INFORMATION REGARDING STREAM RESTORATION IN THE OUTER COASTAL PLAIN OF NORTH CAROLINA

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This document is intended to provide information to compensatory mitigation providers for use when planning or evaluating potential stream mitigation projects in the outer coastal plain (defined as the Middle Atlantic Coastal Plain Ecoregion as shown on Griffith, et. al. 2002). This document is meant to complement the April 2003, Stream Mitigation Guidelines, prepared by the Corps of Engineers Wilmington District, Environmental Protection Agency, the North Carolina Division of Water Quality and the North Carolina Wildlife Resources Commission (US Army Corps of Engineers, 2003).

Riparian headwater system are for purpose of this guidance, those systems that either do not appear or appear as first order streams[1] on the appropriate county soil survey as published by the Natural Resources Conservation Service or its predecessor, the Soil Conservation Service. The term "stream" as used in this guidance, means that the flow of water is contained in a natural channel or bed with identifiable banks and, in its unaltered state on the coastal plain, usually has adjacent wetlands.

The majority of compensatory stream mitigation completed to date in North Carolina, has been in the Piedmont and Mountain Regions. Mitigation site selection efforts in these areas target degraded sites where the main problems are instability and unnatural sediment transport. Maximum mitigation credits are achieved by using natural channel design techniques to return the stream to its most probable natural state by restoring proper pattern, dimension and profile.

Many outer coastal plain riparian headwater systems have been channelized or ditched in the past, making it difficult to determine whether a true intermittent or perennial stream was historically present. These existing "man-made" channels have, in most cases, intercepted surface runoff and/or groundwater to the extent that they now possess intermittent or perennial flow and exhibit functions commonly associated with natural streams. These systems are often considered jurisdictional waters of the US and, in many cases, are classified as "streams". Permits to impact these systems usually require some form of stream mitigation as compensation.

[1] A first order stream is that portion of a waterway from its identified point of origin downstream to the first intersection with another waterway.

There is an increasing need for compensatory stream mitigation in the outer coastal plain of North Carolina. Many sites selected to provide compensatory mitigation are channelized or ditched riparian headwater systems. There is debate over the necessity and/or appropriateness of traditional channel design techniques in these systems. Typically, intermittent and perennial streams with well-defined bed and bank characteristics are associated with specific soil series (Table 1) and are present in those unaltered riparian headwater systems having relatively large watersheds draining into a well-defined topographic feature. Here, natural channel design techniques may be appropriate.

Often however, unaltered riparian headwater systems with smaller watersheds and less definite topography possess a braided, diffuse flow pattern across a narrow floodplain of riparian, wooded wetlands. In these instances, stream restoration involving the development of pattern, dimension, and profile would not be appropriate. These sites would likely not support engineered stream channels due to the lack of slope and sandy terrain. Restoration of these riparian headwater systems could still be accomplished to provide both stream and wetland mitigation credit without physically constructing a distinctive stream channel.

The NCDWQ is currently working with researchers from NC State University and the N.C. Center for Geographic Information and Analysis to develop a stream mapping methodology. This methodology should provide scientifically valid predictions for the origin of coastal plain streams. However, it is likely that it will be several years before this data is available. In the interim, those involved in the development of compensatory stream mitigation projects on the outer coastal plain of NC should use the following criteria to decide what design is appropriate for the proposed mitigation site.

Zero[2] to first order headwater streams: Restoration of stream pattern, dimension and profile is often not appropriate in features appearing as zero to first order, headwater streams in the outer coastal plain. Projects constructed in these areas may still qualify for stream restoration even though they may not include construction of an actual channel. These projects should include success criteria commensurate with the restoration of a bottomland riparian (wetland) community. Additional considerations for success criteria may include documentation of diffuse flow and inundation of adjacent wetland. Credit will be calculated based on the length of the valley rather than an exact length of the channel.

The limit of credit for stream and riparian wetland mitigation credit will be decided on a case-by-case basis and will typically depend on the width and extent of a clearly visible valley in the landscape. A 50-foot buffer is typically required for stream mitigation projects in the coastal plain. Therefore, stream credit may only be awarded where the discernible valley is a minimum of 100 feet wide. Areas outside this 100 foot corridor but within the valley feature may be used as riparian wetland mitigation. The width of the valley would usually be defined using the edge of the valley slope. Mitigation outside

[2] For the purposes of this guidance, jurisdictional waterways that do not appear on a county Soil Survey are considered zero order

of and/or above this valley could be considered non-riparian wetland mitigation assuming restoration of wetland hydrology, hydric soils and appropriate wetland plants. In-field confirmation of the presence and limits of the valley may be needed in order to determine the extent of riparian wetland and stream mitigation. Local topographic information (USGS quad sheets, LIDAR imaging, site-specific topographic surveys, etc.), site-specific soil mapping (for instance, linear mucky soil features bordered by mineral soils) and information on flood frequency and duration are often helpful tools in identifying these valleys in the outer coastal plain.

Second and higher order streams: Traditional stream mitigation methods using natural channel design to predict and restore pattern, dimension and profile are typically appropriate in systems indicated as second and higher order streams. Credit for this type project would be calculated based on the actual length of the channel restored or enhanced. The restoration of wetlands adjacent to the restored channel should be given strong consideration.

This document is intended as a general guide. The preparers realize there may be exceptions to the above information. Natural channel design may for instance, be appropriate when a zero or first order stream is located in a soil series that traditionally supports streams (Table 1) and sufficient watershed area is available. The converse is also true in that there may be larger watersheds where stream mitigation as described for zero to first order streams may be more appropriate. It is also likely that large mitigation sites may have both zero/first order streams and higher order streams as well as wetland complexes thereby requiring multiple mitigation design techniques. Designers are strongly encouraged, in all cases, to use reference sites with similar watershed size and topographic conditions to determine the type of restoration that is appropriate for the site Planning documents must adequately support the mitigation work proposed.

The guidance found in this document is subject to change if and when additional information becomes available. The most current version of this document as well as information on its applicability will be posted on the websites of both the Corps of Engineers (http://www.saw.usace.army.mil/wetlands/notices.html) and Division of Water Quality (http://h2o.enr.state.nc.us/ncwetlands/rd_pub_not.html).

Citations

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

US Army Corps of Engineers, et al. 2003. Stream Mitigation Guidelines. Wilmington, NC

Table 1[3]

Soils series in the coastal plain of NC which typically can contain streams

Soil Series Name	Beaufort	Bertie	New Hanover	Craven
Altavista	X			X
Augusta	X			
Autryville				X
Bibb		X		
Chewacla		X		
Craven		X		X
Currituck	X			
Doravan	X	X	X	X
Exum				X
Goldsboro				X
Johnston			X	
Lafitte				X
Masontown				X
Muckalee	X			
Norfolk		X		X
Onslow				X
Seabrook				X
State				X
Suffolk				X
Tidal Marsh			X	
Wahee	X	X		
Wasda	X			
Wehadkee		X		
Winton	X	X		

[3] These features normally occur on soils that typically contain streams. This table lists examples of some of these soil series for several coastal plain counties and is intended to serve as a general guide for this determination.