject to or operating under other nutrient strategy rules in the Jordan watershed pursuant to the requirements of 15A NCAC 02B .0273. Approve eligible trades, and ensure that such practices are accounted for and tracked separately from those contributing to the goals of this Rule."

[24] 15A NCAC 02B .0280(7)(b)(vii)

[25] For private development or local government development, in Falls see 15A NCAC 02B .0277 and in Jordan see 15A NCAC 02B .0265. For state and federal development, in Falls see 15A NCAC 02B .0281 and in Jordan see 15A NCAC 02B .0271.

developers that cannot or choose not to meet the onsite nutrient loading targets contained in new development regulations. This type of trade is common to each of North Carolina's major nutrient strategies.

Developers interested in obtaining nutrient offset credits from providers follow a predetermined and established process. If a developer determines that it is advantageous to seek nutrient offset credits for a new development project, the permitting authority (local government or state) will certify this need using a standard form. Developers may then contact any or all providers with nutrient offset banks serving their area. Nutrient offset credit prices are determined through negotiation between the developer and provider. If no nutrient offset credits are available from private providers, developers may seek to pay an established in-lieu fee to DMS to meet this regulatory requirement. DMS may either apply existing nutrient offset credits to this requirement or generate nutrient offset credits in accordance with the nutrient offset rule. Developers who are government entities, as that term is defined in G.S. 143-214.11, may seek nutrient offset credits directly from either DMS or a private bank in no mandated order.[26] Government entities include all state and federal entities regulated by North Carolina's nutrient strategy rules as well as some local governments.

The developer's purchase of credit or utilization of DMS's in lieu fee program constitutes a trade. Once the trade occurs, the nutrient offset provider issues a receipt of the transaction to the developer. The credit is deducted from the nutrient offset bank ledger and through this action the credits are effectively retired. The developer then provides proof of the nutrient offset purchase to the local government to satisfy the conditions of its development permit.

3.3 Provider to Local Government Credit Transfer (Existing Development Rules)

Applicable basins: Jordan and Falls

Nutrient offset credits may be purchased by local governments seeking to comply with existing development stormwater rules. These credits may be purchased from nutrient offset banks and/or from DMS as described by G.S. 143-214.26.

Per existing development rules, compliance will be evaluated on an annual basis. Generally, for direct compliance with the rule, local governments will provide a summary of nutrient reduction practices and associated nutrient credits to DWR. If a local government anticipates an annual credit shortfall for existing development compliance, it must acquire nutrient offset credits prior to the end of its reporting year to remain in compliance. Nutrient offset credit purchases should be summarized as part of the local government's annual existing development report, with DWR verifying the transactions via the ledgers of the nutrient offset bank or DMS as applicable.

3.4 Provider to Wastewater Facilities Credit Transfer (Wastewater Rules)

Applicable basins: Neuse, Tar-Pamlico, Jordan, and Falls

Offset transactions sought by wastewater facilities are governed by G.S. 143-214.26, applicable wastewater rules and the nutrient offset rule. Under the wastewater rules in the Neuse, Jordan and Falls watersheds, new and expanding wastewater facilities must first evaluate all practical alternatives to a surface water discharge and make reasonable efforts to obtain allocation from existing dischargers before seeking nutrient offset credits generated from nonpoint sources.[27] Where those efforts prove unsuccessful, nutrient offset

[26] G.S. 143-214.26

[27] For Neuse, see 15A NCAC 02B .0234 7(a), 7(b), 8(a), 8(b). For Jordan, see 15A NCAC 02B .0270(7)(a)(1) and (8)(a)(i). For Falls, see 15A NCAC 02B .0279(8)(a)(i), (9)(a)(i).

credits may then be purchased by wastewater facilities. The nutrient offset rule includes procedural requirements specific to wastewater dischargers that are analogous to the process for developers. To realize the benefits of a nutrient offset credit, facilities should work primarily through DWR's NPDES permitting branch. DWR will certify the need for credits, and the facility may then purchase credits from a nutrient offset credit provider. Once purchased, these credits may be used to justify a permit modification allowing for an increased nutrient loading cap in future years.

In the Neuse River Basin, a succession of wastewater and nutrient offset rule amendments has led to a murky rule language that presently governs the acquisition and redemption of nutrient offset credits for wastewater rule compliance purposes. In this circumstance, "facilities may purchase a portion of the nonpoint source load allocation for a period of 30 years at a rate of 200 percent of the cost as set in 15A NCAC 02B .0240 to implement practices designed to offset the loading created by the new facility."[28] While the nutrient offset rule once contained reference to a specific cost rate for nonpoint source nutrient reduction practices, it now requires payment for credits at a rate negotiated between the provider and purchaser. The practical effect of this rule at the time it was written was to enforce a 2:1 point to nonpoint source trading ratio when purchasing nutrient offset credits for point source compliance. Clarifying language has been proposed for the Neuse wastewater rule.

