# Regulatory Impact Analysis

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| **Rule Topic:** | **Reinstating Permitting Mechanism for Non-Jurisdictional Wetlands and Waters** | |
| **Rule Citation:** | 15A NCAC 02H .1301 – Discharges to Isolated Wetlands and Isolated Waters: Scope and Purpose<br><br>15A NCAC 02H .1401 - .1405 – Discharges to Federally Non-Jurisdictional Wetlands and Federally Non-Jurisdictional Classified Surface Waters | |
| **DEQ Division:** | Division of Water Resources (DWR) | |
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| **Impact Summary:** | State government: | Net costs due to increased workload and training |
| | NCDOT: | Significant direct costs due to permitting and mitigation fees, likely partially to completely offset by significant avoided costs due to increased project location flexibility. |
| | Local government: | Net indirect benefits due to increased land value and development opportunities. |
| | Private entities: | Significant net indirect benefits to development community due to increased land value and development opportunities, partially offset by direct costs of permitting and mitigation fees. Significant direct benefits to mitigation banks and environmental consulting companies. |
| | Substantial Impact: | Total annual economic impact (costs + benefits) is projected to exceed $1,000,000. |
| **Authority:** | N.C.G.S. 143-215.1(a)(6); 143-215(b)(3); 143-215.3(a)(1); 143-215.3(c) | |

# 1. EXECUTIVE SUMMARY

The purpose of this document is to provide an analysis of the impacts associated with proposed revisions to the Isolated Wetlands and Waters Rule 15A NCAC 02H .1301 and the proposed adoption of Non-jurisdictional Wetlands and Waters Rules 15A NCAC 02H .1401-.1405. The purpose of the adoptions is to reinstate a permitting mechanism to authorize unavoidable impacts to wetlands and waters that are no longer eligible for permitting through Section 401 of the Clean Water Act because of a June 2020 change to federal rules. DWR is proposing a permitting mechanism that includes "deemed permitted" and compensatory mitigation thresholds similar to what was in effect when these wetlands and waters were covered under the state's 401 program. DWR is proposing a compensatory mitigation of 1:1 in acreage of wetland impacted to acreage of wetland mitigation required, which is similar to the current requirement for projects covered under the state's 401 program.

For this analysis, DWR used an estimate that at least 30.6% of wetlands in North Carolina may have lost federal jurisdiction as a result of the recent change to federal rules. This is equivalent to approximately 1.3 million acres. It follows that 1.3 million acres of wetlands may potentially be impacted by the proposed rules. The impacts to streams and open waters are expected to be *de minimus*; as such, this analysis focused on impacts associated with wetlands permitting.

Wetlands provide ecological functions that are extremely valuable to society such as providing habitat for fish and wildlife, flood control, natural water quality improvement, shoreline protection, and recreational opportunities. While it may be preferable to avoid all impacts to wetlands to protect these valuable functions, DEQ recognizes the need to balance the protection of the state's environmental resources with the need for economic growth and development opportunities that often require impacting land use such as from residential and commercial development, transportation projects, agriculture, and mining activities. As such, it is imperative that a permitting mechanism be reinstated such that unavoidable impacts to this subset of wetlands may occur lawfully. The proposed rules will enable the permitting of such impacts while also mitigating some of the larger scale environmental impacts. In tradeoff, it is highly likely that the proposed rules will result in the acceleration of net loss of wetland function as well as the net loss of wetland acreage on a statewide basis.

As part of the North Carolina rulemaking process, North Carolina General Statute 150B-19.1 requires agencies to quantify to the "greatest extent possible" the costs and benefits to affected parties of a proposed rule. The agency anticipates that if the non-jurisdictional wetlands and waters rules are adopted as proposed, the changes would result in the following economic impacts, as compared to the baseline (see Section 4 for description of the baseline):

Environment: All NC Residents

- The environment is likely to incur significant net costs associated with loss of wetland functions and acreage from projects both above and below the compensatory mitigation threshold. (Section 7).

Development Community

- The development community, which includes private developers, industries that affect land use (e.g., agriculture and mining), and local government is likely to incur significant costs associated with the application and permitting process (Section 6.2.1).

- The development community is likely to incur significant costs associated with requirements to provide compensatory mitigation (Section 6.2.2).

- The development community is likely to realize significant, long-term, indirect benefits from the increased opportunities to impact non-jurisdictional wetlands (Section 6.2.3).

- Landowners and developers of undeveloped land that contain non-jurisdictional wetlands are likely to realize increased land values associated with the potential for their land to be developed due to the reinstated permitting mechanism (notwithstanding other limiting federal, state and local restrictions) (Section 6.2.3).

- Private mitigation banks, environmental consulting companies, and others in the wetland restoration sector (e.g., plant nurseries, legal and planning practices, landscape architects, construction companies, etc) are likely to benefit indirectly from the reinstatement of a permitting mechanism and associated compensatory mitigation requirements (Section 6.4)

State Agencies

- DEQ - DWR is likely to incur costs from the increased workload associated with permit review and staff training; these costs will be balanced by increased revenue from permit application fees. It should be noted that the proposed rules will increase revenue and workload as compared to the baseline condition (i.e., no permitting mechanism); however, they will not increase revenue and workload as compared to the condition that existed prior to the 2020 change to the Federal Rule, with the exception of minimal additional costs associated with staff training on jurisdictional determinations (Section 6.3).

- DEQ – DMS is likely to incur costs from the increased workload associated with administering the mitigation program; these costs will be balanced by increased revenue from mitigation fees. It should be noted that the proposed rules will increase revenue and workload as compared to the baseline condition (i.e., no permitting mechanism); however, they will not increase revenue and workload as compared to the condition that existed prior to the 2020 change to the Federal Rule (Section 6.3).

- NC DOT is likely to incur significant costs associated with the application and permitting process (Section 6.2.1) and compensatory mitigation (Section 6.2.2). They are also likely to avoid significant costs associated with being constrained to locate future transportation projects so as to avoid areas with non-jurisdictional wetlands such as from having to build longer roads, purchase more right-of-way acreage, relocate existing homes and businesses, and pay higher mitigation costs from impacting a larger amount of jurisdictional wetlands. These savings from expanded development options are offset in part by the cost of compensatory mitigation requirements for impacting non-jurisdictional wetlands (Section 6.2.3).

These estimates were based on the best available data and reasonable assumptions, in particular, regarding the scope of wetlands that lost federal jurisdiction as a result of the 2020 change to the federal rule. In the absence of statewide ground truthed jurisdictional wetland determinations, we relied on limited studies and the Division's 401 Program permitting data to project minimum potential future wetland impacts.

The primary cost and benefit drivers of the proposed rules are the wetlands permitting and mitigation thresholds as well as the wetlands mitigation ratio. The combination of the proposed 0.10 acre permitting and mitigation thresholds and 1:1 mitigation ratio will result in the almost certain acceleration of net loss of wetland function and the almost certain net loss of wetland acreage in North Carolina as compared to the baseline.

The magnitude of the expected development benefits and environmental costs are highly uncertain. Although this analysis identifies the direction of the expected impacts, the relative *magnitudes* of the costs and benefits could not be fully quantified due to data and research limitations, including:

- A lack of data on the number and scope of wetland development projects annually below the proposed "deemed permitted" threshold of 0.10 acres;
- Limited applicable research to fully value these particular wetlands; and
- Uncertainty surrounding the effectiveness of mitigation wetlands at replacing various wetland functions.

A prohibition on development is almost certainly not optimal. However, it is not possible to determine quantitatively whether, or to what extent, the expected costs to the environment are justified by the economic development benefits from the proposed rules. Based on our best available information and acknowledging the limitations of our analyses, we estimate the rules will generate a minimum benefit to regulated parties, local government, and state government, of at least $775,000 annually, but likely much higher. We also estimate partial economic costs from wetland function and acreage losses of at least -$870,000 annually, but likely much higher. The net impact to North Carolina is unknown. Partially or wholly unquantified impacts are likely to be significant:

- Wetland acreage and function losses due to projects below 0.10 acres;
- Lost wetland services from incomplete restoration of wetland functions through mitigation;
- Avoided costs to NC DOT; and
- Indirect benefits to portions of the wetland restoration sector (e.g., plant nurseries, landscape architects, etc).

## 2. Necessity for Rule Change

The proposed rule revisions and adoptions are necessary to 1) reinstate a permitting mechanism to authorize unavoidable impacts to wetlands in North Carolina that are no longer eligible for permitting through Section 401 of the Clean Water Act because of a recent change in Federal Rule; 2) add definitions for terms that were previously defined by the U.S. Army Corps of Engineers; and 3) replace temporary rules that were adopted pursuant to G.S. 150B-21.1 and published in the *North Carolina Register* on March 17, 2021.

Wetlands provide ecological functions that are extremely valuable to society such as providing habitat for fish and wildlife, flood control, natural water quality improvement, shoreline protection, and recreational opportunities. While it may be preferable to avoid all impacts to wetlands to protect these valuable functions, DEQ recognizes the need to balance the protection of the state's environmental resources with the need for economic growth and development opportunities that often require impacting land use such as from residential and commercial development, transportation projects, agriculture, and mining activities. As such, it is imperative that a permitting mechanism be reinstated such that unavoidable impacts to this subset of wetlands may occur lawfully. The proposed rules will enable the permitting of such impacts while also mitigating larger scale environmental impacts.

## 3. BACKGROUND

### 3.1 Navigable Waters Protection Rule

On April 21, 2020, the U.S. Environmental Protection Agency (EPA) and the U.S. Department of the Army published the Navigable Waters Protection Rule[1] in the *Federal Register* to finalize a revised definition of "waters of the United States" under the Clean Water Act. The Navigable Waters Protection Rule regulates the nation's navigable waters and the core tributary systems that provide perennial or intermittent flow into them. The new definition of "waters of the United States" (hereafter referred to as the "Federal Rule") became effective on June 22, 2020. As a result of the new Federal Rule, a subset of wetlands and waters classified under North Carolina state regulation are no longer eligible for permitting through Sections 404 and 401 of the Clean Water Act. Section 401 of the Clean Water Act is implemented through state Rule 15A NCAC 02H .0500.

### 3.2 Permitting of Impacts to Wetlands

The wetlands in North Carolina that are affected by the adoption of the Federal Rule are generally wetlands that do not directly touch a jurisdictional sea, lake, pond, or tributary. For purposes of this document, "non-jurisdictional" refers to a wetland that is not subject to the Clean Water Act federal jurisdiction. Wetlands that are adjacent to a "relatively permanent water" and those that do not have a significant nexus to a "relatively permanent water" (i.e., isolated wetland) were not affected by the new Federal Rule and will continue to be permitted under existing state rules (Table 1). Prior to the passage of the Federal Rule, the affected subset of wetlands was permitted under Rules 15A NCAC 02H .0500 (401 Water Quality Certification).

**Table 1: Permitting Mechanisms for Impacts to Wetlands in North Carolina**

| **Wetland Landscape Position** | **NC Permitting Mechanism** ***Pre-June 2020 NWPR*** | **NC Permitting Mechanism** ***Post-June 2020 NWPR*** | ***Proposed*** **NC Permitting Mechanism** |
|---|---|---|---|

[1] https://www.epa.gov/sites/production/files/2020-01/documents/navigable_waters_protection_rule_prepbulication.pdf

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| Adjacent Wetlands: meaning touching at least one point or side of a-jurisdictional tributary or jurisdictional impoundment* | Clean Water Act Section 401 Certification *15A NCAC 02H .0500* ***Jurisdictional*** | Clean Water Act Section 401 Certification *15A NCAC 02H .0500* ***Jurisdictional*** | No Change |
| Wetlands not touching a jurisdictional tributary or impoundment but connected by a non-jurisdictional channel ("significant nexus")† | Clean Water Act Section 401 Certification *15A NCAC 02H .0500* ***Jurisdictional*** → | No certification or permitting mechanism exists as of June 22, 2020 ***Non-jurisdictional*** | **Proposed rules to reinstate permitting mechanism *15A NCAC 02H .1401-.1405*** |
| Wetlands not connected to "relatively permanent water"‡ (isolated) | Isolated Wetlands permitting *15A NCAC 02H .1300* ***Non-Jurisdictional*** | Isolated Wetlands permitting *15A NCAC 02H .1300* ***Non-Jurisdictional*** | No Change |

*Adjacent wetlands, jurisdictional tributaries and jurisdictional impoundments are defined in the 2020 Navigable Waters Protection Rule, Section 120.2.

† "Significant nexus" means a continuous surface connection with the potential to carry pollutants and flood waters to downstream waters.

‡ "Relatively permanent waters" are waters that typically (e.g., except due to drought) flow year-round or waters that have a continuous flow at least seasonally (e.g., typically three months). Relatively permanent waters do not include ephemeral tributaries which flow only in response to precipitation and intermittent streams which do not typically flow year-round or have continuous flow at least seasonally. Source: "Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos v. United States* & *Carabell v. United States*" (signed December 2, 2008).

The wetlands affected by the Federal Rule remain protected by state Rule 15A NCAC 02B .0231 (Wetland Standards); however, as a result of the new Federal Rule, there is no longer a permitting mechanism by which the State can authorize unavoidable impacts to these wetlands. In the context of the state's wetlands rules, the term "impacts" means the deposition of dredged or fill material into the wetland or surface water, thereby adversely affecting its natural hydrologic function. In the absence of such a permitting mechanism, any impacts to this subset of wetlands would be in violation of state rule. Such impacts could be considered "unavoidable" if they meet the criteria prescribed in rule such as avoiding and minimizing impacts to wetlands and waters, demonstrating that there is no economically viable practical alternative to the activity, and demonstrating that the activity will not cause or contribute to a violation of water quality standards. The replacement of existing uses through compensatory mitigation is required for some impacts.

## 3.3 Permitting of Impacts to Open Waters and Streams

The Federal Rule also redefined the jurisdictional status of open waters (lakes and ponds) and streams. The impacts of this change are much more pronounced in some parts of the country than others. Based on North Carolina's geography and climate, and on how streams are defined in existing state rule, the impacts from the Federal Rule on streams and open waters is expected to be negligible. The impacts from the Federal Rule on wetlands in North Carolina, however, is expected to be significant; it follows that the impacts on wetlands from the current proposed rules are also expected to be significant (as compared to the regulatory baseline). For this reason, the cost-benefit analysis in this document will focus on the impacts associated with wetlands permitting and will not attempt to monetize the *de minimus* economic impacts from stream permitting.

