North Carolina Department of Environment and Natural Resources
Division of Water Quality

Michael F. Easley, Governor

William G. Ross, Jr., Secretary
Alan W. Klimek, P.E., Director

DRAFT

# Stream Mitigation for FERC-related 401 Certifications
# Internal DWQ Guidance

NC Division of Water Quality
January 9, 2007
Version 1.4

## I. Regulatory background

The Division of Water Quality must issue 401 Water Quality Certifications for FERC licenses and has done so for several years. The review process that DWQ uses is outlined in the 401 Water Quality Certification rules (15A NCAC 2H .0500) and generally follows the 404(b)(1) guidelines – namely, 1) avoid the impact, then 2) minimize the impact to the maximum extent practical and then 3) finally, mitigate for unavoidable impacts. The following guidelines assume that the FERC project has been reviewed for avoidance and minimization and that the remaining unavoidable impacts to stream channels are to be addressed through compensatory stream mitigation. In some cases, stream restoration or enhancement can be done to replace the unavoidably lost uses. The process for these practices is well outlined in various documents but primarily in the joint state/federal stream mitigation guidelines (US Army Corps of Engineers 2003). In other situations, preservation of streams, their adjacent buffers or perhaps entire watersheds can be acceptable alternatives. This guidance focuses on the preservation option in order to provide additional details to DWQ staff and the regulated community on this approach for FERC relicensing. These guidelines are advisory and present DWQ's preferred approach to meet this regulatory requirement. If applicants can demonstrate an alternative way that adequately addresses these regulatory issues, then DWQ will carefully consider all proposed alternative approaches.

## II. Stream buffers and water quality

From a review of the scientific literature, it is clear that wooded stream buffers provide essential water quality benefits to the adjacent stream. Indeed, stream restoration and enhancement projects in NC have always required restoration or enhancement of the stream buffers (generally, 50 feet in the piedmont and coastal plain or 30 feet in the mountains). There is also a positive relationship between the width of the stream buffer and the degree of water quality benefit whereby a larger buffer has greater water quality benefit. However, the relationship is not linear. Above a certain buffer width, increases in water quality benefits tend to level off. From analysis of scientific literature on buffer width and pollutant removal (Figures 1, 2 and 3), the incremental water quality benefits of stream buffers wider than 50 feet tend to be relatively small. It should be noted that the sediment removal curve

401 Wetlands Certification Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
2321 Crabtree Boulevard, Suite 250, Raleigh, North Carolina 27604
Phone: 919-733-1786 / FAX 919-733-6893 / Internet: http://h2o.enr.state.nc.us/ncwetlands

An Equal Opportunity/Affirmative Action Employer – 50% Recycled/10% Post Consumer Paper

One NorthCarolina Naturally

(Figure 2) provides support for buffers greater than 50 feet wide. Several comprehensive reviews of the buffer literature (Castelle, et. al. 1994, Doohaluk 2000 and Wenger 1999) suggest that a 100 foot buffer is important for long-term water quality protection since most of the studies that are reflected in Figures 1 – 3 are based on short-term research. Therefore, DWQ believes that protected buffers of 50 feet should generally be the minimal width but that protected buffers of 100 feet should be encouraged and receive more beneficial credit ratios.

## III. Existing state/federal stream mitigation guidelines

In 2003, the state and federal regulatory agencies developed and adopted the "Stream Mitigation Guidelines" (April 2003) to provide guidance to the US Army Corps of Engineers, US Environmental Protection Agency, NC Wildlife Resources Commission and NC Division of Water Quality as well as the regulated community in our review and approval of stream mitigation projects. These guidelines are intended to be used for 404 and 401 permitting decisions but also provide a useful framework for FERC-related stream mitigation issues.

The guidelines define four types of stream mitigation (Restoration, Enhancement Level I, Enhancement Level II and Preservation) with corresponding mitigation ratios (1:1, 1.5:1, 2.5:1 and 5:1, respectively). Preservation sites must meet the criteria shown on page 16 of this document. Foremost in those criteria is that in addition to the biological value of the streams, the site must be in an area with threats to development. In many cases for FERC permits, preservation is a viable option to provide mitigation for unavoidably reduced stream flow. The following guidance is intended to expand upon the Stream Mitigation Guidelines in the FERC-context. DWQ intends to open discussions with the other state and federal agencies to include these items in a revised Stream Mitigation Guidelines once we have more experience with these issues in the FERC-context. Additionally if stream buffers can only be protected on one side of a stream, then one-half the credit is available. Finally, if an existing regulatory buffer exists, then any additional buffer must go beyond the protected buffer in order to count at a reduced ratio for mitigation credit.