In Jordan and Falls watersheds, trading rules specific to each watershed exist in addition to the governing authorities identified above.[29] For wastewater offsets, the trading rules heavily reference both the nutrient offset rule and the Falls and Jordan wastewater rules. Notably, both the trading and offset rule contain a provision that "the party seeking to sell credits shall…quantify and account for relative uncertainties in the reduction need estimates and excess loading reduction estimates."[30] However, in these watersheds no specific point to nonpoint source trading ratio has been identified. To the extent nutrient offset credits are acquired for wastewater compliance purposes in these basins, the Division will work with both parties to ensure these relative uncertainties are addressed.[31]

In the Tar-Pamlico Basin, unlike the other watersheds, no specific rule exists to address wastewater facilities that are members of the Tar-Pamlico Basin Association (TPBA). As a legacy of being the first nutrient trading program developed in the state, their discharges are governed by a three-party agreement between TPBA, DEQ, and the Department of Agriculture and Consumer Services.[32] The agreement has a self-contained nutrient offset program, in which TPBA may pay a specified rate of $13.15/ lb. N to the N.C. Division of Soil and Water Conservation for the installation of cost-share practices in the event of nutrient cap exceedances. The agreement also contains a provision for the parties to develop an offset rate for phosphorus and update the payment rate for nitrogen over time based on a suite of considerations. It does not explicitly authorize the redemption of nutrient offset credits generated by the nutrient offset rule.

[28] 15A NCAC 02B .0234(7)(b) and (8)(d)
[29] 15A NCAC 02B .0273 (Jordan), 15A NCAC 02B .0282 (Falls)
[30] 15A NCAC 02B .0273(2)(d)(ii) (Jordan), 15A NCAC 02B .0282(2)(b)(i) (Falls)
[31] Section 2.2 provides a brief discussion of options that might be utilized to address "relative uncertainties" in accordance with federal law and guidance.
[32] Tar-Pamlico Nutrient Sensitive Waters Implementation Strategy: Phase IV. July 9, 2015. Accessible at: https://deq.nc.gov/about/divisions/water-resources/planning/nonpoint-source-management/nutrient-strategies/tar-pamlico.

For non-association dischargers in the Tar-Pamlico basin, new or expanding facilities may generate allocation by "funding nonpoint source control programs approved by the Division of Water Quality" at a rate specified in 15A NCAC 02B .0237 ($29/kg or 13.15/lb).[33] This value was based on the installation of anaerobic lagoons as a nutrient reduction practice and its calculation included both a 200% uncertainty factor and a 10% administrative cost.[34] In addition, this rate is subject to a 110% multiplier as directly provided in 15A NCAC 02B .0229. DWR has proposed modernizing this rule to allow all new and expanding dischargers in the Tar-Pamlico basin to acquire and utilize nutrient offset credits from private banks or the Division of Mitigation Services at prevailing market rates.

3.5 NPDES Permittee-Responsible Nutrient Offsets

Applicable basins: Neuse, Tar-Pamlico, Jordan, and Falls

As described in section 4.3, a wastewater discharger may purchase nutrient offset credits from a nutrient offset bank for wastewater compliance purposes. Representatives of wastewater treatment plants have also expressed interest in generating their own nutrient offset credits through nonpoint source nutrient reduction projects. Vertically-integrated, permittee-responsible nutrient offset projects have not yet been implemented for wastewater compliance purposes in North Carolina, owing in part to the existence of a robust nutrient offset credit market and a lack of historical demand from point sources. However, rules or guidance supporting this trading scenario are common nationwide.

The nutrient offset rule, 15A NCAC 02B .0240, is designed to provide accountability and consistency in the creation and transaction of nutrient offset credits. When used to satisfy point source obligations, the requirements of the nutrient offset rule also provide confidence that credits generated and traded are compliant with the Clean Water Act and associated EPA policy and guidance. Such oversight is particularly important when a single party is generating nonpoint source credits, transacting them between rule domains, and redeeming them to assist with NPDES wastewater permit compliance.

Local governments interested in this approach may coordinate with DWR's 401 and Buffer Permitting Branch to establish a nutrient offset bank as generally described in Chapter 3. Credits generated may be utilized to increase nutrient allocation limits contained in NPDES wastewater permits. Once generated, local governments may seek an NPDES nutrient permit allocation increase consistent with the credits generated.

Note: Applicability in Falls Lake

In the Falls Lake watershed additional rule language applies to the permittee-responsible scenario. Originally envisioned to allow point source improvements to support existing development rule compliance, 15A NCAC 02B .0282(4) says "(4) Local governments have the option of combining their reduction needs from NPDES dischargers assigned allocations in 15A NCAC 02B .0279 and existing development as described in 15A NCAC 02B .0278 […] into one reduction and allocation requirement and meet them jointly." This language is generally consistent with a jurisdictional joint compliance approach.

[33] 15A NCAC 02B .0229

[34] Tippett, John P. and Randall C. Dodd. Cost-Effectiveness of Agricultural BMPs for Nutrient Reduction in the Tar-Pamlico Basin. Research Triangle Institute. January 1995. "Our estimated cost-effectiveness range for the above scenario is from $5 to $21 per kilogram of nitrogen reduced (Table ES-1). To estimate a single trading value, NCDEM multiplied the median of this range ($13/kg N) by a safety factor of 2 and then added at 10% administrative cost. The resulting figure was $28.60, which was rounded to $29/kg N." (pg. 76).