### 3.4 Temporary Rules

To reinstate a regulatory mechanism to authorize impacts to wetlands and waters that are no longer federally jurisdictional and to provide regulatory certainty to the regulated community, the North Carolina Environmental Management Commission (EMC) adopted temporary rules 15A NCAC 02H .1401-.1405. These rules established a state permitting program for federally non-jurisdictional wetlands and waters that are not eligible for permitting coverage under other existing wetland permitting rules in 15A NCAC 02H Section .0500 (401 Certification) or Section .1300 (Isolated Wetlands). For the sake of consistency and expediency of implementation, the temporary rules were adopted to be substantively similar to 15A NCAC 02H Section .1300 - Isolated Wetlands and Waters Rules. In addition, temporary amendments to Rule 15A NCAC 02H .1301 were adopted to define two terms that were previously defined by the U.S. Army Corps of Engineers: "isolated wetlands" and "isolated waters." These temporary rules were adopted by the EMC on May 13, 2021 with an effective date of May 28, 2021. The temporary rules will expire February 22, 2022 unless permanent rules are adopted to replace them.

## 4. Regulatory Baseline

As part of the permanent rulemaking process, North Carolina General Statute 150B-19.1 requires agencies to quantify to the "greatest extent possible" the costs and benefits to affected parties of a proposed rule. To understand what the costs and benefits of the proposed rule changes would be to regulated parties and the environment, it is necessary to establish a regulatory baseline for comparison. For the purpose of this regulatory impact analysis, the following items are considered to comprise the baseline:

- the current version of Rule 15A NCAC 02H .1301 Discharges to Isolated Wetlands and Isolated Waters: Scope and Purpose (readopted June 15, 2020);
- the current version of Rule 15A NCAC 02B .0231 Wetlands Standards (readopted November 1, 2019); and
- the current version of Rules 15A NCAC 02B .0200 Classifications and Water Quality Standards applicable to Surface Waters and Wetlands of North Carolina.

Taken together, the current regulations establish the baseline condition that impacts to non-jurisdictional waters and wetlands (other than isolated wetlands and waters) are prohibited because

there is no state permitting mechanism for such impacts. The proposed rules seek to reinstate a state permitting mechanism such that impacts can occur again within a regulatory framework.

Other regulations and legal limitations that alleviate or otherwise affect the impact of the proposed rules include:

- the current version of Rules 15A NCAC 02H .0500 Water Quality Certification (Clean Water Act 401 program; readopted June 1, 2019 and applicable to the subject affected wetlands until June 22, 2020);
- N.C.G.S. 143-214.7C (mitigation thresholds for stream impacts);
- N.C.G.S. 143-214.11 Division of Mitigation Services: compensatory mitigation;
- 15A NCAC 02R .0402 Rate Schedule - Stream and Wetland Rates for the Division of Mitigation Services
- Section 401 of the Clean Water Act (33 U.S.C. 1341) – requires DEQ to certify that a given project will not degrade waters of the State or violate State water quality standards; and
- Section 404 of the Clean Water Act (33 U.S.C. 1344) – requires the U.S. Army Corps of Engineers (ACOE) to issue a permit prior to the discharge of fill material into wetlands. In accordance with federal code 40 CFR 230.10(a), the ACOE cannot issue a 404 permit if a practicable alternative exists that would have less adverse impact on the aquatic ecosystem.

In accordance with North Carolina Office of State Budget and Management policy, the temporary rules 15A NCAC 02H .1301 and 15A NCAC 02H .1401 - .1405 currently in effect are not considered a part of the regulatory baseline for purposes of this analysis.

## 5. Proposed Amendments

Tables 2 and 3 contain summaries of proposed rule changes and adoptions and the rationale for the changes. The aspects of the proposed rules that have gotten the most attention and likely have the greatest impact on total costs and benefits are the "deemed permitted" threshold and the compensatory mitigation threshold. Additional details about the proposed "deemed permitted" threshold and compensatory mitigation threshold are contained in Subsections 5.1 and 5.2.

**Table 2 Summary of proposed changes to 15A NCAC 02H .1301**

| Rule | Proposed Change | Rationale |
|---|---|---|
| 15A NCAC 02H .1301 Scope and Purpose | • Define "isolated wetland," "isolated waters," and "project."<br>• Minor technical corrections and clarifications. | • "Isolated wetland" and "Isolated waters" were previously classified or determined by the USACE.<br>• Definition of "project" added in response to public comment on temporary rule. |

| Table 3: Summary of proposed adoption of 15A NCAC 02H .1401 - .1405 | | |
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| **Rule** | **Proposed Requirement** | **Rationale** |
| 15A NCAC 02H .1401 Scope and Purpose | • Specify categories of wetlands and waters subject to the proposed 15A NCAC 02H .1400 rules.<br>• Process for determining the boundary and extent of non-jurisdictional wetlands.<br>• Require permit or Certificate of Coverage (COC) for activities not considered "deemed permitted."<br>• Instructions and timeframe for a landowner/applicant to dispute the boundaries and extent of a non-jurisdictional wetland or stream when determined by DWR.<br>• Specify exempt activities and discharges. | • Necessary to identify what wetlands and waters are subject.<br>• Necessary to state that a permit or COC is required.<br>• Provide clarity to regulated community on methodology to be used for wetland and stream boundaries.<br>• In response to public comment on the temporary rule, add instructions about how to appeal a non-jurisdictional stream or wetland determination made by DEQ. Includes a 60-day time limit, which is consistent with the time limit for filing a petition in a contested case in NCGS 150B, Article 3. |
| 15A NCAC 02H .1402 Filing Applications | • Instructions for submitting an application.<br>• Adopt requirement for DEQ to give site owner 3-days' notice prior to a site visit during application review process. | • Substantively identical to 15A NCAC 02H .0502.<br>• 3-day notice added in response to public comment on the temporary rule. |
| 15A NCAC 02H .1403 Public Notice and Public Hearing | • Public notice and public hearing requirements for general and individual permits. | • Substantively identical to 15A NCAC 02H .0503. |
| 15A NCAC 02H .1404 Decision on Application for Permits or Certifications of Coverage | • Requirements for how DEQ will make decisions to issue or deny applications, including timeframes. | • Substantively identical to 15A NCAC 02H .0507. |
| 15A NCAC 02H .1405 Review of Applications | • Criteria for an activity to be considered "deemed permitted."<br>• Set review evaluation criteria for impacts that require permits or COCs.<br>• Set compensatory mitigation thresholds and ratios. | • Review process and mitigation thresholds are substantively identical to 15A NCAC 02H .0506.<br>• "Deemed permitted" thresholds substantively similar to the 401 certifications.<br>• Mitigation (and "deemed permitted" threshold, to a lesser extent) creates incentive for wetland impacts on a project to be avoided and minimized.<br>• Higher thresholds have potential for increased cumulative impacts to |

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| | | downstream watersheds due to lack compensatory mitigation. |

## 5.1 "Deemed permitted" threshold

"Deemed permitted" refers to the allowance of an impact to a regulated wetland or water without applying for a permit from the State. Under proposed permanent Rule 15A NCAC 02H .1405, the deposition of dredged or fill material (referred to as a "discharge") to regulated wetlands and waters can be considered "deemed permitted" if the discharge meets certain conditions. A discharge may be considered "deemed permitted" if it impacts less than a specified acreage of non-jurisdictional wetlands and complies with erosion and sedimentation control requirements and other conditions such that the remaining non-jurisdictional wetland and adjacent streams are not adversely impacted. Discharges that can meet these conditions are then allowed without state review or approval.

The purpose of having a "deemed permitted" threshold in the proposed rule is twofold. First, it provides a more efficient mechanism by which smaller projects can move forward. This directly benefits the regulated community by avoiding the costs and time associated with the application process. It also alleviates some of the workload of DEQ permit writers that would otherwise be tasked with reviewing every impact to a wetland, no matter how minor. Second, a "deemed permitted" threshold can create an incentive for wetland impacts on a project to be minimized to stay below the acreage impact threshold, which can lessen the potential net impacts to the environment compared to allowing all impacts without mitigation requirements. It should be emphasized that projects that are "deemed permitted" are still expected to comply with applicable rule requirements. In general, DWR staff expects noncompliance with the proposed rules to be low based on years of staff experience with similar thresholds in the 401 rules; in instances of noncompliance, DWR will pursue corrective actions or enforcement, as appropriate.

Public comments received on the temporary rules were largely in support of those rules with the exception of the "deemed permitted" thresholds for wetlands. A majority of commenters specifically requested that when the Division drafted permanent rules that the numeric threshold for impacts to federally non-jurisdictional wetlands be lower than that adopted in the temporary rule. In light of this strong support for lower thresholds and considering the potential for significant cumulative impacts to the environment from smaller-scale projects, the "deemed permitted" thresholds in the proposed permanent Rule 15A NCAC 02H .1405(a)(3) match the thresholds which had previously been in effect when these types of wetlands were regulated under Section 401 of the Clean Water Act and Rule 15A NCAC 02H .0500 (Table 4).

**Table 4: "Deemed permitted" Thresholds under State and Federal Rules**

| | **Wetlands** | | | **Classified open waters** | **Classified streams** |
|---|---|---|---|---|---|
| | **Coastal Region** | **Piedmont Region** | **Mountain Region** | | |

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| Section 401 CWA*† & 15A NCAC 02H .0500* | 0 - 1/10 acre | 0 - 1/10 acre | 0 - 1/10 acre | 0 - 1/10 acre | 0 - 150 linear feet |
| Temporary Rule 15A NCAC 02H .1405‡ | 1 acre | 1/2 acre | 1/3 acre | 1/2 acre | 150 linear feet |
| Proposed Permanent Rule 15A NCAC 02H .1405 | 1/10 acre | 1/10 acre | 1/10 acre | 1/2 acre | 150 linear feet |

* Section 401 (Clean Water Act) and 15A NCAC 02H .0500 (Water Quality Certification) do not apply to wetlands that are not subject to Section 404 of the Clean Water Act. This includes wetlands that are connected to "relatively permanent water" by non-jurisdictional channels following adoption of the June 22, 2020 Federal Rule.
† Section 401 thresholds are dependent on type of activity – 0.10 acre is the most common threshold; however, there are other thresholds that can cause a project to require application/review regardless of the amount of wetland impact such as sensitive waters, work in riparian buffer basins, and high density development.
‡ Temporary Rule in effect as of May 28, 2021. The temporary rule is not considered part of the regulatory baseline for purposes of this analysis. It is included in this table for illustrative purposes only.

## 5.2 Compensatory mitigation thresholds and mitigation ratio

Another key element of the proposed 15A NCAC 02H .1400 rules is compensatory mitigation. In the context of the proposed rules, compensatory mitigation refers to the replacement of lost wetland or stream function by the restoration, creation, enhancement, or preservation of other wetlands and streams as a condition of a permit issued by DEQ. It can also be described as the replacement of existing uses of subject wetlands and streams adversely impacted by development.

The purpose of having mitigation requirements in the proposed rules is to offset the losses of wetlands and streams in the State from permitted development and transportation projects. Mitigation requirements are included as permit conditions for those impacts to wetlands and streams that exceed the applicable mitigation threshold.

Mitigation thresholds create an incentive for wetland and stream impacts on a project to be avoided and minimized while allowing projects with relatively small impacts to occur without mitigation. Similar to the "deemed permitted" thresholds, the majority of public comments specifically requested that when the Division drafted permanent rules that the numeric threshold for mitigation be lower than that adopted in the temporary rule. In light of this strong support for lower thresholds and considering the potential for significant cumulative impacts to the environment from smaller-scale projects, the mitigation thresholds in the proposed permanent Rule 15A NCAC 02H .1405(c) match the thresholds which had previously been in effect when these types of wetlands and streams were regulated under Section 401 of the Clean Water Act and Rule 15A NCAC 02H .0500 (Table 5).

| Table 5: Mitigation Thresholds under State and Federal Rules | | | |
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| | **Wetlands** | | |

| | Coastal Region | Piedmont Region | Mountain Region | Classified open waters | Classified streams‡ |
|---|---|---|---|---|---|
| Section 401 CWA & 15A NCAC 02H .0500* | 1/10 acre | 1/10 acre | 1/10 acre | None | 300 linear feet |
| Temporary Rule 15A NCAC 02H .1405† | 1 acre | 1/2 acre | 1/3 acre | None | 300 linear feet |
| Proposed Permanent Rule 15A NCAC 02H .1405 | 1/10 acre | 1/10 acre | 1/10 acre | None | 300 linear feet |

* Section 401 (Clean Water Act) and 15A NCAC 02H .0500 (Water Quality Certification) do not apply to wetlands that are not subject to Section 404 of the Clean Water Act. This includes wetlands that are connected to "relatively permanent water" by non-jurisdictional channels following adoption of the June 22, 2020 Federal Rule.
† Temporary Rule in effect as of May 28, 2021. The temporary rule is not considered part of the regulatory baseline for purposes of this analysis. It is included in this table for illustrative purposes only.
‡ In accordance with N.C.G.S. 143-214.7C, DEQ cannot require mitigation for losses of 300 feet or less of perennial stream bed.

The proposed mitigation ratio for impacts to wetlands and streams is 1:1 in terms of area of wetland or length of stream impacted to area of wetland or length of stream replaced. Note that the proposed mitigation ratio of 1:1 is based solely on a measure of area or length and does not take into account the natural wetland/stream or mitigation wetland/stream function. When these wetlands were under federal rules, the mitigation imposed by the federal agency ratio was 2:1 in most cases.

## 6. Development Community and State Agency Impact

The purpose of this Section is to examine the potential economic impacts (costs and benefits) of the proposed non-jurisdictional wetlands and waters rules. The estimated numbers of permitted and "deemed permitted" projects under the proposed rules are discussed in Subsection 6.1. The potential impacts from the proposed rules on the development community, DEQ, the wetland restoration sector, and landowners are discussed in Subsections 6.2 through 6.5. Impacts to the environment are considered in Section 7. Alternatives to the proposed rules are presented in Section 8. A tabular summary of costs and benefits is in Section 9.

As stated in Subsection 3.3, the impacts to streams from the proposed rules are expected to be *de minimus*, as such, the following cost-benefit analysis focuses on the impacts associated with wetlands permitting and does not attempt to monetize the *de minimus* impacts from stream permitting.

### 6.1 Estimating the Number of Development Projects

To estimate the costs and benefits to the development community, DEQ, and the environment, we must first estimate how many development projects we expect to occur under the proposed rules, including projects that fall above and below the "deemed permitted" threshold. Projects with

wetland impacts above the proposed 0.10-acre threshold must submit permit applications to DWR and will require mitigation. Projects below the threshold do not require permits or mitigation.