## IV. Proposed policy

a. <u>Demonstrable threat</u>
Sites proposed for preservation must have a demonstrable threat as defined in Appendix 1. This definition was developed for and approved by the Performance Assessment and Consistency Group (PACG) by the relevant state and federal agencies including DWQ. Written documentation of the demonstrable threat to a particular site or group of sites is needed before a preservation site can be approved by DWQ.

b. <u>Preservation mechanism</u>
Preservation should be fee simple acquisition with title given to a relevant state or federal land management agency or responsible local conservation group (non-governmental organization) such as The Nature Conservancy or local land trust. A conservation easement shall also be provided with the land. Provisions for land management, access and other activities shall be clearly spelled out in

the conservation easement using guidance available from agencies such as the US Army Corps of Engineers, EEP or the Clean Water Management Trust Fund.

c. Preservation of 100 foot stream buffers
Preservation of 100 foot stream buffers shall receive a 4:1 mitigation ratio since preservation of this wider buffer is more important to water quality than preservation of the typical 50 foot buffer.

d. Preservation of entire watersheds
Preservation of an entire local watershed surrounding a particular stream channel shall receive a 3:1 mitigation ratio for the length of streams in the watershed since preservation of the entire watershed will protect water quality in these streams in perpetuity. Protection of the entire watershed provides longer term water quality benefits than protection of 50 or 100 foot buffers.

e. Example (hypothetical)
The following example (Figure 4) is provided to illustrate the use of the above preservation ratios. This example is hypothetical and is therefore not based on a particular site. This example assumes that the site has a demonstrable threat and that a fee simple acquisition is contemplated with a conservation easement.

In this example, there are 10,000 feet of unavoidable stream impact for a particular project. A proposed mitigation package includes 24,000 feet of stream in Parcel A and 9,000 feet of streams outside Parcel A. We will presume that an applicant propose to preserve the entirety of Parcel A as well as 100 foot wide buffers along 4,000 feet of streams outside Parcel A and 100 foot wide buffers along 5,000 feet of streams outside Parcel A. The following amount of stream credit would then be available for this proposal:

**Table 1: Stream mitigation credits from different types of stream preservation assuming impact and mitigation sites are within one stream order of each other. This example assumes 10,000 feet of stream mitigation is required.**

| Type of Preservation | Length of streams (feet) | Mitigation Ratio | Mitigation Credits |
|---|---|---|---|
| Watershed preservation | 24,000 | 3:1 | 8,000 foot-credits |
| 100 (200) foot wide buffers | 4,000 | 4:1 | 1,000 |
| 50 foot wide buffers | 5,000 | 5:1 | 1,000 |
| **Totals** | **33,000** | | **10,000 credits** |

Therefore this proposed stream mitigation package provides sufficient compensatory mitigation for the 10,000 feet of stream impact assuming that stream size considerations (discussed below) are met.

f. Stream size considerations

The Stream Mitigation Guidelines state that mitigation should be within one stream order of the impact. In many cases for FERC projects, mitigation will need to be done for larger stream impacts with preservation on smaller stream channels. A strong effort should be made to provide mitigation for larger order streams (third and up) with large streams (third order or up) and for smaller streams (first and second order) with smaller streams. When this is not possible, the applicant should provide written justification that the proposed mitigation will adequately replace lost aquatic life functions. Finally, preservation should focus on the perennial stream segments rather than the intermittent segments unless the impact is on intermittent streams.

g. Statistically-based estimates of stream length

Once the above calculations are made to determine the amount of mitigation requirement for a particular project, it will be necessary to tally the length of stream on a particular site. If an exact stream length can be readily determined in the field, this is the preferred approach. If questions arise as to whether a particular feature is a stream or not, then NC DWQ's "Identification Methods for the Origins of Intermittent and Perennial Streams" (Version 3.1; January 1, 2005) should be used to make this determination.

However in many cases of watershed preservation, it is not practical to map all the streams found in the watershed. Unfortunately there are no available maps which accurately depict stream length in NC. As an initial, rough estimate, the length of stream shown on the 1:24,000 USGS topographic maps can be used along with regional correction data. However for a specific mitigation proposal, a more accurate determination of stream length is required.