Unfortunately, if used to justify wastewater permit exceedances, this provision potentially conflicts with key elements of the Clean Water Act and EPA's trading policy and guidance. First, it does not include PS: NPS trading ratios to account for the relative uncertainty of nonpoint source reductions. Second, DWR's oversight of the existing development rule is unlikely to entail a project-by-project review of nutrient reduction projects installed by local governments for direct compliance purposes.

A trading ratio and a higher level of project oversight, both of which would be generally consistent with the generation of nutrient offset credits, is much more likely to comply with Clean Water Act requirements. While local governments in the Falls Lake watershed may indeed merge their stormwater and wastewater obligations, in cases where an NPDES permitted wastewater facility is expected to discharge more nutrients than permitted, local governments should proactively plan to generate nutrient offset credits and increase their nutrient allocations to remain in compliance with state and federal NPDES permit requirements.

Practically, DWR notes that Falls WWTFs are discharging well below their stage I limits and the implementation of the Falls existing development rule is in early stages. It is difficult to project a near-term scenario in which a Falls WWTF will be reliant on NPS credits. Pursuant to S.L. 2016-94, the Falls Lake rules will be amended and readopted before stage II limits take effect. Therefore, the planned rules readoption process for the Falls Lake watershed provides an opportunity to better harmonize state and federal authorities in this area.

3.6 Agricultural Producers as Providers

As described in Section 3.1.2, the generation and transfer of nutrient offset credits by agricultural producers is subject to various regulatory restrictions in North Carolina's nutrient strategies. However, if producers comply with the standards of their applicable agriculture rule and the nutrient offset rule, they may trade credits with other parties as described in the sections above without further limitation.

This section is not intended to address circumstances under which a local government might properly generate compliance credit for existing development rules on agricultural land. At this time, the Division views this issue as direct compliance with existing development rules and not as a nutrient offset credit trade. The ultimate resolution of this separate issue and the format in which guidance will be provided remain a point of discussion with potentially interested parties.

3.7 Summary of Nutrient Offset Trading Options

The table below offers a summary of nutrient offset trading options in North Carolina's nutrient strategy watersheds for general reference purposes. If inconsistencies arise between this table and applicable laws, regulations, or written guidance, those latter sources shall govern and control.

TABLE 2: SUMMARY OF NUTRIENT OFFSET TRADING OPTIONS

		Seller/Credit Surplus				
		Nutrient Offset Bank	Developer (Private or Governmental except NCDOT)	Governmental Entity for Existing Development)	Wastewater Treatment Facility	Agricultural Producer
Buyer/Credits Needed	Nutrient Offset Bank	NA[1]	NA[1]	NA[1]	NA[1]	NA[1]
	Developer (Private or Governmental except NCDOT)	3.2	3.2[2]	3.2[2]	3.2[2,4]	3.2[2]
	Governmental Entity for Existing Development)	3.3	3.3[2]	3.3[2]	3.3[2,4]	3.3[2,5]
	Wastewater Treatment Facility	3.4	3.4[2]	3.4[2]	3.4[2,4]	3.3[2,]
	Agricultural Producer	NA[3]	NA[3]	NA[3]	NA[4]	NA[2,4]

1- Nutrient offset credits must be purchased by a regulated party and nutrient offset banks have no regulatory nutrient reduction requirements.
2- Seller would be required to establish a nutrient offset bank to sell or transfer nutrient offset credits.
3- No individual agricultural producer is required to comply with the agriculture rule and therefore no nutrient offset credits should be purchased.
4- Nutrient offset credits could theoretically be generated by wastewater treatment facilities, but there is presently limited interest in this option and no practice standard presently exists.

Chapter 4: Nutrient Allocation Trading

4.1 Nutrient Allocation Trading Overview

Applicable basins: Statewide with conditions

Nutrient allocation trading among point sources is generally authorized by the EPA in accordance with the Clean Water Act. Specific authorities are further described further in EPA's 2003 Water Quality Trading Policy and in its 2009 Water Quality Trading Toolkit for Permit Writers. In accordance with a Memorandum of Agreement with EPA, North Carolina administers the NPDES permitting program and in this role will review any proposed nutrient allocation trades conducted via permit. An example of this type of trading can be found among wastewater treatment facilities subject to the Lake Wylie TMDL.

A specific state wastewater rule is not necessary to allow such allocation trades to occur through mutual major permit modifications.[35] Nutrient strategy wastewater rules, which are currently in place for Neuse, Jordan and Falls watersheds, also provide additional compliance options for the dischargers subject to a nutrient strategy, including the option for joint compliance discussed in Chapter 5. A joint compliance approach allows facilities to trade allocation without a permit modification. In contrast, this chapter describes state-regulated nutrient allocation trading requiring a permit modification.

4.2 Nutrient Allocation Trading Requirements

The following general elements are necessary to support a point source allocation trade. More information may be requested or additional conditions may be required to ensure allocation trades are consistent with federal and state authorities.