"Deemed Permitted" Projects Below 0.10 Acres

An unknown extent of wetlands will be filled without compensatory mitigation when development projects' wetland impacts fall below the "deemed permitted" threshold of 0.10 acres. DWR has no data to determine the number of these projects annually because written approval is not typically required for these smaller scale projects.

A DWR study of sample sites across the state found that the median, ground-truthed wetland size in the Piedmont and Mountain ecoregions (those areas containing the majority of affected wetlands) is 0.10 acre, so it is reasonable to expect that most development projects affecting wetlands in these regions will fall in this category. However, it is not possible to estimate the *magnitude* of wetland acreage and function losses and development community benefits from these smaller scale projects with the available data. See additional discussion in section 6.2.3 and section 7.

Projects Requiring Applications and Mitigation

Since we cannot know for certain how many projects above 0.10 acres will be developed in the future, we used past 401 program application and permitting data to inform our estimate of future project application numbers under the proposed rules. Table 6 shows the breakdown of applications for 401 certification reviewed by DWR in the ten months before and ten months after passage of the Federal Rule. Note that this data pre-dates the temporary rule that is currently in effect.

**Table 6: Applications for 401 Certification Projects with Impacts to Jurisdictional Wetlands**

| | **July 1, 2019 – Apr 30, 2020** *pre-Federal Rule* | | **July 1, 2020 – Apr 30, 2021** *post-Federal Rule* | |
|---|---|---|---|---|
| **Size of permitted impact to wetland** | # Project Applications | Total acres impacted | # Project Applications | Total acres impacted |
| < 1/ 10 acre* | 194 | Unknown | 144 | Unknown |
| 1/10 – 1/3 acre | 86 | 16.46 | 52 | 9.37 |
| 1/3 – 1/2 acre | 20 | 8.42 | 161 | 6.62 |
| 1/2 - 1 acre | 11 | 7.44 | 13 | 9.59 |
| > 1 acre | 6 | 24.10 | 8 | 28.03 |

| | | | | |
|---|---|---|---|---|
| **Totals** | **317** | **64.92** | **233** | **59.40** |

* The counts associated with impacts less than 1/10 acre are only a subset of the total projects with impacts less than 1/10 acre. The total number of projects is unknown since most projects with impacts of less than 1/10 acre do not require written approval (i.e., certification) under the 401 program. DWR staff report that there is likely a significant number of these "deemed permitted" projects as the rules provide an incentive to remain under the 1/10 acre threshold to avoid costs associated with permitting and mitigation.

The number of project applications received in 2019-2020 was comparable to the average from recent previous years and is assumed to be representative of a typical year. In the ten months after the Federal Rule – when non-jurisdictional wetlands could not be developed in the state- the number of applications for 401 certification for projects with wetland impacts was **26% lower** than the previous year. We assume that this decrease was largely due to projects that had been unable to proceed pending adoption of the EMC's temporary rule.

Total acres impacted are also included in Table 6 to demonstrate that there was not a correspondingly large decrease in the number of wetland acres impacted. The number of acres impacted is project specific and highly variable; as such, we believe that the number of projects is the more meaningful indicator of the effect of the Federal Rule for this particular period of time.

This decrease in project applications as a result of the Federal Rule may have been larger if not for the following reasons:

- Applications being submitted during this timeframe likely had wetland determinations made prior to passage of the Federal Rule (lag factor);

- 2020-2021 saw a large increase in development, particularly in housing and warehousing, resulting in an increase in permit applications relative to the previous years. This could be partially masking the downward effect of the Federal Rule on application numbers; and

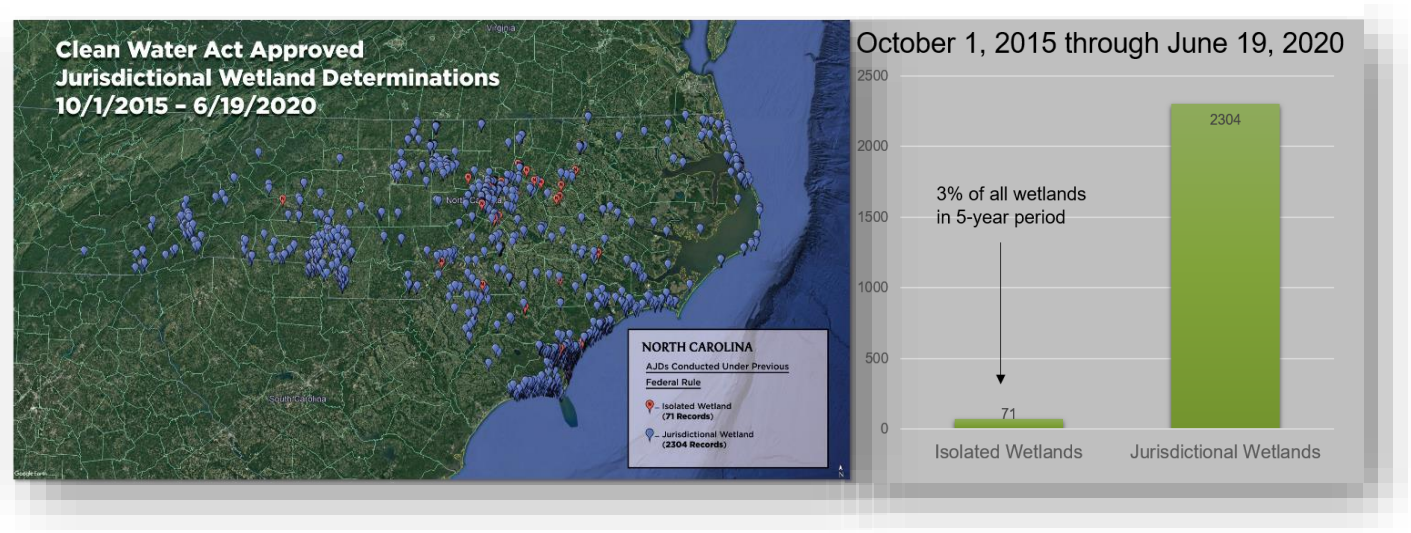
- Some percentage of projects would have required 401 certifications regardless of wetland impact amounts. This means that a portion of the 317 projects likely had wetland areas that were jurisdictional before the Federal Rule, but would not be jurisdictional after.

For the above reasons, we concluded that the 26% decrease in 401 certification applications seen post-Federal rule likely underestimates the full effect of the Federal rule, although we don't know exactly by how much. The following data from the U.S. Army Corps of Engineers (USACE) provides an additional level of detail with which to refine our estimate.

Figure 1 shows the number and distribution of approved jurisdictional wetland determinations (AJDs) made by the USACE under the Clean Water Act (404/401 programs) between 2015 and 2020 (*pre-Federal Rule*). A request for a jurisdictional wetland determination is typically made by a permit applicant in the early stages of project development. Of the 2,375

determinations made by the USACE during that time, only 3% were determined to be non-jurisdictional (i.e., isolated wetlands).

## Figure 1




## Figure 2

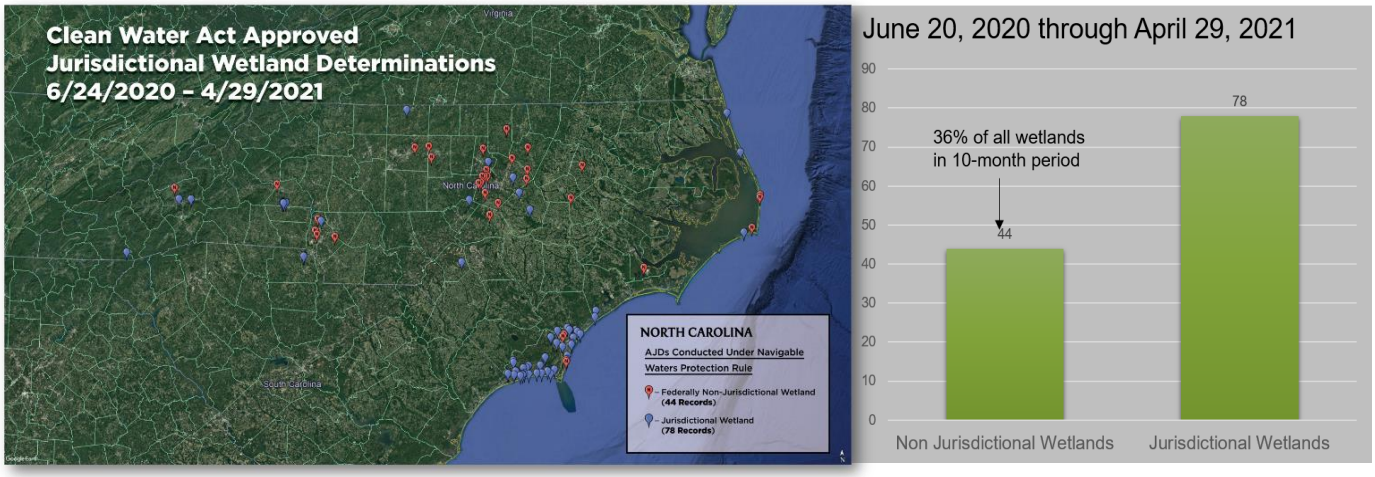



Figure 2 shows the determinations made in the 10 months *post-Federal Rule*. Of the 122 determinations, 36% of wetlands were determined to be non-jurisdictional (isolated + other non-JD).

Considering the USACE data, and assuming that the 26% decrease in 401 project applications received by DWR post-Federal Rule is an underestimate, we estimate that the percentage decrease in 401 applications as a result of the Federal Rule is 33% (36% total – 3% isolated). Assuming an average of 317 applications received in a typical year, we expect to receive 104 fewer applications under the 401 program going forward. It follows that these 104 projects will instead be subject to the proposed non-jurisdictional wetlands rules going forward.

Although all of the 104 projects will be subject to the proposed rules, only *a portion* will be

required to submit an application and provide compensatory mitigation. Only those projects that will impact greater than 1/10 acre of wetland (i.e., the "deemed permitted" and mitigation threshold) will be required to apply for a permit under the proposed rules. To estimate this number, we again used past permitting data from the 401 program.

c. From 2019-2020, 40% of projects impacted greater than 1/10 acre of wetland, and 60% of projects impacted 1/10 acre or less (Table 6). It should be noted that although 60% of reviewed projects had wetland impacts of 1/10 acre or less, there almost certainly is an unknown number of additional projects that had impacts of less than 1/10 acre that did not have to apply for 401 certification due to meeting that program's "deemed permitted" requirements. As such, 60% is an underestimate of the actual percentage of projects with impacts of 1/10 acre or less when accounting for the unknown number of "deemed permitted" impacts.

Based on the above data, we estimated the average number of projects (and applications) that will be reviewed under the proposed non-jurisdictional wetlands rules will be about 42 projects per year, calculated as follows:

- 104 projects x 40% (> 0.10 acre impact) = **42 projects** per year that will be permitted under the proposed non-jurisdictional wetlands rules.

We also estimated the average number of projects that will be subject to the proposed rules but not required to be reviewed (i.e., "deemed permitted") will be at least 62 projects per year, calculated as follows:

- 104 projects x at least 60% (< 0.10 acre impact) = **at least 62 projects** per year that will be "deemed permitted" under the proposed non-jurisdictional wetlands rules.

We expect there will be an unknown number of additional projects that will not have to apply for a permit under the proposed rules due to meeting "deemed permitted" requirements. This same unknown number of projects will also not be required to provide compensatory mitigation. Although staff report that they expect the number of "deemed permitted" projects to be much greater than 62, we have no way of estimating this number with any confidence. This is because DEQ does not have a way to track projects that fell under permitting thresholds in the past, so there is no data with which to predict how many additional projects will be "deemed permitted" in the future.

The potential loss of wetlands and wetland services from permitted and "deemed permitted" projects are discussed in Section 7 of this analysis.

### 6.2 Development Community

For this analysis, the development community is a broad category that includes private developers, industries that impact land use (e.g., agriculture and mining industries), local government, and NCDOT. The baseline condition would not allow non-jurisdictional wetland impacts of any size due to the lack of a permitting mechanism. Therefore, the proposed rules are likely to result in direct costs to the development community in the form of permit application fees and compensatory mitigation fees and indirect but significant benefits in the form of development opportunities.

### 6.2.1 Application Costs

The proposed rules require that an application for a permit be submitted to DWR before development activity can occur. Note that applications are required only for those projects that will exceed the "deemed permitted" threshold.

For purposes of this analysis, we assumed that every applicant will require the services of a professional environmental consultant to apply for a permit from DWR. Although this is not a requirement, this is a reasonable assumption based on staff experience.
There could be some rare cases where the applicant chooses to prepare their own application; in these cases, the consulting costs in Table 7 should be considered opportunity costs of internal staff time rather than direct consulting fees. The services provided by the consultant typically include site visits, wetland delineation, preparation of application materials, and providing additional information to DWR as needed. To estimate the consulting costs, DWR staff surveyed three private consulting companies and compiled their low-end and high-end fee estimates. Fees typically correlate to the size of the project.

We also assumed that the number of projects will be distributed as follows: 13% local government; 33% NCDOT; 54% all other applicants. These percentages were based on Division of Mitigation Services (DMS) data tracking the number of projects requiring mitigation for which credits were purchased by NCDOT and non-NCDOT customers between 2017-2019 (see Subsection 6.2.2 and Appendix II).

Relative to the baseline (i.e., not accounting for the temporary rule), an **increase of 42 applications** will result in a direct cost to the regulated community in the form of permit application fees. The cost to submit an application is **$240** for a minor application and **$570** for a major application, payable to DEQ.

> *"Minor" refers to projects that impact less than one acre of wetlands.*
> *"Major" refer to projects that impact one acre or more of wetlands.*

In the past two years, **97%** of 401 permitted projects had impacts less than one acre (minor); only **3%** had impacts of an acre or greater (major).