In lieu of comprehensive mapping of watersheds, it may be possible to collect statistically-based estimates of stream length as long as the preservation sites are similar in geology and topography. DWQ would need to approve this study design which should be based on the on-going stream mapping effort coordinated by DWQ, NC Center for Geographic Information and Analysis (CGIA) and DOT and based on the US Environmental Protection Agency's Ecoregion Map (Griffith, G.E., et. al. 2002). If statistically valid data are collected, then these data can be used to accurately predict the length of streams in a particular watershed without extensive stream mapping in that watershed.

## V. References


Castelle, A.J, et. al. 1994. Wetland and stream buffer requirements – A review. Journal of Environmental Quality 23:878-882.

Doohaluk, D.A. 2000. A summary of the integration of science and policy: A case study on riparian forest buffers. Master of Public Health report, Institute for Public Affairs, University of South Carolina. Columbia, SC.

Griffith, G.E., et. al. 2002. Ecoregions of North and South Carolina. Reston, VA.

N.C. Division of Water Quality. 2005. Identification Methods for the Origins of Intermittent and Perennial Streams. Version 3.1. Raleigh, NC

U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, NC Wildlife Resources Commission and NC Division of Water Quality. 2003. Stream Mitigation Guidelines. Wilmington, NC.

Wenger, S. 1999. A review of the scientific literature on riparian buffer width, extent and vegetation. Institute of Ecology, University of Georgia. Athens, GA.

# Appendix 1

**Preservation Demonstrable Threat Guidance Criteria**
(Prepared for use by the NC EEP Program Assessment and Consistency Group - PACG)
April 5, 2004
Version 1.1

The *1995 Federal Guidance for the Establishment, Use and Operation of Mitigation Banks* and *Corps Mitigation RGL 02-2* (12-26-02) have almost identical language concerning preservation and the demonstrable threat requirement. Both documents state that the use of preservation as a sole basis for mitigation should only be under exceptional circumstances and should meet the following requirements:

"Districts will consider whether the wetlands or other aquatic resources: 1) perform important physical, chemical or biological functions, the preservation and maintenance of which is important to the region where those aquatic resources are located; and, 2) are under demonstrable threat of loss or substantial degradation from human activities that might not otherwise be avoided. **The existence of a demonstrable threat will be based on clear evidence of destructive land use changes that are consistent with local and regional (i.e., watershed) land use trends, and that are not the consequence of actions under the permit applicant's control."** (RGL 02-2)

These two guidance documents establish two conditions that must be met for "stand alone" preservation to be used for mitigation credit. Stand alone preservation is defined as preservation not augmenting the functions of newly established, restored or enhanced aquatic resources. The EEP Program Assessment and Consistency Group (PACG) developed the Preservation Criteria Guidance to use for determining if preservation sites satisfy the first criteria, i.e., ecologically significant to the region. The following guidance is to be used to determine if the second criteria, i.e., "clear evidence of demonstrable threat" has been satisfied.

It is often difficult to document whether a "demonstrable threat" exists to an aquatic resource and the resource agencies have not developed specific guidelines for making this determination. For this reason, the PACG has prepared the following list of items to be considered when preparing the "clear evidence of a demonstrable threat of loss or substantial degradation from human activities" documentation. When consulting this list, one should consider what is reasonably foreseeable within the next ten years and realize there may be additional items which should be considered for individual scenarios.

**Demonstrable Threat Items***

- Development trends in the watershed.
- Nearby tracts being developed
- Proximity of metropolitan areas
- Water and/or sewer lines extension plans for the area
- Local and DOT thoroughfare plans
- Specific development plans for tract
- Timbering threat to stream buffers
- Local land trust (or other sources) of local information on potential development
- Age of landowners in the area
- Threats to listed species (if present)
- Buffer protection rules in watershed, trout waters, etc.
- Permitting issues – how likely to be permitted for fill activities (high quality wetlands, etc.)
- To what extent is resource already protected by local/state/federal ordinances and regulations

*This list is not intended to be used as a checklist. The above are items to be considered when preparing the demonstrable threat discussion for preservation sites for mitigation during the EEP transition phase.