4.2.1 Contractual Trading Agreement

Before a trade can occur, the trading parties should provide documentation to DWR that they intend to trade allocation. A bilateral contractual trading agreement will, at minimum, state the quantity and type of allocation being traded (nitrogen, phosphorus, flow). Such an agreement should be conditioned on a successful permit modification for both parties.

4.2.2 Nutrient Allocation

The facility that is selling or leasing nutrient allocation must have an existing nutrient allocation. It must also demonstrate that after the allocation is reduced, it will be able to perform within its reduced nutrient limits. The facility seeking to secure this allocation may be an existing source seeking to expand its allocation, or it may be a new source seeking to acquire nutrient allocation for the first time.

4.2.3 Common Watershed

Facilities seeking to trade nutrient allocation must each share a common watershed. Typically, a nutrient allocation originates because a downstream waterbody has been designated as impaired for a nutrient-related parameter or the segments within a watershed have received a "nutrient sensitive waters" designation. To date in North Carolina, only the more comprehensive nutrient strategies – Neuse, Tar, Jordan, and Falls – have led to establishment of nutrient allocations by the state and thus the ability to trade allocation. At minimum, point sources must share the same river basin as identified by a 6-digit hydrologic unit code (HUC). However, in some cases a smaller watershed area may have been identified by nutrient

[35] A general description of the NPDES wastewater permitting process is provided online by the Division at: https://deq.nc.gov/about/divisions/water-resources/water-resources-permits/wastewater-branch/npdes-wastewater/permitting-process#Permit_Modifications.

strategy rules. The Falls Lake and Jordan Lake watersheds are each examples of smaller watersheds, and even within those watersheds specific geographic limitations have been identified for trading.

4.2.4 Hotspot Evaluation

Allocation trades will be reviewed by DWR staff to ensure they do not create an undue risk for localized water quality impacts in the affected streams or downstream waters. Impoundments between a point source discharge location and a water body with a nutrient-related impairment, TMDL or TMDL alternatives may be particularly susceptible to the formation of nutrient hotspots.

4.2.5 Application of Trading Ratios

Trading ratios must be applied to an allocation trade to ensure the trade does not result in any additional nutrient loading to an impaired water body or a water body subject to a TMDL or TMDL alternative. If applicable, transport factors will be applied to the allocations of both buying and selling facilities. Uncertainty or point to nonpoint source trading ratios are not necessary for allocation trades. If a downstream facility is selling allocation to an upstream facility, an allocation trade may result in a net increase in total point source end-of-pipe nutrient discharges within a watershed. Such an increase is allowable so long as the to-lake or to-stream loading remains neutral.

Chapter 5: Joint Compliance

5.1 Joint Compliance Overview

In addition to utilizing traded nutrient credits, North Carolina's nutrient strategies have long provided mechanisms for **joint compliance** among a group of regulated entities. Wastewater nutrient rules provide an option for group compliance, including the aforementioned group (or "bubble") permit issued for all facilities participating in a wastewater compliance association.[36] North Carolina's existing development regulations also allow local governments to group together to meet existing development obligations within the same subwatershed.[37] Because each of these joint compliance options allow multiple regulated parties to merge regulatory requirements and meet them together, this option may be more specifically referred to as **group compliance**.

The Falls Lake rules also allow an individual local government to combine its wastewater and existing development obligations and jointly meet them within its jurisdiction.[38] This joint compliance option, resulting from the merging of regulatory requirements from two distinct domains, is hereafter referred to more specifically as **jurisdictional compliance**.

To use a well-established analogy, these joint compliance arrangements can be thought of as "bubbles" within which compliance must be achieved. In each joint compliance scenario described, compliance can be demonstrated to state regulators without the need to trade nutrient offset credits. The state's interest is primarily focused on ensuring that the terms of joint compliance are met, with little oversight regarding the terms of any transactions that occur within the bubble.

A basic premise underlying the bubble concept is the idea that individual nutrient reduction requirements, when grouped together, are additive. Therefore, an entity regulated with a single nutrient reduction requirement in any domain must choose to belong to one and only one compliance bubble with respect to that requirement. For example, a single local government's wastewater facility could be part of a wastewater compliance association or it could elect to support jurisdictional compliance. However, the facility may not do both. To provide a different example, a single local government may be a party to a wastewater compliance association and an existing development group compliance association because it has two load reduction (or allocation) assignments under two different regulated domains and would be keeping them separate. However, this arrangement would foreclose a jurisdictional compliance approach. Finally, cases may arise where a single entity has multiple requirements under spatially overlapping nutrient strategies (Falls and Neuse presently). In such cases, each distinct requirement could be applied to a joint compliance bubble for each strategy.

[36] For a Falls Lake example, see 15A NCAC .0279(11).

[37] For a Falls Lake example, see 15A NCAC .0278(6) ("A municipality shall have the option of working with the county or counties in which it falls, or with another municipality or municipalities within the same subwatershed, to jointly meet the loading targets from all lands within their combined jurisdictions within a subwatershed.")