**Table 7: Estimated Annual Costs to Development Community to Apply for Permit under Proposed Rules 15A NCAC 02H .1400**

| | Minor | Major |
|---|---|---|
| # Projects per Year | 41 | 1 |
| Application Fee | $240 | $570 |
| **Sub-Total Application Fees** | $9,840 | $570 |

| | | |
|---|---|---|
| Consulting Costs per Project | $4,000 (low)<br>$13,800 (high) | $4,000 (low)<br>$20,500 (high) |
| **Sub-Total Consulting Costs** | $164,000 (low)<br>$565,800 (high) | $4,000 (low)<br>$20,500 (high) |
| **Total Costs for all Projects per Year** | $173,840 (low)<br>$575,640 (high) | $4,570 (low)<br>$21,070 (high) |

| Regulated Entity | **Local Gov't** *13% of total costs* | **NCDOT*** *33% of total costs* | **Other** *54% of total costs* |
|---|---|---|---|
| **Total Application Costs per Year by Regulated Entity** | $1,353 | $3,435 | $5,621 |
| **Total Consulting Costs per Year by Regulated Entity** | $21,840 (low)<br>$76,219 (high) | $55,440 (low)<br>$193,479 (high) | $90,720 (low)<br>$316,602 (high) |
| **Total Permitting Costs per Year by Regulated Entity** | $23,193 (low)<br>$77,572 (high) | $58,875 (low)<br>$196,914 (high) | $96,341 (low)<br>$322,223 (high) |

* Assuming that 33% of applications will be from NCDOT, direct annual costs to NCDOT from application fees will be $3,435. DWR Transportation Permitting staff estimate that NCDOT hires consultants for about 70% of their project applications and prepare the remaining 30% in house; as such, consulting costs for NCDOT should be considered 70% direct costs and 30% opportunity costs.

### 6.2.2 Compensatory Mitigation

To get an idea of potential future mitigation costs from the proposed rules, we looked at the number of projects, wetland credits, and program costs per credit for the past three years (Table 8, data from DMS reports). Note that DMS has a dedicated in-lieu fee program for NCDOT, so those values are separated out from "other customers." Over 80% of the wetland credits purchased by these non-NCDOT customers were from private developers for school, church, recreational, medical, commercial, and residential projects.

**Table 8: DMS In-lieu Fee Program Data from 2017-2020**

| | **# Projects*** | | **# Wetland Credits** | | **Credits per Project†** | | **Range of Costs per Credit-DMS‡** | **Range of Costs per Credit-Private Banks§** |
|---|---|---|---|---|---|---|---|---|
| | NCDOT | Other Customers | NCDOT | Other Customers | NCDOT | Other Customers | | |
| **2017-2018** | 99 | 190 | 76 | 180 | 0.8 | 0.9 | $5,400 - $76,897 | $39,769 to $76,000 R; $18,500 to $50,000 NR |
| **2018-2019** | 73 | 109 | 295 | 44 | 4 | 0.4 | $29,500 - $71,000 | $54,000 - $90,000 R; $50,000 - |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | $64,500 NR |
| **2019-2020** | 65 | 199 | 170 | 68 | 3 | 0.3 | $29,500 - $106,400 | $41,819 - $91,969 R; $40,000 - $75,000 NR |
| **Avg** | 79 | 166 | 180 | 97 | **2.6** | **0.5** | $21,467 - $84,766 | 40,681 - 74,578 |

* Number of projects includes all DMS in-lieu fee programs (wetlands, stream, buffer, nutrient offset).
† The # credits per project was calculated by dividing the # Wetland Credits by the # Projects for each year, then averaged over 3 years. These averages were calculated by DWR and are used to illustrate the relative difference in average project size between NC DOT projects and non-NC DOT projects.
‡ Mitigation fees were set using the Actual Cost Method and may include premium costs by region. All of these costs were for freshwater wetland projects. There were no coastal wetland projects during these three years.
§ N.C.G.S.143-214.13 requires DMS to compare their costs with private mitigation bank rates. "R" refers to Riparian Wetland; "NR" refers to Non-Riparian Wetland. There were no coastal wetland projects reported during these three years.

For purposes of this analysis, we assumed that all project applicants will choose to either purchase mitigation credits from a private bank or pay a fee to DMS. According to DMS staff, approximately 85% of applicants pay an in-lieu fee to DMS and approximately 15% purchase credits from a private mitigation bank. DMS staff stated that most private mitigation banks set their credit purchase rates near DMS in-lieu fee rates to be competitive. There are other options, but these are used very rarely. See Appendix II for more details on mitigation options, as well as other factors that affect mitigation cost including service area, mitigation type, and method of mitigation.

The total estimated mitigation costs by entity is presented in Table 9. These estimates were based on the data in Table 8 as well as the following data and assumptions:

- The projected number of projects that will require mitigation under the proposed rules is 42 per year;
- The estimated relative makeup of project owners (i.e., mitigation purchasers) is 13% local government; 33% NCDOT; 54% all other applicants;
- DMS estimates that about 85% of non-NCDOT mitigation projects/credits are funded by DMS; 15% are funded by private mitigation banks;
- Assume that each project is the same size, on average; and
- Past data is a sufficient predictor of future trends.

**Table 9: Estimated Mitigation Costs by Entity under Proposed Rules**

| | **NCDOT** | **Local Government** | **Other** |
|---|---|---|---|
| Number of projects/yr | 14 | 5 | 23 |
| Number of credits/project *(from Table 8)* | 2.6 | 0.5 | 0.5 |
| Total number of credits/yr | 36.4 | 2.5 | 11.5 |
| Percent of credits funded by DMS vs private bank | 100% DMS | 85% DMS<br>15% Private | 85% DMS<br>15% Private |

| | | | |
|---|---|---|---|
| Percent of credits/yr funded by DMS vs private bank | 36.4 DMS<br>0.0 Private | 2.1 DMS<br>0.4 Private | 9.8 DMS<br>1.7 Private |
| Range of costs per credit DMS *(from Table 8)* | $21,467 - $84,766 | | |
| Range of costs per credit private bank *(from Table 8)* | $40,681 - $74,578 | | |
| **Range of costs per year funded by DMS** | $781,399 - $3,085,482 | $45,617 - $180,128 | $209,840 - $828,588 |
| **Range of costs per year funded by private bank** | $0 | $15,255 - $27,967 | $70,175 - $128,647 |
| **Total mitigation costs per year** | $781,399 - $3,085,482 | $60,872 - $208,095 | $280,015- $957,235 |

DMS staff stated that wetlands mitigation projects make up a small percentage of their projects --and a small percentage of their revenue -- as compared to stream, buffer, and nutrient offset projects. DMS reported the following total revenues for 2019-2020 for all DMS in-lieu fee programs: NCDOT - about $41 million; non-NCDOT - about $28 million. In comparison to these reported revenues, the total mitigation costs in Table 9 seem like reasonable estimates. Total costs are reported as low-high ranges; actual costs will depend on variables such as project size, location, option (DMS vs private bank), and number of projects. It should also be noted that these cost ranges are likely overestimates on a per project basis as the DMS reports included an unknown number of projects that had higher mitigation ratios as compared to the proposed rules 1:1 mitigation ratio. The reports included mitigation of impacts to jurisdictional wetlands permitted under the Section 404 of the Clean Water Act. Under the 404 program, the U.S. Army Corps of Engineers typically requires mitigation at a ratio of 2:1.

### 6.2.3 Benefits to Development Community

The proposed rules are likely to result in the following significant indirect benefits to the regulated community:

NC DOT is likely to avoid significant costs associated with baseline regulatory constraints. For example, without a permitting mechanism to allow impacts to non-jurisdictional wetlands, the agency faces additional constraints in locating future transportation projects to avoid areas with non-jurisdictional wetlands. This can mean having to design longer roads, purchasing more right-of-way acreage, relocating more existing homes and businesses, and paying higher mitigation costs from impacting jurisdictional wetlands. We do not have data to be able to estimate the potential avoided costs, but it is likely significant given the very high costs of new road construction. According to a 2016 online news report, it costs an average of $3-$4 million per mile to build a new two-lane road; and $30 million per mile to build a new interstate road.[2] Potential savings to NC DOT will be re-invested in future road construction projects.

The development community, which can include private developers, local government agencies, and industries such as agriculture and mining, are likely to realize indirect benefits

[2] How a road in North Carolina gets built - News - Wilmington Star News - Wilmington, NC (starnewsonline.com)

associated with increased development opportunities from the proposed rules. One approach to trying to value a portion of this potential benefit is by estimating the potential increase in land value.

In general, the benefit to landowners from the proposed rules could be thought of as recouping the opportunity costs of land use restrictions that occurred as a result of the Federal rule and loss of a permitting mechanism for non-jurisdictional wetland impacts. But for purposes of this analysis, we must compare the potential increase in land value against the current land value, without accounting for land values that existed prior to the Federal rule. As such, the potential increase in land value will be considered an indirect benefit to landowners.

Current and future land values were based on the following data and assumptions:

- Average value of "developed" land in North Carolina is $55,714 per acre (2009$). "Developed" land does not include agriculture or federal lands. [3]

- Average value of "nondeveloped" land in North Carolina is $17,114 per acre (2009$). "Nondeveloped" land does not include agriculture or federal lands.[4]

- "Developed" land comprises about 10.4% the land area and about 35.7% of total land value in North Carolina (as of 2009). Land value is highest in metropolitan areas and generally increases with population.[5]

- "Nondeveloped" land comprises about 49.6% of the land area and 52.3% of the total land value in North Carolina (as of 2009).[6]

- Proposed rules will allow for development of at least 49 wetland acres per year plus an unknown number of acres from smaller scale projects that do not require permitting and approval. This estimate is based on the projection that DWR will receive 33% fewer applications under the 401 program as a result of the Federal Rule. Those applications will instead be submitted under the proposed non-jurisdictional wetlands rules. If we assume there will be a proportional 33% decrease in permitted impacts to wetland acres as a result of the Federal Rule, it follows that 33% will be impacted under the proposed rules instead. Note that we are using an estimate of "permitted impacts" for this calculation rather than the estimate of "jurisdictional impacts" (30.6%, Section 7.1). Between 2016-2021, the total wetland acres permitted under the 401 program was 735.78 acres. Number of wetland acres potentially permitted to be impacted was estimated as follows:

    - 735.78 acres x 33% = 242.8 acres permitted over 5 years under 401 program

[3] Larson, William. April 2015. "New Estimates of Value of Land of the United States." US Department of Commerce, Bureau of Economic Analysis, April 2015. Available at: https://www.bea.gov/papers/pdf/new-estimates-of-value-of-land-of-the-united-states-larson.pdf. Note that an error in Table 3 was identified: the values listed under the "Value" column are in $billions, not $millions.

[4] Larson, Table 3.

[5] Larson, Table 3.

[6] Larson, Table 3.

- 242.8 acres/5 years = 48.6, rounded to 49 permitted wetland acres impacted per year under the proposed rules.

Note that the wetland acreage number used in these calculations is almost certainly an underestimate since the underlying 401 program data does not include unknown impacts from "deemed permitted" projects. In the absence of a more complete dataset, our estimates of the potential benefits to the development community should be considered minimum benefits.

- As before, we assumed that the benefits will be distributed in proportions similar to DMS data, with 13% of the benefit for local government. The remaining 87% would be for all others, excluding NCDOT which we do not expect will be a significant beneficiary of land value increases.
- The land value increases from expanding development opportunities should be considered partial benefits. The estimates do not capture the broader economic impact that can result from developing property, such as increased business and tax revenue, job opportunities for the surrounding area, wealth building for families purchasing homes, etc. These indirect impacts are project-specific and highly variable across industries and locations.

**Table 10: Difference in Average North Carolina Land Value due to Development**

| | Nondeveloped land | Developed land |
|---|---|---|
| Avg. value per acre* | 17,114 | 55,714 |
| Min # Wetland acres | 49 | 49 |
| Total value | $838,586 | $2,729,986 |
| Annual Net Gain in Land Value: $1,891,400 | | |
| $1,891,400 x 13% = **$245,882 local government**<br>$1,891,400 x 87% = **$1,645,518 other dev. community** | | |

*Note that these values are in 2009 dollars. We did not adjust these to 2021 dollars since we are concerned only with the difference between values and not absolute value.

**Table 11: Summary of Annual Costs and Benefits to Development Community**

| | **NCDOT*** | **Local Government** | **Other** | **Sub-totals** |
|---|---|---|---|---|
| Benefits | | | | |
| Increased land value *Table 10* | $0 | $245,882 | $1,645,518 | $1,891,400 |
| **Total Benefits** *does not include significant* | $0 | $245,882 | $1,645,518 | $1,891,400 |

| | | | | |
|---|---|---|---|---|
| *unquantified benefits* | | | | |
| Costs | | | | |
| Application + Consulting *Table 7* | $58,875 (low) $196,914 (high) | $23,193 (low) $77,572 (high) | $96,341 (low) $322,223 (high) | $178,409 (low) $596,709 (high) |
| Mitigation *Table 9* | $781,399 (low) $3,085,482(high) | $60,872 (low) $208,095 (high) | $280,015 (low) $957,235 (high) | $1,122,286 (low) $4,250,812 (high) |
| **Total Costs** | $840,274 (low) $3,282,396 (high) | $84,065 (low) $285,667 (high) | $376,356 (low) $1,279,458 (high) | $1,300,695 (low) $4,847,521 (high) |
| **Net annual impact (cost minus benefit) to the development community as a whole is between a net cost of $2,956,121** ***($4,847,521 minus $1,891,400)*** **and a net benefit of $590,705** ***($1,300,695 minus $1,891,400)*****.** **The costs are comprised of direct and opportunity costs; the benefits are indirect benefits.** | | | | |

***** DWR Transportation Permitting staff estimate that NCDOT hires consultants for about 70% of their project applications and prepare the remaining 30% in house; as such, consulting costs for NCDOT should be considered 70% direct costs and 30% opportunity costs.

## 6.3 Department of Environmental Quality (DWR and DMS)

An increase in applications will result in an increase in revenue to DWR in the form of permit application fees. As shown in Table 7, with an estimated increase of 42 applications per year, DWR will receive an additional **$10,410** in application fees ($9,840 minor + $570 major).

An increase in applications will also result in an increase in workload for DWR permit writers. DWR staff provided general estimates of the time spent on processing a permit application, including review, site visit, and additional information requests: 8 hours for a minor application; 12 hours for a major application. Average hourly staff cost was estimated at $41/hour (based on salary information from NC OSHR as of July 1, 2021). Staff cost reflects total compensation which includes salary, payroll taxes, retirement, leave, and health benefits. Total estimated DWR staff cost was calculated as follows:

> [41 minor applications/year x 8 staff hrs/minor application] + [1 major application/yr x 12 staff hrs/major application] = [340 hrs/yr] x [$41/hr] = total annual staff costs to DWR of **$13,940/year** related to permit application processing.