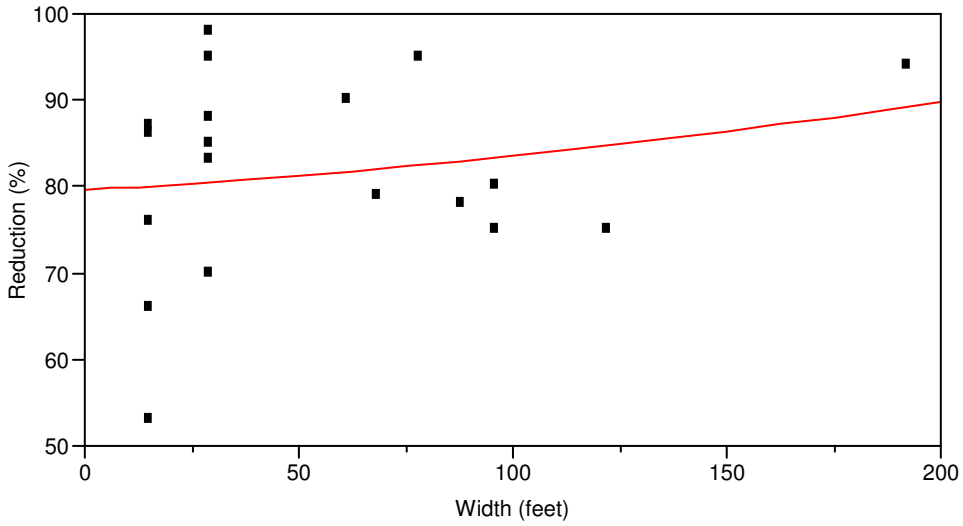


Figure 1. Reduction of nitrate nitrogen as a function of riparian buffer width

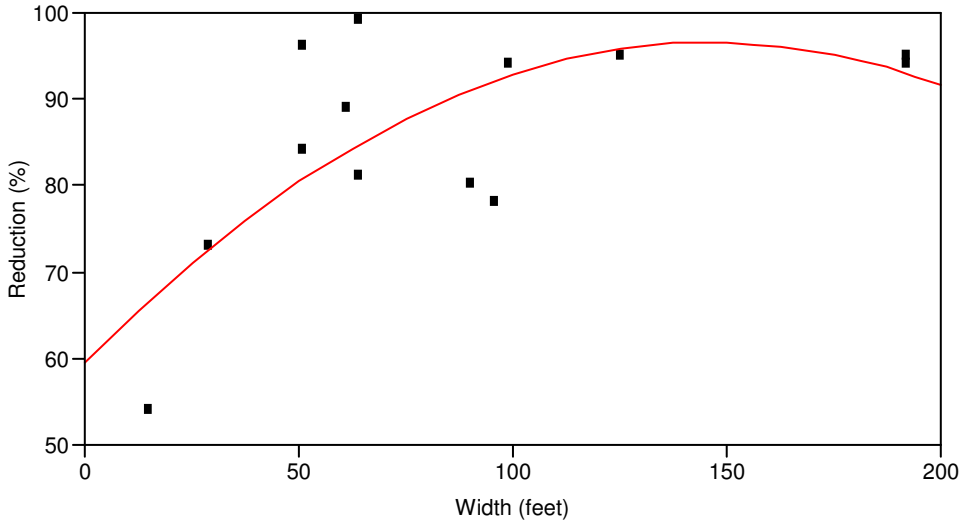


Figure 2. Sediment reduction

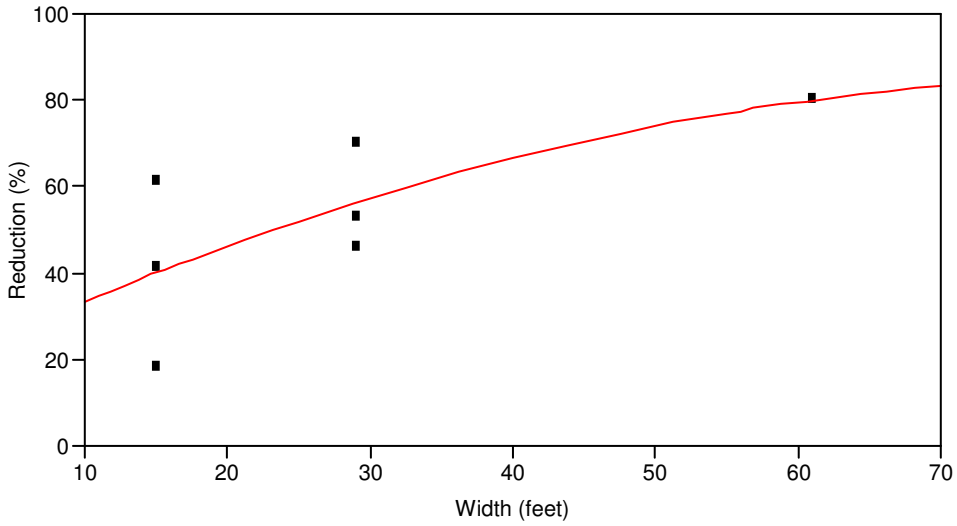


Figure 3. Phosphorus reduction