[38] For a Falls Lake example, see 15A NCAC .0282(4) ("Local governments have the option of combining their reduction needs from NPDES dischargers assigned allocations in 15A NCAC 02B .0279 and existing development as described in 15A NCAC 02B .0278, including loads from properly functioning and malfunctioning septic systems and discharging sand filters, into one reduction and allocation requirement and meet them jointly.")

5.2 Point Source Group Compliance

Applicable basins: Neuse, Tar-Pamlico, Jordan, and Falls

Wastewater treatment facilities in the comprehensive nutrient strategy basins have nutrient limits in their NPDES permits. Each of these four nutrient strategies also allows multiple wastewater facilities to form an association and jointly comply with their total nutrient limit. At the time of this draft, compliance associations have formed in the Neuse, Tar-Pamlico, and Jordan watersheds. Each association also has its own group permit. So long as all dischargers under an association's bubble permit are collectively in compliance, nutrient permit limits for individual facilities do not apply. The benefit of this bubble arrangement is that individual facilities may exceed their limits without penalty so long as the group collectively does not. However, if the group does not meet its limit, then individually exceeding facilities are noncompliant and subject to enforcement.

Within an association, nutrient allocation trading occurs contractually between facilities and/or the association. Members can "informally" trade allocation through "leases" or "sales," depending on duration. These are not subject to formal state involvement or oversight. These allocation trades reflect self-enforcement policies of the association, which are structured to prevent the economic free rider problem. However, if the association exceeds the group limit, the individual limits in the group permit, which do not reflect these informal agreements, would be in effect and subject to enforcement. For leases or sales to be effect for compliance purposes, the facilities must agree to formally transfer the allocation and then obtain permit modifications that reflect the transfer.

5.3 Existing Development Group Compliance

Applicable basins: Jordan and Falls

Local governments seeking to meet existing development rules are provided with an option in the Jordan and Falls nutrient strategies to establish a compliance bubble with other local governments within the same subwatershed.[39] Unlike point source group compliance, these rules have not yet reached a point of implementation resulting in the pursuit of this option, thus it is untested and somewhat lean on ground rules. To exercise this option, local governments seeking to utilize this procedure will be asked to provide notice to the Division in their local existing development programs and through annual reporting. A local government may not enter or leave a compliance bubble in the middle of a reporting year; any changes in status should take effect for the following reporting year. To ensure joint compliance arrangements are clearly established among all regulated entities and to ensure the Division can adequately assess compliance with existing development rules, a copy of all supporting contractual or organizational provisions underpinning this arrangement should be provided to DWR.

State and Federal entities with existing development requirements may also participate in a group compliance approach with one another or with other local government entities.[40]

[39] For Falls, see 15A NCAC 02B .0278(6). For Jordan, see 15A NCAC 02B .0266(10)(a).
[40] For Falls, see 15A NCAC 02B .0281(8). For Jordan, see 15A NCAC 02B .0271(5)(b)(vi).

5.4 Jurisdictional Compliance (Wastewater Overtreatment).

Applicable basins: Falls

Pursuant to the Falls Lake strategy, an individual local government that has both wastewater and existing development nutrient reduction obligations may combine them and meet them jointly.[41] As with group compliance, this option has not yet been pursued by the Falls communities. If a local government intends to utilize wastewater overtreatment to assist with its existing development obligations, it should notify the Division through its local existing development program and/or annual progress reports. Nutrient reduction credit from wastewater overtreatment may be reported along with other nutrient reduction practices for annual compliance purposes.

5.5 Combining Existing Development Group and Jurisdictional Compliance Options

Applicable basins: Falls

Local governments with wastewater facilities in this watershed have multiple joint compliance options as described above. While not explicitly authorized in rule, DWR interprets that the provisions referenced in sections 5.3 and 5.4 may be utilized together create a single joint compliance bubble. This is most likely to occur if a local government with a high-performing wastewater treatment plant chooses to merge its wastewater and existing development obligations and also partner with other local governments seeking to meet existing development requirements within its watershed. The provisions governing section 5.3 are also applicable in this context.

5.6 Summary of Joint Compliance Options

The table below offers a summary of joint compliance options in North Carolina's nutrient strategy watersheds for general reference purposes. If inconsistencies arise between this table and applicable laws, regulations, or written guidance, those latter sources shall govern and control.

TABLE 3: SUMMARY OF JOINT COMPLIANCE OPTIONS

		Credit Surplus		
		Wastewater Treatment Facility (Association member)	Wastewater Treatment Facility (unaffiliated)	Governmental Entity (for Existing Development)
Credits Needed	Wastewater Treatment Facility (Association member)	5.2	NA	NA
	Wastewater Treatment Facility (unaffiliated)	NA	NA	NA, but see 3.5
	Governmental Entity (for Existing Development)	NA	5.4	5.3

[41] 15A NCAC 02B .0282. "Local governments have the option of combining their reduction needs from NPDES dischargers assigned allocations in 15A NCAC 02B .0279 and existing development as described in 15A NCAC 02B .0278, including loads from properly functioning and malfunctioning septic systems and discharging sand filters, into one reduction and allocation requirement and meet them jointly."