It should be noted that while the proposed rules will increase revenue and workload as compared to the baseline condition (i.e., no permitting mechanism), they will not increase revenue and workload as compared to the condition that existed prior to the 2020 change to the Federal Rule, with the exception of minimal additional costs associated with staff training on wetland boundary determinations. As such, the proposed rule changes will not result in the need for an expansion of the existing budget in order to cover staff costs; nor will they result in a surplus of funds collected as application fees.

In accordance with proposed Rule 15A NCAC 02H .1401(a), there could be instances when DWR staff is required to confirm the extent and boundaries of federally non-jurisdictional wetlands. This requirement could result in minimal additional costs to DWR to train staff on the U.S. Army Corps of Engineers Wetland Delineation Manual.[7] The average tuition for a local 40 contact-hour training class on use of the manual is $1,125. If we assume that one staff per year will take this training, the total annual tuition costs will be **$1,125**.

We expect that DWR staff will be involved in on-site determinations very infrequently – only when a USACE approved jurisdictional determination is not available, there is not a consultant associated with the project, or there is a question that would otherwise warrant a site visit. If we assume (conservatively) that staff will make two determinations per year, spending 4 hours per determination, total annual staff costs will be as follows:

[40 hrs/class x $41/hr] + [1 class/yr x $1,125 tuition/class] x 1 staff = $2,765
[2 on-site determinations/year x 4 staff hrs/determination] x $41/hr = $328

Total annual staff cost to DWR is estimated to be **$3,093/yr** related to wetland delineation manual training and performing on-site determinations.

**Table 12: Summary of Estimated Annual Costs and Benefits to DWR**

| | |
|---|---|
| **Revenue** | |
| Application Fees | $10,410 |
| Total Revenue | **$10,410** |
| **Costs** | |
| Staff time for permitting | $13,940 |
| Training | $3,093 |
| Total Costs | **$17,033** |
| Net Cost<br>*costs minus revenue* | **$6,623** |

DMS can also expect an increase in revenue as a result of the proposed rules in the form of mitigation fees. It should be noted that 100% of fees collected by DMS are put back into the program (70% project; 30% administrative/overhead).

DMS staff estimated that about 85% of non-NCDOT mitigation projects in North Carolina are funded by DMS (as opposed to private banks). 100% of NCDOT projects are funded by DMS. We calculated their potential revenue as follows:

- 28 projected non-NCDOT projects x 85% DMS funded = 23.8, rounded up to 24 non-NCDOT projects per year funded by DMS;
- 14 projected NCDOT projects x 100% DMS funded = 14 NCDOT projects per year funded by DMS;

[7] Corps of Engineers wetlands delineation manual - Technical Reports - USACE Digital Library (oclc.org)

- $40,681 - $74,578 range of costs per credit for non-NCDOT (Table 9) x 0.5 credits per project (see Table 8) = $20,340 - $37,289 cost per project;
- $21,467 – 84,766 range of costs per credit for NCDOT (Table 9) x 2.6 credits per project (see Table 8) = $55,814 - $220,392 cost per project;
- $20,340 - $37,289 cost per project x 24 projects/year non-NCDOT = $488,160 - $894,936 revenue per year for DMS
- $55,814 - $220,392 cost per project x 14 projects/year NCDOT = $781,396 - $3,085,488 revenue per year for DMS

**Table 13: Summary of Estimated Annual Costs and Benefits to DMS**

| | |
|---|---|
| **Revenue** | |
| Mitigation Fees | $1,269,556 -$3,980,424 |
| Total Revenue | **$1,269,556 - $3,980,424** |
| **Costs** | |
| Project (70%) | $888,689 - $2,786,297 |
| Admin/Overhead (30%) | $380,867 -$1,194,127 |
| Total Costs | **$1,269,556 - $3,980,424** |
| Net Cost *costs minus revenue* | **$0** |

DMS staff stated that wetlands mitigation projects make up a small percentage of their projects --and a small percentage of their revenue -- as compared to stream, buffer, and nutrient offset projects. DMS reported the following total revenues for 2019-2020 for all DMS in-lieu fee programs: NCDOT - about $41 million; non-NCDOT - about $28 million. In comparison to these reported revenues, the revenues and costs in Table 13 seem like reasonable estimates. Costs and revenues are reported as low-high ranges; actual costs and revenues will depend on variables such as project size, location, and number of projects. It should also be noted that these cost and revenue ranges may be overestimates as the DMS reports included an unknown number of projects that had higher mitigation ratios as compared to the proposed rules 1:1 mitigation ratio.

## 6.4 Wetland Restoration Sector

Mitigation Banks

Private mitigation banks, environmental consulting companies, and others in the wetland restoration sector (e.g., plant nurseries, legal and planning practices, landscape architects, construction companies, etc) are likely to benefit indirectly from the reinstatement of a permitting mechanism and associated compensatory mitigation requirements.

Mitigation banks generate credits that can be used to meet the demand for compensatory mitigation. Their customers are primarily private entities (e.g., developers) and some local government agencies. DMS estimated that about 15% of non-NCDOT mitigation projects in North Carolina are funded by private mitigation banks. We calculated their potential revenue as follows:

- 28 projected non-NCDOT projects x 15% private bank funded = 4.2, rounded down to 4 projects per year funded by private mitigation banks;
- $40,681 - $74,578 range of costs per credit (Table 9) x 0.5 credits per project (see Table 8) = $20,340 - $37,289 cost per project
- $20,340 - $37,289 cost per project x 4 projects/year = $81,360 - $149,156 revenue per year for private mitigation banks

| Table 14: Summary of Estimated Annual Benefits to Private Mitigation Banks | |
|---|---|
| **Revenue** | |
| Mitigation Fees | $81,360 - $149,156 |
| Total Revenue | **$81,360 - $149,156** |

Consultants

Environmental consulting companies are also expected to benefit from the increased business the proposed rules will likely allow:

- 38 projects per year [28 non-NCDOT projects + 10 NCDOT projects (or 70% of the 14 NCDOT projects)]
- Potential annual revenue to environmental consultants was calculated as:
    - Total consulting costs for local government + NCDOT + Others (not including application fees, Table 7) = $151,368 (low) to $528,256 (high) revenue per year.

| Table 15: Summary of Estimated Annual Benefits to Environmental Consulting Companies | |
|---|---|
| **Revenue** | |
| Consulting Fees | $151,368 - $528,256 |
| Total Revenue | **$151,368 - $528,256** |

Actual revenues will depend on project size, location, and number of projects. It is very likely that these ranges are overestimates as the DMS report upon which these estimates were based did not distinguish between mitigation ratios -- most projects were likely required to purchase credits at a 2:1 ratio. These estimates represent revenue (i.e., income) and not net profit as they do not take into account the banks' related expenses.

Other Industries

In addition to the direct benefits that should be realized by mitigation banks and consulting companies, there are numerous associated industries that will indirectly benefit such as plant nurseries, legal and planning practices, landscape architects, and construction companies. We did not attempt to monetize these benefits; however, the benefits are likely significant.

## 7. Environmental Impact

Wetlands provide ecological functions that are extremely valuable to society such as providing habitat for fish and wildlife, flood control, natural water quality improvement, shoreline protection, and recreational opportunities. They also provide valuable nonuse benefits, which are benefits that people receive from the existence of an environmental feature independent of people's current resource use.

As compared to the regulatory baseline, the proposed rules will allow impacts to non-jurisdictional wetlands that would otherwise be prohibited due to the current lack of a permanent State permitting mechanism. As compared to the baseline, it is highly likely that rules, as proposed, will result in the acceleration of net loss of wetland function as well as the net loss of wetland acreage on a statewide basis. Both permitted projects above 0.10 acres and "deemed permitted" projects below 0.10 acres will result in the net loss of wetland function and acreage, although "deemed permitted" projects are likely to be the greater contributor to loss as those impacts will not be mitigated at all. The 1:1 mitigation ratio will likely preserve wetland acreage for *permitted* projects but will accelerate the loss of wetland function because mitigation wetlands do not perform as well as natural wetlands for all functions.

. DEQ recognizes the need to balance the protection of the state's environmental resources with the need for economic growth and development. However, it is not possible to fully quantify and weigh the benefits and the costs attributable to the proposed rules. While this analysis identifies the *direction* of the environmental impacts, the *magnitude* of wetland acreage and function loss is unknown due to the following:

- A lack of data on the number and scope of wetland development projects annually below the "deemed permitted" threshold of 0.10 acres,
- Limited applicable research to fully value these particular wetlands, and
- Uncertainty surrounding the effectiveness of mitigation wetlands.

The total benefits from increased development opportunity is similarly uncertain (see section 6). Therefore, it is not possible to pinpoint quantitatively the exact combination of mitigation thresholds and trading ratios that best balance these outcomes. Although a prohibition on development is almost certainly not optimal, it is unclear whether, or to what extent, the expected economic development benefits from the proposed rules outweigh the expected wetland acreage and function losses.

Acknowledging these limitations, the following subsections rely on the best available information to contextualize the scope and nature of the rules' environmental impacts.

### 7.1 Scale and Scope of Impact

For purposes of this analysis, it is important to understand the potential scale and scope of impacts the proposed rules will have on the environment in terms of impacts to wetlands and their associated ecosystem services.

In the absence of a statewide, ground truthed inventory of wetlands, we are basing our analysis on several sources of data that, when taken together, provide a reasonable idea of the scale and scope of potential impacts:

- Survey sample estimates suggest that 13%-14% of North Carolina's 31 million acres[8] is wetlands and that wetland area is declining. High resolution, verified, statewide wetland assessments do not exist.

    - U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) estimated that wetlands covered approximately 17% of the total surface land area of North Carolina as of 1990. [9] As of 2020, they estimated that wetlands covered approximately 14% of the land area (about 4.4 million acres).[10] Approximately 95% of those acres are located in the Coastal Plain; 4.8% in the Piedmont; and 0.2% in the Mountains.

    - In 2020-2021, DWR conducted a grant-funded study[11] of the accuracy of NWI data in North Carolina. Staff compared NWI data to field-verified wetlands data from NCDOT corridor surveys, DWR wetland study sites, Great Smoky Mountains National Park field surveys, and Division of Mitigation Services preservation sites. Of the 103,516 acres surveyed, 13,340 acres (13%) were verified to be wetlands. Applying that rate of 13% to the total land area in the State, the estimated wetland acres in North Carolina would be about 3.98 million acres.

      Results of this DWR study suggest significant inaccuracies in NWI data. For example, the NWI dataset accurately depicts larger wetlands (> 1 acre), but it does a relatively poor job at capturing smaller wetlands (< 1 acre). In fact, NWI does not capture any wetlands that are less than 0.5 acre in size. The current DWR study found that the median ground truthed wetland size in the Piedmont and Mountain ecoregions is **0.10 acre**. Statewide, about 68% of ground truthed wetlands were below the NWI minimum mapping size of 0.5 acres. The study also found that the NWI misclassifies a significant portion of linear features (i.e., streams, ditches) as wetlands. For these reasons, the NWI dataset has limited utility for the current analysis which focuses on the unmitigated impacts to wetlands that are less than 0.10 acre.

- An estimated 1.3 million acres of wetland (30.6% of 4.4 million acres) have lost jurisdiction under the Federal Rule and now fall under the proposed state rules.

    - Geospatial analysis by the Southern Environmental Law Center (as part of litigation) estimated that approximately 526,996 acres of wetlands in the Cape Fear River Basin and 364,586 acres in the Neuse River Basin have likely lost jurisdiction under the new WOTUS definition. [12] Using the NWI estimate of 4.4 million acres of wetlands in North Carolina, about 20% of North Carolina's wetlands have likely lost jurisdiction in just these two river basins.

[8] State Area Measurements and Internal Point Coordinates (census.gov)
[9] https://www.fws.gov/wetlands/documents/Wetlands-Losses-in-the-United-States-1780s-to-1980s.pdf
[10] NWI data from USEPA Economic Analysis, Page 199 : https://www.epa.gov/sites/production/files/2020-01/documents/econ_analysis_-_nwpr.pdf
[11] NC DWR, National Wetlands Inventory (NWI) Accuracy in North Carolina – DRAFT report, July 2021. Authors would like to take this opportunity to emphasize the need for funding of more ground truthed wetland studies specific to North Carolina.
[12] See Pages 78-88: https://files.nc.gov/ncdeq/Environmental%20Management%20Commission/EMC%20Meetings/2021/may2021/attachments/Attach A_to_21-17_HORwith_attachments_correction.pdf

- Under contract by Southern Environmental Law Center, consulting firm Moffat & Nichol studied 163 NC Wetland Assessment Method (NC WAM) reference wetlands, 34 NC DEQ Headwater Wetland Study sites, and several specific case study sites to estimate what proportion of these wetlands would lose jurisdiction under the new WOTUS definition.[13,14] The study concluded that federal jurisdiction would likely be lost for at least 29.2% of wetlands in the Mountain ecoregion, 62.9% in the Piedmont ecoregion, and 18.2% in the Coastal Plain ecoregion.
- The distribution of data points in Figure 2 supports the conclusion that there is likely a greater proportion of non-jurisdictional wetlands in the Piedmont region as compared to the Coastal and Mountain regions. This is likely due to geographic characteristics -- specifically, the high prevalence of deeply incised streams in the Piedmont region which essentially reduces the hydrologic connectivity between the stream and the wetland located in the adjacent floodplain.

  The study also estimated that at least 30.6% of wetlands overall across the State would lose jurisdiction. The authors of the study acknowledged that these sites were not randomly selected; as such, they may or may not be representative of all non-jurisdictional wetlands in the State.

  This same study identified the wetland types that have likely had the greatest losses of federal jurisdiction as well as some of the federally threatened and endangered plant and animal species that rely on these types of wetlands.
- If approximately 1.3 million acres of wetland (30.6% of 4.4 million acres) have lost jurisdiction under the Federal Rule, it follows that those same 1.3 million acres are potentially impacted by the proposed 15A NCAC 02H .1400 rules. The annual impact will be on a much smaller scale, however, but it will still be significant in terms of loss of wetlands and the ecosystem services they provide.

- DWR expects to receive approximately 42 permit applications per year under the proposed rules for development projects exceeding 0.10 acres of wetland impacts. Despite the requirement to provide compensatory mitigation at a 1:1 ratio, there is still likely to be net loss of wetland function and potentially some net loss of wetland acreage from these 42 permitted projects.

  - A study of the state's No Net Loss goal for wetlands in North Carolina showed that the *area* of wetland mitigation project approvals was about 1.8 times greater than the *area* of permitted wetland impacts statewide between 2005 and 2010 (individual subbasins experienced a range of losses and gains).[15] The majority of projects in the study were required by the USACE to provide mitigation at a ratio of 2:1, which is twice as high as our proposed mitigation ratio of 1:1. Based on this study that

[13] "Proposed Changes to the Waters of the United States (WOTUS) Definition – Summary of M&N Conclusions" presented to Geoff Gisler, Southern Environmental Law Center, Chapel Hill, NC, April 7, 2019, prepared by Moffat & Nichol."