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Chapter 6: Refining North Carolina's Nutrient Trading and Joint Compliance Options

6.1 Opportunities for Refinement

The development of this trading framework has entailed a review of relevant authorities and guidance including the Clean Water Act, EPA's trading policy and other federal guidance documents, North Carolina statutes and regulations implemented over a 20-year time horizon, and many trading references developed by other jurisdictions, academics, and professional organizations. Even at this draft stage, it has also elicited and incorporated perspectives from the regulated community.

North Carolina arguably provides more flexibility in its trading framework than any other state, at least in terms of potential trading options and active trading markets. However, there are many potential areas for refinement and improvement. We anticipate that implementation of existing development rules will drive a set of refinements in the foreseeable future. Similarly, in the coming years there will be many opportunities to incorporate improvements to the trading-related provisions of North Carolina's nutrient strategy rules.

As described in the introduction, DWR is presently working with the EMC and stakeholders to readopt the nutrient offset rule and the Neuse and Tar-Pamlico nutrient strategies. Several adjustments have been proposed in the nutrient offset rule, including codification of existing policies and amendments designed to make these credits permanently available to local government and wastewater purchasers. The Neuse and Tar-Pamlico rules are the oldest existing nutrient strategy rules, and the rules readoption process provides an opportunity to update trading options in these basins to reflect advancements over the past 20 years.

In future years, the Falls and Jordan Lake strategy rules will also be subject to readoption. A strategy for High Rock Lake is also planned for development. Each rule adoption process provides an opportunity to update trading-related provisions according to developments in North Carolina and elsewhere while also potentially advancing new trading concepts.

As DWR is currently engaged in the rulemaking process, there is no need to recount proposed rule changes through this document. Once those rules are amended, this document will also be updated to reflect those changes. However, in the longer term, DWR staff suggests the following themes for exploration:

6.2 Application of the "Fair, Reasonable, and Proportionate" Standard

The Clean Water Responsibility and Environmentally Sound Policy Act, passed in 1997, requires that "all point sources and nonpoint sources of pollutants jointly share the responsibility of reducing the pollutants in the State's waters in a fair, reasonable, and proportionate manner..." Through each of North Carolina's nutrient management strategies, that "fair, reasonable, and proportionate" mandate has been operationalized by seeking identical percentage nutrient reductions from all regulated sectors.

North Carolina's historical approach clearly meets the standard articulated above, but the standard also arguably provides significant flexibility in the assignment of nutrient load reductions. Alternate approaches may also meet this standard while accounting for other considerations like population, projected compliance costs, extent of prior reduction actions by a sector, access to financial capital, and efficacy of various nutrient strategy rules, just to name a few.

One of the key factors in designing a functional trading framework is the initial allocation of regulatory obligations among parties or sectors. More reliable economic information regarding compliance costs is becoming available for use in developing a regulatory framework.

When new nutrient management strategies are proposed and existing strategies are studied in preparation for amendment and readoption, the relationship between the initial assignment of regulatory obligations and their influence on a trading market merits a closer look. Generally, relative inequity in compliance costs and a market with low transaction costs are precursors to a high-volume trading approach. On the other hand, relative financial equity among parties may preclude the need for trading altogether.

6.3 Transaction Costs

If nutrient credit trading volumes increase significantly, minimizing transaction costs and maximizing the efficiency of the nutrient credit trading market will become more challenging given state agency resource limitations. Various transaction costs will be borne by regulatory agencies as well as entities engaging in trade. If transaction costs are too high, they can drive a wedge in the market, reducing its overall efficiency and potential trading volume. Legislative authorization would be required for the state to increase staff, directly invest in an online trading registry, or authorize user or transaction fees. Some of these approaches to supporting nutrient trading infrastructure may ultimately be desirable depending on how much the nutrient credit market develops.

6.4 Hotspots

A concern about nutrient trading is that is has the potential to allow concentrated nutrient pollution in smaller areas, potentially resulting in new localized impairments. Nutrient wastewater rules allow for permit modifications if discharges are creating localized water quality issues. However, this issue is not fully addressed in relation to nonpoint sources or trading, and it may become exacerbated if credit trading volume increases significantly. Amendments to rules and/or policies related to credit generation and trading might help alleviate these concerns and provide regulatory certainty for credit market participants. One potential approach might include limits on buying or selling nutrient credits if a localized impairment develops. Regulatory incentives might also be considered for providers that agree to monitor downstream reaches within their project's vicinity, providing DWR with additional information regarding nutrient strategy performance.

6.5 Agriculture Regulations

In many nutrient trading frameworks nationwide, agricultural nutrient reduction practices are regarded as the most cost-effective source of nutrient offset credits. However, due to the current structure of North Carolina's agriculture regulations, agricultural producers are largely unable to participate in the credit trading market. Yet trading does allow for credits to be earned from agricultural land by other regulated sectors due to the transfer of property rights, potentially impacting the agriculture sector's ability to meet its own nutrient strategy goals as a group.

North Carolina's agricultural nutrient regulations are unique in their structure in comparison to other jurisdictions nationally. In many places agriculture regulations do not exist and in others alternate regulatory approaches are in place that require producers to meet certain minimum stewardship expectations before additional practices are eligible to generate credit. Such alternative structures may prove beneficial if they can achieve similar or better nutrient reductions from agriculture land, incur a similar or lesser regulatory burden, and facilitate participation in the trading market by producers where financially advantageous.

6.6 Permanent and Temporary Credit Trading Options

North Carolina's nutrient offset market primarily functions to provide lower cost options for developers to meet their obligations under new development rules. Development is effectively permanent on the scales considered for nutrient offset purposes, and the agricultural buffer practice presently generating most offset

credits is permanent in nature. However, the current nutrient offset rule provides "temporary" 30-year credits. Permanent credits would be more appropriate for offsetting development impacts. Permanent credits are also likely to provide additional value for local governments implementing existing development rules and for wastewater facilities, who would be able to rely on them for long-term planning.

At the same time, a more efficient market for generating, trading, and retiring temporary credits with shorter durations than 30 years may also be desirable. Short-term temporary credits would be most appropriate for nutrient reduction projects where significant maintenance obligations are required to sustain the project's nutrient reductions. Upon expiration, credits could be renewed upon demonstration that project maintenance obligations continue to be met.

Short-term temporary credits may be particularly helpful in addressing existing development rule compliance, and they may also be helpful in a wastewater compliance context. A key challenge anticipated with implementing short-term temporary credits may be the administrative infrastructure required to manage the volume of reviews, approvals and oversight that could result. An option contemplated would be to decentralize responsibilities to local governments. The decentralization of short-term temporary offset credit approval may help foster its implementation, adding to the supply of credits available overall. In turn, a short-term temporary crediting option may also incentivize new market participants otherwise unwilling to commit their properties to permanent restoration projects.

6.7 Delivery and Transport Factors

North Carolina's nutrient strategy watersheds each take a different approach with respect to the application of delivery and transport factors. In many cases these figures are either not utilized or are based on coarse or dated modeling information. As a coarse control on delivery differences, trading is statutorily limited to areas of 8-digit HUCs or smaller, where development impacts or end-of-pipe discharges can be roughly equated with nutrient offset credits generated in the same area.

Adoption of scientifically defensible delivery or transport factors where they are not currently in use potentially provides significant benefits. First, it provides the more accurate estimates of relative impacts and improvements to the water body being restored. Conversely stated, it reduces one type of uncertainty associated with credit trades. Beyond credit trading, these figures provide a tool to evaluate how various TMDLs or TMDL alternatives are being met.

Delivery factors may also serve as a tool to make more cost-effective credits available to regulated parties. Relative delivery differences, even within an 8-digit HUC, could provide significant savings. Further, such savings might be magnified in North Carolina's estuarine strategies if delivery factors were implemented in place of the existing 8-digit HUC trading limitation found in statute and rule. As delivery factors are developed or refined, further analyses can identify and potentially mitigate any potential impacts to regulated parties associated with their introduction.

6.8 Practice Crediting

The Division of Water Resources has made considerable efforts in recent years to credit a variety of nutrient reduction practices, and will continue these efforts going forward. The driver to expand the nutrient reduction "toolbox" has been existing development rules in the Falls Lake and Jordan Lake watersheds. However, these practices may also support nutrient offset credits. To the greatest extent possible, the Division intends to credit a full complement of nutrient reduction practices to provide cost-effective flexibility for regulated parties.

While new practice crediting methods are being developed, other existing practices are due to be revisited. The agricultural buffer restoration practice is a prime example. This crediting method has been in place since 1998 and it underpins nearly all nutrient offset credits created statewide. The credit value assigned to this practice for regulatory purposes substantially exceeds those provided based on more recent scientific literature estimates.

6.9 Role of Water and Sewer Authorities in Joint Compliance

Where existing development rules are in place, the jurisdictional compliance approach affords substantial flexibility for local governments with wastewater treatment facilities to overtreat wastewater to assist with existing development compliance. However, wastewater plants operated by water and sewer authorities share many similar features but are not explicitly authorized to participate in a jurisdictional compliance arrangement even if they serve the residents of a locality. Because major water and sewer authorities exist in both the Falls Lake and Jordan Lake watersheds, their role in supporting joint compliance deserves additional consideration.

6.10 Role of Payments

G.S. 143-214.26 and 15A NCAC 02B .0240 both contain multiple references to the term “payment” to describe the acquisition of nutrient offset credits. In many cases, the term is modified by words like “optional” or the permissive “may.” Such language is potentially limiting to entities like wastewater treatment facilities or developers seeking to generate and then directly use nutrient offset credits for rule compliance purposes. In such cases, credit might be generated or acquired, but a “payment” would not occur. On the other hand, such language might be read to limit permittee-responsible offsets in favor of the private market. This subject deserves further consideration.