[14] "Dorney, John (Moffatt & Nichol-Raleigh) The Effect of the Trump Administration's Proposed Waters of the United States (WOTUS)Definition in North Carolina. 2020 Presentation to NCAEP."

[15] Unpublished manuscript: Dorney, J.R. and B. Munoz, Wetland, stream and riparian buffers: Spatial relationships between impacts and compensatory mitigation as well as No Net Loss Calculations in North Carolina, USA, Jan. 2018

showed approved mitigation area (at 2:1 ratio) offset permitted impact area by about 180%, it follows that at the proposed 1:1 mitigation ratio, mitigation area may be expected to offset permitted impact area by about 80%. Caution should be used, however, before relying on this estimate as the study used *regulatory* success as the indicator of whether North Carolina's 401 program achieved No Net Loss. The study did not include ground truthing to confirm whether the impacts occurred as permitted, or whether the mitigation projects were built as approved. Nor did it evaluate whether there were unanticipated wetland losses due to long-term failure of the mitigation projects. As such, these results may or may not reflect the actual conditions on the ground. In any case, this study suggests that under the proposed rules, a net loss of wetland area from permitted impacts is possible, and probably likely. This does not include the additional losses expected from "deemed permitted" impacts which are not required to provide any mitigation.

It is also important to note that this study did not attempt to evaluate the gain or loss of wetland *function*, which is a critical component of the No Net Loss goal. Studies of mitigation wetland function suggest that some mitigation wetlands, particularly larger ones, can replicate sediment control and water quality functions fairly well, but not wildlife habitat.[16] Their success at replicating other natural wetland functions tends to be more variable. For example, mitigation (i.e., replacement) wetlands contained fewer species and different communities of plants, amphibians, mammals, and birds.[17,18] Large differences were observed between hydrogeomorphic functions in mitigation wetlands and natural reference wetlands.[19] Significant differences were found in bacterial community structures, which could have a large effect on potential denitrification rates.[20] Created wetlands tend to have reduced capacity for nitrate removal and carbon sequestration.[21] Of course, whether a mitigation wetland successfully replicates the functions of the natural wetland it is intended to replace depends on the condition of the natural wetland to be impacted. It is likely to be more successful at replicating the functions of a heavily degraded wetland in an urban area, for example, than a quasi-pristine wetland in a less heavily developed area.

- An unknown extent of wetlands will be filled without compensatory mitigation when development projects' wetland impacts fall below the "deemed permitted" threshold of 0.10 acres. These wetland losses could be cumulatively significant in terms of wetland area and function.
    - Based on the USACE's Approved Jurisdictional Determination data and DWR 401 program permitting data, DWR expects that at least 62 projects per year will

[16] Brown, S.C. & Veneman, P.L.M. Effectiveness of compensatory wetland mitigation in Massachusetts, USA. *Wetlands* **21,** 508 (2001).
[17] Turner, R.E., Redmond, A., & Zedler, J. Count It by Acre or Function—Mitigation Adds Up to Net Loss of Wetlands. *National Wetlands Newsletter*, **23(6)** (2001). https://biotech.law.lsu.edu/blog/2001-ELI-turner.pdf
[18] Brown, S.C. & Veneman 2001.
[19] Hoeltje, S.M. & Cole, C.A. Losing function through wetland mitigation in central Pennsylvania, USA *Environmental Management* **39(3)** 385-402 (2007).
[20] Peralta, A.L, Matthews, J.W. & Kent, A.D. Microbial community structure and denitrification in a wetland mitigation bank. *Applied and Environmental Microbiology* **76**, 13 (2020).
[21] Hossler, K, Bouchard, V, Fennessy, M.S., Frey, S.D., Anemaet, E. & Herbert, E. No-net-loss not met for nutrient function in freshwater marshes: recommendations for wetland mitigation policies. *Ecosphere* **2(7)** (July 2011).

be "deemed permitted" under the proposed rules and will not be required to mitigate impacts. DWR reviews only a small subset of these smaller scale projects. Based on staff experience of the number of sites that initiate consultation with the agencies regarding impacts and permitting versus the number of applications submitted, we believe the actual number of "deemed permitted" projects will be significantly greater than 62 per year, but we do not have data to be able to estimate an upper range.

- Wetland losses will likely be concentrated in the Piedmont and urban areas.
    - Based on past permitting data and recent analyses of the potential effects of the Federal rule, we expect that over 50% of the unmitigated impacts will occur in the Piedmont, with lesser impacts in the Mountain and Coastal Plains.
    - For permitted impacts, it is likely that a net loss of wetlands will occur in urban areas due to greater development pressure in these areas. It is possible that rural areas could see a net gain of wetland from mitigation of permitted impacts; the chances of this occurring, however, are reduced when taking into account "deemed permitted" losses. This is supported by research that demonstrated a general statewide trend of wetland relocation from urban to rural areas due to mitigation projects being located predominantly in rural areas.[22]

## 7.2 Valuing Wetland Services

Wetland protections (or losses) are particularly challenging to quantify using standard valuation methodologies because:

1) they provide such a broad array of functions, services, and commodities with distinctly different societal impacts rather than a singular good;

2) wetland services tend to be valued differently by households based on numerous different sociodemographic and geographic variables; and

3) there are not enough high-quality primary studies specific to each benefit, service, commodity, wetland type, and location to allow for comprehensive benefit transfer in this regulatory context.

In the absence of a comprehensive valuation of wetlands in North Carolina that we can apply to this analysis, the following sources provide a general idea of the likely very high value that should be placed on the State's wetlands when considering the impact of the proposed rules.

- Wetlands protect property value by reducing storm damage:
    - Value of the protective effects of wetlands in east coast U.S. counties: average $1.8 million/km$^2$ ($7,284/acre); median $91,000/km$^2$ ($368/acre). Differences in storm protection value across counties was due to the property values at risk, local wetland coverage, coastline shape, local elevation, building codes, and the probability of experiencing different wind intensities. Low valued wetlands were located in more

[22] Dorney, 2020 Presentation to NCAEP.

rural, less populated counties; high valued wetlands were located in more urban, higher populated counties.[23]

- Another study estimated the annual value of coastal wetlands for storm surge protection in North Carolina (adjusted to 2019$) at $12,852 per ha/yr ($5,201 per acre).[24]
- A one percent loss of coastal wetlands was associated with a 0.6% increase in property damage. There was not a statistically significant difference between freshwater and saltwater wetlands in terms of reducing damage to property from storm surge.[25]

- Wetlands provide habitat for aquatic life:
  - 75% of commercially harvested fish are wetland dependent (95% if include shellfish).[26]
- Wetlands filter sediment and other pollutants from industrial, residential, and agricultural runoff:
  - Study by Duke University Wetland Center showed that under moderate storm loads, a restored wetland-stream system can reliably achieve 40% reductions in total phosphorus and total nitrogen loading, rated near that of reference wetlands. In their study, a 24 ha (59 acre) Duke Stream Wetland Assessment Method Park (SWAMP) wetland reduced total nitrogen by 30%, total phosphorus by 20%, and sediment loading by 488 metric tons/year.[27]
- Wetlands provide valuable recreational opportunities:
  - The value of each acre of Great Lakes wetlands was $3,596 (in 2007$) over the lifetime of a recreational user;[28]
- Wetlands sequester carbon:
  - Freshwater inland sites cumulatively store over 90% of the wetland soil carbon in the conterminous United States.[29]
- Wetlands also provide valuable nonuse benefits, which are benefits that people receive from the existence of an environmental feature independent of people's current resource use. For example, some people value protection of coastal waters even if they may never visit the beach. Nonuse benefits include bequest, existence, and ecological

[23] Sun and Carson 2020 Coastal wetlands reduce property damage during tropical cyclones | PNAS, p. 5719
[24] Costanza, R., et al. "The Value of Coastal Wetlands for Hurricane Protection," *AMBIO: A Journal of the Human Environment* 37(4), 241-248, (1 June 2008).
[25] Sun and Carson, p. 5720
[26] US EPA. 2001. Functions and Values of Wetlands. EPA 843-F-01-002c. https://www.epa.gov/sites/production/files/2016-02/documents/functionsvaluesofwetlands.pdf
[27] Richardson, C, Flanagan, N,, & Ho, M. July 25, 2017. Integrated Stream and Wetland Design: A Watershed Approach to Restoring Ecosystem Functions and Services on the Landscape. ASWM Presentation. https://www.aswm.org/pdf_lib/nffa_webinar/integrated_stream_and_wetland_design_072517_richardson.pdf
[28] Whitehead, J.C., Groothuis, P.A., & Southwick, R. Linking Recreation Demand and Willingness to Pay with the Inclusive Value: Valuation of Saginaw Bay Coastal Marsh. Prepared for U.S. EPA Workshop (2007).
[29] Nahlik, A. M. & Fennessy, M. S. Carbon storage in US wetlands. *Nat. Commun.* **7,** 13835 doi: 10.1038/ncomms13835 (2016).

preservation values:

- Bequest value of a natural resource is the value people place on being able to provide future generations with a pristine natural resource.
- Existence benefits occur when people value a resource or natural feature maintained in its current condition. An example of existence value is the substantial amount of money directed to conservation groups for land preservation.
- Ecological preservation is the protection of an entire ecology or system of plants and animals and their physical habitats. Strong ecosystems preserve biodiversity, making organisms more resistant to environmental stresses.

Nonuse benefits are particularly difficult to value since they lack traditional markets, but these values can be significant. This fiscal analysis does not attempt to monetize nonuse values of wetlands; however, this benefit does exist and should be taken into account when policy decisions are made.

## 7.3 Forgone Benefits

The net loss of North Carolina wetland area and function from the proposed rules will result in a forgone benefits over time, including flood and water quality protection, aquatic habitat, recreation, and aesthetic benefits. As a result, both public and private entities that rely on these wetland services may be adversely impacted, as follows:

- increased flood risk resulting in costly property damage;
- reduced wildlife habitat, which can result in a loss of recreational opportunities for hunting, fishing, and bird watching. This will impact not only the recreational community themselves, but also businesses that serve this community;
- degraded water quality which can impact commercial and recreational activities and the businesses that support these activities, as well as potentially lead to higher drinking water treatment costs; and
- increased potential for sediment loading to downstream communities which can increase the need for dredging for navigation and reservoir capacity.

Given the expectation that the impacts will be relatively dispersed across the State, there should not be a disproportionate impact on any one particular business sector or community. Based on the higher proportion of non-jurisdictional wetlands in the Piedmont region, it is likely that a higher percentage of these reductions in services could occur in that region.

In its 2020 economic analysis, the U.S. EPA estimated a mean forgone benefit of reduced mitigation requirements from lost habitat-supporting and non-extractive recreation services of North Carolina freshwater wetlands at $140,321 per acre (2018$) resulting from the revised definition of WOTUS.[30] For our analysis, we are considering “forgone benefits of reduced mitigation requirements” to be a proxy for the costs of future loss of freshwater wetland habitat-supporting and non-extractive recreation functions since we are tasked with evaluating the loss

[30] See P. 222, Table E-5, Economic Analysis for the Navigable Waters Protection Rule: Definition of "Waters of the United States" (epa.gov) Jan. 2020. *Forgone benefit per acre was calculated* as *Mean estimate of forgone benefits $677,750 divided by Estimated annual forgone mitigation acres 4.83 = $140,321 forgone benefit per acre.*

of wetland function from an unknown number of future unmitigated "deemed permitted" projects.

We are including this information to give an idea of scale of wetland services value per wetland acre. However, this estimate should be interpreted as a **partial, incomplete value** reflecting habitat-supporting services and non-extractive recreation (i.e., other than fishing and hunting). A comprehensive value – if it were possible to determine – is likely significantly greater than that estimated in the U.S. EPA analysis for the following reasons. First, the 2020 EPA analysis does not capture other highly valuable ecosystem services, such as fishing, flood control, and water filtration. Second, their analysis did not account for the relatively high willingness-to-pay (WTP) that is typical in urban areas and population centers versus rural areas. Third, the model used in their analysis used a seemingly arbitrary wetland system size of 10,000 acres as a baseline without a discussion of sensitivity or rationale behind its use.[31]

Based on past permitting data and our projected future permit numbers under the proposed rules, we expect an annual net loss of at least 6.2 acres of wetlands (62 "deemed permitted" projects per year at 0.10 acres each). Using the U.S. EPA's *partial* forgone benefit estimate of $140,321 per acre, this would equate to a **minimum forgone benefit from habitat-supporting and non-extractive recreation services of $869,990 per year** as a result of the proposed rules. The actual forgone benefit is likely to be even greater due to 1) wetland services missing from this value per acre, 2) acreage and associated function losses from the additional unknown number of "deemed permitted" projects, and 3) potential losses that could occur from future mitigation projects that are not providing equivalent functional replacement due to either noncompliance or the inherent difficulty in replicating natural ecosystem functions.

## 8. ALTERNATIVES ANALYSIS

To provide additional context with which to consider the effects of the proposed rules, DEQ analyzed several alternatives to the proposed rulemaking, including taking no action.

Since the primary cost and benefit drivers of the proposed rules are the wetlands permitting and mitigation thresholds and the wetlands mitigation ratio, we considered the effects of varying the thresholds and ratio in different combinations. Our focus in this section was on the effects to mitigation costs and costs to the environment as these were the costs most sensitive to changes. Calculations are shown in Appendix III.

### **Combination #1** 0 acre permitting and mitigation threshold + 1:1 mitigation ratio

Cost estimates for this combination are the least certain because 1) the underlying cost data includes an unknown number of projects that were required to provide mitigation at a higher ratio, so per project costs may be an overestimate; and 2) the number of projects expected under the 0.10 threshold is unknown, so the total costs for mitigation could be an underestimate. In addition, costs to the environment do not include likely significant unquantified forgone benefits

[31] External Environmental Economics Advisory Committee, Report on the Repeal of the Clean Water Rule and its Replacement with the Navigable Waters Protection Rule to Define Waters of the United States (WOTUS), Dec 2020 66964 4_5aa4f5f0493a4902a3aaed117bd92aef.pdf (filesusr.com)

of wetland services due to challenges associated with replicating natural wetland functions through mitigation. As compared to the proposed combination (#3), this combination should result in a lower rate of net loss of wetland function and acreage and higher mitigation costs.