Glossary

"Allocation" means the mass quantity, as of nitrogen or phosphorus that a discharger, group of dischargers, or other source is potentially allowed to release into surface waters. Allocations may be expressed as delivered or discharge quantities. Possession of allocation does not authorize the discharge of nutrients but is prerequisite to such authorization in an NPDES permit.

"**Allocation trading**" is the exchange of nutrient allocation between NPDES-permitted facilities through permit modifications.

"**Bubble**" is an informal term referring to the combined nutrient reduction requirements that must be met when an entity (or entities) utilizes a joint compliance approach.

"**Bubble Permit**" is an informal term referencing the permit of a compliance association. This permit allows for joint compliance among association members, precluding individual enforcement regarding nutrient parameters so long as the association is meeting its total permitted nutrient limit.

"Bundled credit" means a credit that account for all of the services provided by a particular ecosystem. Bundled credits include wetland, stream, and buffer credits.

"Domain" A topical area of regulation under North Carolina's nutrient strategy rules. For any given nutrient strategy, a domain is a single rule within that nutrient strategy. Regulatory domains include wastewater, agriculture, new development stormwater, state and federal stormwater, existing development, and buffers.

"DMS" means the N.C. Division of Mitigation Services

"Credit Trading" is the exchange of nutrient offset credits between entities or between the regulated domains of a single entity.

"Compliance credit" refers to credits generated by a single regulated entity for compliance under a single rule domain. Methods for compliance credit accounting are provided within individual domain rules and associated guidance.

"Delivery Factor" is the percentage estimate of nutrient loading that reaches the water body subject to a TMDL or TMDL alternative. The term is typically used in a nonpoint source context, including for new development load reduction requirements and for the generation and acquisition of nutrient offset credits. and can be assigned to individual facilities based on the location of their discharge points.

"Double Counting" occurs when one of the credit types being stacked is designed to mitigate impact to a full ecosystem, requiring a bundle of services. Any other credit type stacked with such a bundle will likely overlap with one of the services that is included in the bundle. If so, the result is two separate impacts and only one offsetting activity, leading to a net loss of ecosystem services.[42]

"Group Compliance" refers to rule provisions that allow multiple entities to band together to collectively meet nutrient reduction requirements. Group compliance options exist in rule for wastewater dischargers and local governments under existing development rules. Group compliance is a type of joint compliance.

"Joint Compliance" refers to a voluntary strategy where regulated entities choose to merge distinct nutrient reduction requirements to create a larger compliance bubble.

[42]David Cooley and Olander, Lydia. Stacking Ecosystem Services Payments: Risks and Solutions. September 2011.

"**Jurisdictional Compliance**" refers to rule provisions that allow a single local government to meet nutrient regulations under multiple rule domains together, particularly stormwater and wastewater. Jurisdictional compliance is a type of joint compliance.

"N**utrient allocation limit"** of point source dischargers are not nutrient reduction credits. However, they do have some relationships to nutrient reduction credits. Like nutrient reduction credits, allocation can be traded between facilities under existing rule. Allocation trading can eliminate or delay the need for a point source to purchase nutrient offset credits.

"N**utrient offset credit", "credit", or "offset" (n.)** is a nutrient load reduction credit that generated in compliance with the nutrient offset rule, 15A NCAC 02B .0240. Nutrient offset credits are expressed in pounds of total nitrogen or total phosphorus per year and may be traded.

"N**utrient reduction credits"** represent verifiable nutrient reductions from a nutrient reduction project or practice. Nutrient offset credits are nutrient reduction credits, but nutrient reduction credits may also be generated for direct compliance with nutrient strategy rules.

"Nutrient reduction project" is a site-specific installation and implementation of a nutrient reduction practice or combination of practices.

"Nutrient reduction practice" or "practice" is any project type or type of programmatic effort that generates a quantifiable or estimated decrease in nutrient loading, and for which practice design standards and load reduction estimation methods have been approved in rule or by the Division.

"**Nutrient offset bank**" **or "bank"** is a nutrient reduction project that is implemented by a provider and approved by the Division for the purpose of generating nutrient offset credit.

"**Nutrient offset banking instrument**" is a written legal agreement between the Division and the provider that governs the establishment, operation, and use of a nutrient offset bank.

"Offset" (v.) means to compensate for increased nutrient loads using offsite or alternate practices other than those required for direct compliance with nutrient strategy rules.

"**Provider**" means any public or private person or entity that implements a nutrient reduction project and seeks nutrient offset credit, including DMS.

"Redeem" means to use a nutrient offset credit for compliance purposes.

"Retire" credit means to remove a nutrient offset credit from all credit ledgers.

"**Stacking**" means the establishment of more than one credit type on spatially overlapping areas.

"**Trading**" means the state-regulated transaction of nutrient offset credits or nutrient allocation.

"Transport Factor" is the percentage estimate of nutrient loading that reaches the water body subject to a TMDL or TMDL alternative. The term is typically used in a point source context and can be assigned to individual wastewater treatment facilities based on the location of their discharge points.

"**Unbundled credit**" is a credit where only one among many ecosystem services is being accounted for. Nitrogen and phosphorus offset credits both represent unbundled credits.