### **Combination #2** 0 acre permitting and mitigation threshold + 2:1 mitigation ratio

This combination is the most costly to the development community in terms of mitigation costs, but the least costly to the environment in terms of net loss of wetland function and acreage. As discussed in Section 7.1, a study of the regulatory success of DEQ's 401 program showed that when projects were required to provide mitigation at ratio of 2:1, approved mitigation area offset permitted impact area by about 180%. Although this study focuses on regulatory success and does not evaluate compliance with the permitted impacts or mitigation projects on the ground, it does suggest that the net loss of wetland *area* from *permitted* impacts is likely to be compensated for by a 2:1 mitigation ratio and could partially compensate for lost acreage from "deemed permitted" impacts. The portion of total costs from lost acreage should approach $0 due to the replacement of wetland area that exceeds the area impacted.

Net loss of wetland function would still be expected for this combination due to challenges associated with trying to replicate natural wetland function; however, these losses are expected to be significantly lower than at the 1:1 mitigation ratio.

### **Combination #3** 0.10 acre permitting and mitigation threshold + 1:1 mitigation ratio

This is the combination that is proposed for adoption. As discussed throughout this analysis, the combination of the proposed 0.10 acre permitting and mitigation thresholds and 1:1 mitigation ratio will result in the almost certain acceleration of net loss of wetland function and the almost certain net loss of wetland acreage in North Carolina as compared to the baseline. These significant costs to the environment may or may not be justified by the likely significant benefits to the development community.

**Combination #4** 0.10 acre permitting and mitigation threshold + 2:1 mitigation ratio

This is the combination that most closely aligns with the current regulatory process under the combined 404/401 programs. The net loss of wetland *area* from *permitted* impacts would likely be compensated for by a 2:1 mitigation ratio. It may even compensate for a portion of wetland area losses due to "deemed permitted" impacts.

Even at the higher mitigation ratio, it is unlikely that mitigation wetlands will fully replace the function of the natural impacted wetlands. But it is likely that the rate of net loss of wetland function would be slowed by the replacement of additional acres. The purchase of additional mitigation credits could also facilitate the construction of larger mitigation wetlands. Larger mitigation wetlands are generally able to better replicate natural wetland functions than smaller, fragmented mitigation wetlands. The costs to the environment from this combination will be lower under the proposed combination, but they will likely still be significant. The higher mitigation ratio would result in much higher costs to the development community, which may or may not be justified by the reduced costs to the environment.

**Combination #5** 1.0 acre permitting and mitigation threshold + 1:1 mitigation ratio

This combination is the least costly to the development community, but most costly to the environment. We estimated that only about three projects per year would be required to provide mitigation at a 1.0 acre threshold. We estimated minimum costs to the environment of over $3.3 million annually from this combination. This minimum estimate does not include significant unquantified costs from loss of wetland services and unknown costs from the very significant number of "deemed permitted" projects.

**Combination #6** 1.0 acre permitting and mitigation threshold + 2:1 mitigation ratio

This combination is similar to Combination #5 in terms of its modest costs to the development community and significant costs to the environment. Because so few projects would be required to provide mitigation, the net costs to the environment would not be significantly less than with the 1:1 mitigation ratio.

The final alternative considered was to take **no action**. In this scenario, there would continue to be no permanent permitting mechanism with which to allow unavoidable impacts to non-jurisdictional wetlands. This would result in:

- Significant wetland protection benefits (avoided loss of wetland services);
- Modest avoided costs to DEQ (DWR and DMS) from maintaining the current workload;
- Modest forgone benefits to DWR from permitting fees;
- Significant forgone benefits to private mitigation bankers;
- Significant forgone benefits to environmental consultants;
- Significant forgone benefits to the development community in the form of land value and development opportunities; and
- Significant forgone benefits to NCDOT due to lack of opportunities to impact non-jurisdictional wetlands.

DEQ acknowledges the need to balance costs to the regulated community with costs to the environment; as such, we rejected the "no action" alternative.

In summary, we expect net wetland losses in terms of *function* under the proposed rules as well as under all other combinations considered. Net losses in terms of wetland *area* are also expected under the proposed rules as well as under other combinations with a 1:1 mitigation ratio. It is possible that net loss of wetland area could be avoided by adopting a regulatory scheme that combines a lower permitting/mitigation threshold of either 0.0 acre or 0.10 acre with the 2:1 mitigation ratio. Losses to wetland function and area would be avoided under the "no action" alternative.

Of course, the levels at which the "deemed permitted" threshold and mitigation ratio are set will have a direct effect on the magnitude of potential costs and benefits to the development community. Higher permitting thresholds and lower mitigation ratios will result in lower costs to the development community. Conversely, lower thresholds and higher ratios will raise costs to the development community.

Based on this analysis, DEQ recommends the "deemed permitted" threshold and the mitigation threshold be set at 0.10 acres. Compared to a higher threshold, a threshold of 0.10 acres will allow DEQ to be better informed about impacts to small wetlands and to better assess cumulative downstream impacts while not being overly burdensome to the regulated community. It is also consistent with the threshold in the existing 401 wetlands program. DEQ also recommends that the mitigation ratio be set at 1:1. A higher ratio would be desirable for reducing wetland function and area loss; however, we are sensitive to the fact that the regulated community is accustomed to the 1:1 ratio in our existing 401 program.

## 9. Summary of Quantified and Unquantified Impacts

There are numerous variables that will affect the actual costs and benefits for the rules, as proposed:

- The actual number of projects, the size of impact for each project, and the locations of future projects is unknown and will factor greatly into the actual costs and benefits;
- Unquantified benefits (avoided costs) to NC DOT from increased opportunities to impact non-jurisdictional wetlands are likely significant;
- Costs associated with loss of wetland function and area are likely significantly higher than estimated as the value used in the analysis did not include some valuable services such as fishing, flood control, and water filtration. In addition, our estimate of number of wetland acres impacted did not include the unknown number of additional "deemed permitted" projects that are possible under the proposed rules; and
- Costs to the development community and benefits to mitigation banks from mitigation fees is likely an overestimate since the per-credit cost ranges provided by DMS included an unknown number of projects that had higher mitigation ratios.
- Benefits to the development community are partial estimates and do not reflect the project and industry-specific benefits from completed projects such as business revenue and jobs.

- Unquantified benefits to wetland restoration-supporting industries (e.g., plant nurseries, legal and planning practices, landscape architects, construction companies, etc)

Table 16 summarizes the quantified potential economic impacts from the proposed rules. These costs and benefits are expected to occur annually on an ongoing basis for the foreseeable future.

**Table 16: Summary of Partial Annual Impacts from Proposed Rules**
**0.10 acre thresholds/1:1 mitigation ratio**

| **Costs – Partial Estimates** | | |
|---|---|---|
| Application and Permitting | Development community (non-government) | $96,341 (low)<br>$322,223 (high, likely)<br>*permit and consulting fees, direct* |
| | Local Government | $23,193 (low)<br>$77,572 (high, likely)<br>*permit and consulting fees, direct* |
| | DEQ (DWR) | $17,033<br>*mostly opportunity cost -- staff time* |
| | NCDOT | $58,875 (low)<br>$196,914 (high, likely)<br>*30% opportunity cost -- staff time* |
| Compensatory Mitigation | Development community (non-government) | $280,015 (low, likely)<br>$957,235 (high)<br>*mitigation fees, direct* |
| | Local Government | $60,872 (low, likely)<br>$208,095 (high)<br>*mitigation fees, direct* |
| | DEQ (DMS) | $1,269,556 (low, likely) - $3,980,424 (high)<br>*projects and overhead, indirect* |
| | NCDOT | $781,399 (low, likely)<br>$3,085,482 (high)<br>*mitigation fees, direct* |
| Wetland Services and Function* | Environment | $869,990<br>*forgone benefit, indirect* |
| | **Total Costs** | **$3,457,274 (low) - $9,714,968 (high)** |
| | **Most Likely Cost Scenario** | **$3,875,574** |

*Wetland Services and Function forgone benefit is likely significantly underestimated due to lack of comprehensive valuation studies and impacts from unknown number of "deemed permitted" projects.

| **Benefits* - Partial Estimates** | | |
|---|---|---|
| Development Opportunities | Development community (non-government) | $1,645,518<br>*land value gain, indirect* |
| | Development community (local government) | $245,882<br>*land value gain, indirect* |
| | Consulting companies | $151,368 (low)<br>$528,256 (high, likely)<br>*consulting services, direct* |
| | DEQ (DWR) | $10,410<br>*permitting fees, direct* |
| Compensatory Mitigation | Private mitigation banks | $81,360 (low, likely)<br>$149,156 (high)<br>*mitigation credit purchase, direct* |
| | DEQ (DMS) | $1,269,556 (low, likely)<br>$3,980,424 (high)<br>*mitigation credit purchase, direct* |
| | **Total Benefits** | **$3,404,094 (low)- $6,559,646 (high)** |
| | **Most Likely Benefit Scenario** | **$3,780,982** |
| *Unquantified benefits are likely substantial, particularly for NCDOT, in the form of avoided costs. | | |

| **Annual Net Impacts (Benefits minus Costs) – Partial Estimates**<br>*Net Impacts were calculated for the low-range, high-range, and most likely scenarios.* | | | |
|---|---|---|---|
| | Low range | High range | Most likely |
| DEQ | ($6,623) | ($6,623) | ($6,623) |
| NCDOT | (899,149) | ($3,479,310) | ($1,037,188) |
| Local Government | $161,817 | ($39,785) | $107,438 |
| Development Community (non-government) | $1,269,162 | $366,060 | $1,043,280 |
| Private Mitigation Banks | $81,360 | $149,156 | $81,360 |
| Environmental Consulting Companies | $151,368 | $528,256 | $528,256 |
| **Subtotal Annual Impact to Development Community (NCDOT and non-gov't), DEQ, and Wetland Restoration Sector**<br>*benefits minus costs, not including cost to the environment* | **$466,746** | **($2,285,332)** | **$775,398 rounded to $775,000*** |
| | ** likely a significant underestimate of benefits* | | |
| **Subtotal Annual Impact to Environment** | **($869,990) rounded to ($870,000) net cost†**<br>*† likely a significant underestimate of costs* | | |
| **Net Impact to North Carolina** | **Unknown** | | |

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# APPENDIX II. MITIGATION OPTION, SERVICE AREA, TYPE AND METHOD

## *Mitigation Option*

Per N.C.G.S. 143-214.11, an applicant can choose from the following mitigation options:

a) purchase credits from an approved private compensatory mitigation bank;
b) pay an in-lieu fee into the Ecosystem Restoration Fund administered by the DEQ Division of Mitigation Services (DMS);
c) donate land to DMS or to other public or private nonprofit conservation organizations as approved by DEQ; or
d) prepare and implement a compensatory mitigation plan.

The same mitigation options are available for use by both government and non-government entities, except that NCDOT has an agreement with DMS to pay actual mitigation costs.

According to DMS staff, approximately 85% of applicants choose the option to pay an in-lieu fee to DMS (Option a); approximately 15% purchase credits from a private mitigation bank (Option b). The other options are used very rarely. For purposes of this analysis, we will assume that all projects will choose to either purchase credits from a bank or pay a fee to DMS.

DMS staff stated that most private mitigation banks set their credit purchase rates near DMS in-lieu fee rates to be competitive. One hundred percent of fees collected by DMS are put back into the program (70% project cost; 30% administrative/overhead).

The number of mitigation banks that accept wetland projects remains fairly steady and is not expected to change as a result of the proposed rules. DMS estimates that three mitigation firms (vendors) account for 80-90% of the private market in terms of number of projects.

## *Service Area*

As shown in Table II-1, DMS' in-lieu fee program rates differ by service area and mitigation type. In addition, premium rates apply to some areas of the State that are located within particular 8-digit hydrologic unit codes (HUC). These HUCs have higher costs associated with wetland or stream mitigation projects due to factors such as high land prices, pristine quality of the natural resources, or lack of supply of suitable restoration sites. DMS adjusts the rates for inflation on July 1st of each year. According to DMS staff, most activity occurs in the Piedmont region.

**Table II-1: Division of Mitigation Services' Stream and Wetland In-lieu Fee Program Rates as of July 1, 2021**

| Service Area | Mitigation Type | DMS Rate per Credit |
|---|---|---|
| Statewide Standard | Stream | $603.87 |
| Statewide Standard | Freshwater Wetland | $67,442.06 |
| Statewide Standard | Coastal Wetland | $560,000 |
| Catawba 03050101 | Freshwater Wetland | $108,806.92 |

| | | |
|---|---|---|
| Catawba 03050102 and 03050103 | Freshwater Wetland | $101,450.33 |
| Little Tennessee 06010203 | Freshwater Wetland | $120,965.90 |
| Neuse 03020201 | Freshwater Wetland | $106,619.36 |
| Roanoke 03010104 | Freshwater Wetland | $111,573.48 |
| White Oak 03030001 | Freshwater Wetland | $94,773.47 |
| Yadkin 03040201 | Freshwater Wetland | $149,604.11 |

In accordance with N.C.G.S. 143-214.11(e), the monetary payment must be based on the ecological functions and values of wetlands and streams permitted to be lost and on the cost of restoring or creating wetlands and streams capable of performing the same or similar functions, including directly related costs of wetland and stream restoration planning, long-term monitoring, and maintenance of restored areas.

### *Mitigation Type*

The type of mitigation also factors into the in-lieu fee associated with a mitigation project. For example, coastal wetland projects are significantly more expensive than a freshwater wetland project. Similarly, wetland projects are significantly more expensive than stream restoration projects. DMS reports that most of their mitigation projects are stream projects -- less than 1% of credits purchased are for wetland projects. They estimate that DMS has about 85% of the wetland market. Private banks have the other 15% of the wetland market.

According to DMS, they receive mitigation payments for between 50 and 100 acres of wetland impacts per year. The exception to this would be in a year when there is a particularly sizable project such as a new reservoir or highway.

Most of their wetland projects are for freshwater wetlands. In fact, in the 20-year history of the DMS program, they have collected only nine payments for coastal wetland mitigation. Coastal wetland mitigation is rare, in large part because the high cost of mitigation provides additional incentive to avoid and minimize impacts. Existing Coastal Area Management Act and Division of Coastal Management rules further limit the potential impacts. For these reasons, we assumed that mitigation associated with the proposed rules will impact only non-coastal wetlands.

### *Method of mitigation*

There are four mitigation methods available: restoration, establishment, enhancement, and preservation[32]. In accordance with proposed Rule 02H .1405(c)(4), a different multiplier applies to each mitigation project depending on the mitigation method, as follows:

- Restoration multiplier = 1
- Establishment multiplier = 1.5
- Enhancement multiplier = 2
- Preservation multiplier = 5

These multipliers apply only to those applicants who propose to do their own mitigation rather than purchase credits or pay an in-lieu fee. This option is rarely used, likely because it is more

[32] https://www.epa.gov/sites/production/files/2015-08/documents/compensatory_mitigation_factsheet.pdf

expensive and time-consuming option for the applicant. We have no information to suggest that these trends will change with the implementation of the proposed rules. For purposes of this analysis, we assume that 100% of future projects will purchase credits from private mitigation banks or will pay in-lieu fees to DMS.

### *Calculating payment*

The in-lieu fees payable to DMS for a particular project are calculated by multiplying the DMS rate (Table 8) by the total number of credits for a particular project. The number of credits is determined by the area of wetland or length of stream impacted and the type of mitigation being requested.

Example:

- A development project will impact 0.25 acres of freshwater wetland.
- The project is located within the Neuse River Basin outside a premium HUC.

0.25 acre impact x 1:1 mitigation ratio = 0.25 mitigation credits required

0.25 mitigation credits x $67,442.06 (per credit rate for Standard area) = **$16,860.52 total mitigation cost**

Upon acceptance by DMS, the applicant makes a payment to DMS to satisfy the mitigation requirement specified in the permit. The permit's mitigation requirement is then transferred to DMS, which implements stream and wetland mitigation projects to satisfy the requirements.

# APPENDIX III. ALTERNATIVES ANALYSIS CALCULATIONS

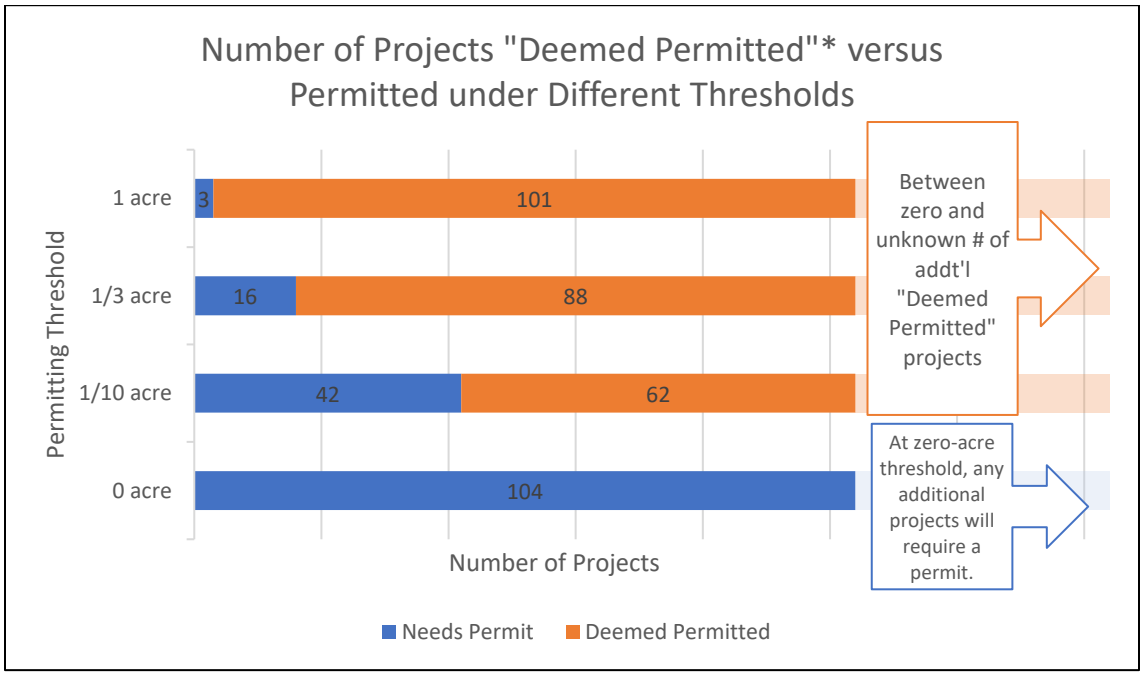
As summarized in Section 8, the total annual quantified costs and benefits for the most likely scenario were compared for six permitting and mitigation threshold/mitigation ratio combinations. The following assumptions applied to all alternative combinations:

- Environmental consultants would receive the same compensation whether or not a permit is required, so we did not vary their benefits by threshold.
- The benefits to the development community associated with increased land value did not vary by threshold.
- Only the "most likely" scenarios were compared.

For each combination, the projected number of permit applications was adjusted in accordance with the relative percentages of applications received in the past under the 401 program. The actual number of "deemed permitted" projects under the proposed rules is unknown but is expected to be significantly higher; as such, the "deemed permitted" numbers should be considered underestimates.

Figure III-1 and Table III-1 show the estimated number of projects that would be permitted and "deemed permitted" under four different thresholds: 0 acre, 1/10 acre, 1/3 acre, and 1 acre. As described in Section 6.1.1, the vast majority of projects are expected to impact less than one acre of wetlands.

**Figure III-1**




* Data in Figure 4 were based on permitting data under the 401 program. The actual percentage of "deemed permitted" projects under the proposed rules is unknown but is expected to be significantly higher; as such, the "deemed permitted" numbers should be considered underestimates.

### Table III-1

| **Threshold (acres)** | # Permitted/Mitigated Projects | # Deemed permitted (unmitigated) Projects |
|---|---|---|
| **0.0** | 104 | 0 |
| **0.10** | 42 | 62 to unknown |
| **0.33** | 16 | 88 to unknown |
| **1.0** | 3 | 101 to unknown |

Table III-2 show the estimated costs for mitigation under three thresholds: 0.0 acres, 0.10 acres, and 1.0 acres. Note that we did not carry out further estimates based on the 0.33 acre threshold since this threshold is unlikely to be considered for the proposed rules as it is not used by any of our other existing wetland programs. It was included in the above figure and table for illustrative purposes only.

### Table III-2

| Costs for mitigation for NCDOT and non-NCDOT calculated for each threshold | | | | | | |
|---|---|---|---|---|---|---|
| | **0.0 acre threshold**<br>*104 permitted projects per year* | | **0.10 acre threshold**<br>*42 permitted projects per year* | | **1.0 acre threshold**<br>*3 permitted projects per year* | |
| | Mitigation - DOT | Mitigation - Other | Mitigation - DOT | Mitigation - Other | Mitigation - DOT | Mitigation - Other |
| % Total Projects | 33% | 67% | 33% | 67% | 33% | 67% |
| Number of Permitted Projects<br>*# projects * % total projects* | 104 * 0.33 = 34 | 104 * 0.67 = 70 | 42 * 0.33 = 14 | 42 * 0.67 = 28 | 3 * 0.33 = 1 | 3 * 0.67 = 2 |
| Number of Credits per Project | 2.6 | 0.5 | 2.6 | 0.5 | 2.6 | 0.5 |
| # Credits | 88.4 | 35 | 36.4 | 14 | 2.6 | 1 |
| % Credits from DMS | 100% | 85% | 100% | 85% | 100% | 85% |
| % Credits from Bank | 0% | 15% | 0% | 15% | 0% | 15% |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number of Credits from DMS<br><br>*# credits * % credits from DMS* | 88.4 | 35 * 0.85 = 29.7 | 36.4 | 14 * 0.85 = 11.9 | 2.6 | 1 * 0.85 = 0.85 |
| Number of Credits from Bank<br><br>*# credits * % credits from Bank* | 0 | 35 * 0.15 = 5.25 | 0 | 14 * 0.15 = 2.1 | 0 | 1 * 0.15 = 0.15 |
| Cost Range per Credit DMS | $21,467 - $84,766 | $21,467 - $84,766 | $21,467 - $84,766 | $21,467 - $84,766 | $21,467 - $84,766 | $21,467 - $84,766 |
| Cost Range per Credit Bank | NA | $40,681 - $74,578 | NA | $40,681 - $74,578 | NA | $40,681 - $74,578 |
| Total Cost of Credits from DMS<br><br>*# credits * cost per credit* | 88.4 * $21,476 = $1,897,683 low<br><br>88.4 * $84,766 = $7,493,314 high | 29.7 * $21,467 = $637,570 low<br><br>29.7 * $84,766 = $2,517,550 high | 36.4 * $21,467 = $781,399 low<br><br>36.4 * $84,766 = $3,085,482 high | 11.9 * $21,467 = $255,564 low<br><br>11.9 * $84,766 = $1,008,715 high | 2.6 * $21,467 = $55,814 low<br><br>2.6 * $84,766 = $220,392 high | 0.85 * $21,467 = $18,247 low<br><br>0.85 * $84,766 = $72,051 high |
| Total Cost of Credits from Bank<br><br>*# credits * cost per credit* | NA | 5.25 * $40,681 = $213,575 low<br><br>5.25 * $74,578 = $391,534 high | NA | 2.1 * $40,681 = $85,430 low<br><br>2.1 * $74,578 = $156,614 high | NA | 0.15 * $40,681 = $6,102 low<br><br>0.15 * $74,578 = $11,187 high |
| Total Cost Range | $2,748,828 Low<br>$10,402,398 High | | $1,122,286 Low<br>$4,250,812 High | | $80,163 Low<br>$303,630 High | |

Table III-3 summarizes the mitigation costs for each mitigation ratio being considered.

**Table III-3**

| **Threshold (acres)** | # Permitted/ Mitigated Projects | Mitigation Costs | |
|---|---|---|---|
| | | **1:1 ratio** | **2:1 ratio** |
| **0.0** | 104 | $2,748,828 | $10,402,398 |
| **0.10** | 42 | $1,122,286 | $4,250,812 |
| **1.0** | 3 | $80,163 | $303,630 |

For 1:1 mitigation ratio combinations, the lower costs for mitigation from Table III-2 were used since the per-credit cost ranges provided by DMS included an unknown number of projects that had mitigation ratios higher than 1:1. As such, the mitigation costs may or may not be an overestimate.

For 2:1 mitigation ratio combinations, the higher costs for mitigation from Table III-2 were used since the per-credit cost ranges provided by DMS included an unknown number of projects that had mitigation ratios of 2:1. The DMS data may be a more accurate representation of costs under the 2:1 mitigation combinations versus the 1:1 combinations

Note that the actual number of acres expected to be unmitigated is likely significantly higher due to the unknown number of "deemed permitted" impacts.

Table III-4 shows the number of unmitigated acres of wetlands per year under the three different permitting thresholds. The actual number of unmitigated acres is expected to be higher under the 0.10 and 1.0 acre thresholds due to the unknown number of "deemed permitted" projects.

**Table III-4**

| **Threshold (acres)** | Minimum number of unmitigated acres of wetland impacts per year* |
|---|---|
| **0.0** | 0 acres |
| **0.10** | 62 projects * 0.10 acres = 6.2 acres + unknown |
| **1.0** | 101 projects, broken down as follows:<br><br>62 projects * 0.10 acre = 6.2 acres + unknown<br>26 projects * 0.33 acre = 8.6 acres<br>9 projects * 0.5 acre = 4.5 acres<br>4 projects * 1.0 acre = 4.0 acres<br><br>Total = 23.3 acres+ unmitigated impacts |

* Note that the actual number of acres expected to be unmitigated is likely significantly higher due to the unknown number of "deemed permitted" impacts.

Table III-5 summarizes the costs to the environment from loss of wetland services under the three permitting thresholds. It should again be noted that the number of unmitigated acres is likely significantly greater and the foregone benefits per acre are partial estimates; as such, the total costs for wetland loss will be greater.

**Table III-5**

| Partial costs to the environment from loss of wetland function and services for each threshold | | | |
|---|---|---|---|
| | **0.0 acre threshold**<br>*104 permitted projects per year; 0 unmitigated* | **0.10 acre threshold**<br>*42 permitted projects per year; 62+ unmitigated* | **1.0 acre threshold**<br>*3 permitted projects per year; 101+ unmitigated* |
| Number of Unmitigated Wetland Acres | 0 | 6.2+ | 23.3+ |
| Cost (i.e., forgone benefit) for each acre of wetland loss | $140,321 | $140,321 | $140,321 |
| Partial annual cost from wetland loss | $0 | $869,990 | $3,269,479 |

Table III-6 summarizes the annual mitigation costs and costs to the environment under the different permitting and mitigation ratio combinations. There are many unknowns underlying these estimates, as indicated in the footnotes. Even given these unknowns, we think the data is useful for comparing the scale of impacts among the different combinations.

**Table III-6**

| Summary of Annual Mitigation Costs and Costs to the Environment under various Permitting/Mitigation Combinations | | | | |
|---|---|---|---|---|
| Threshold (acres) | Mitigation Costs | | Environment Costs | |
| | **1:1 ratio** | **2:1 ratio** | **1:1 ratio** | **2:1 ratio** |
| **0.0** | $2,748,828***** | $10,402,398† | $0§ | $0§ |
| **0.10** | $1,122,286‡ | $4,250,812 | $869,990 | See # footnote |
| **1.0** | $80,163‡ | $303,630 | $3,269,479 | $3,269,479 *assume same as 1:1* |

| | | | | |
|---|---|---|---|---|
| | | | | *due to very low # mitigated projects* |

*Mitigation cost estimate is the least certain for the 0.0 acre/1:1 ratio combination because 1) the underlying cost data includes an unknown number of projects that were required to provide mitigation at a higher ratio, so costs may be an overestimate; and 2) the number of projects expected under the 0.10 threshold that will pay mitigation is unknown and is likely an underestimate.

†Mitigation costs for the 0.0 acre/ 2:1 ratio is likely an underestimate due to the unknown number of projects expected under the 0.10 acre threshold that will pay mitigation.

‡ Mitigation costs for the 0.10 acre/1:1 ratio and 1.0 acre/ 1:1 ratio may be an overestimate as the underlying data included an unknown number of projects required to provide mitigation at a higher ratio.

§ Costs to the environment at the 0.0 acre permitting/mitigation threshold do not include likely significant unquantified forgone benefits of wetland services due to insufficient replication of natural wetland functions by mitigation wetlands.

# Net costs to the environment are still expected at the 2:1 mitigation ratio due to challenges associated with trying to replicate natural wetland function; however, these costs are expected to be significantly lower than at the 1:1 mitigation ratio. The portion of total costs from lost acreage should approach $0 due to the replacement of wetland area that exceeds the area impacted.