



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1890
WILMINGTON, NORTH CAROLINA 28402-1890

Key Branch

February 13, 2002

Regulatory Division

Subject: Key Branch Mitigation Site
USACE Action ID: 200200414

Ms. Elizabeth Lusk, Environmental Biologist
North Carolina Department of Transportation
Project Development & Environmental Analysis
1548 Mail Service Center
Raleigh, N.C. 27699-1548

Dear Ms. Lusk:

We are responding to your request for comments on the Mitigation Plan for the above referenced site in Anson County, North Carolina, dated August 24, 2001. Based on the information provided in the Mitigation Plan and subsequent information received on October 26, 2001, we do not object to the use of this site for compensatory mitigation purposes. The site appears to have the potential for successfully re-establishing an integrated wetland-stream complex as stated in the mitigation goals.

The goal, as stated in your proposal, is to restore 108.9 acres of piedmont bottomland hardwood forest and 6,577 linear feet of perennial stream on Chewacla soil. In order to achieve the restoration goal and receive credit from the Corps for this restoration effort, the site must demonstrate an inundated hydrologic regime of sufficient frequency and duration to mimic, as close as possible, the identified reference site. The hydrology success criteria of inundation having a 5% to 12.5% of the growing season duration, as identified in the report, is not considered sufficient to achieve success for this type of mitigation site. The mitigation site hydrology strategy should target consecutive day duration within the growing season of 12.5% or 31 days, or greater, to achieve a seasonally inundated hydrologic regime and inundation must occur 5 out of 10 years or 50% of the years monitored, at a minimum frequency. Baseline hydrologic data should be obtained from the reference site, which can be used to establish a target for hydrology success. It is suggested that we coordinate a date for the review of the reference site in the field and that the Corps concur with its selection before the baseline data collection has been initiated. Since the source of the required inundation will be over bank flooding from both the restored Key Branch and existing Brown Creek, we request that you provide the results of an acceptable hydrologic model, such as HEC-2, that will demonstrate that the channel design for Key Branch and the existing channel of Brown Creek will have the necessary over bank flooding required to achieve the hydrologic success. Absent any proposed channel modifications, we have some concerns about the flooding potential of Brown Creek,

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especially in light of the channelization of the reach. The result of such a model could be used to design the restoration effort of Key Branch and the proposed selective breaching of the Brown Creek levee. In order to monitor the success of the hydrologic strategy and to determine the extent of the restoration effort, we will require that transects be established perpendicular to the restored Key Branch and Brown Creek. These transects should be established using acceptable standard protocol and should be permanently established on the mitigation site. The continually recording monitoring wells, surface gauges and/or piezometers should be of sufficient numbers and adequately spaced on the transect to determine extent of inundation. This strategy will aid in quickly identifying problem areas for remediation and determine the hydrologic success of the mitigation effort. We must emphasize that the shallow wells, surface gauges and/or piezometers must be developed to measure the extent, frequency and duration of site inundation, except where wetland creation is the goal. Since the proposal is to restore a Chewacla soil wetland, measurements of soil saturation, even though it would yield useful information on the site's hydrology, cannot be used to determine site restoration success. Please refer to USACE WRP Technical Note HY-IA3.1 for installation and development of the monitor wells and/or piezometers. Monitor wells should be visited frequently to avoid lengthy down time of non-functioning wells and maintenance should be scheduled in such a way as to minimize any down time for repairs or replacement. Lengthy down time of wells, such as occurred on some of the wells for baseline data identified in the mitigation plan report, may result in the extension of the monitoring period in order to fill in gaps in the data.

Vegetation monitoring should begin in the spring just after leaf-out. Permanent randomly located sample plots shall be established in each vegetation community. Plot size should be based on established standards for sampling vegetation planted at the target densities, usually 0.1 acre. The number of plots shall be established by use of statistical methods used to identify adequate sample size and, at a minimum, provide combined sample coverage of 2% of the mitigation site. The planted stock shall be marked by use of tree marking paint and/or tree tags for identification and sampling. Plants that have colonized the sample plot should be identified and noted in the monitoring report but not used in the planted vegetation monitoring calculations. Plant recruitment should be calculated as a separate item and corrective measures may need to be taken if the volunteers are undesirable or are jeopardizing the survival of the planted stock. The measurement of planted stock survival using stem density, identified in the mitigation report, will be acceptable provided that only planted stock are counted. In addition, in order to measure health and vigor of the planted stock, height measurements of the plants in each plot shall be taken, compared and provided in the yearly monitoring report. General observations of lateral plant growth, leaf and bud development should also be annotated in the reports.

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The proposed stream restoration design shall be based on an approved stable reference reach. The reach indicated in your mitigation plan can be reviewed for approval at the same time as the wetland reference site. The baseline data on the reference reach channel dimension, pattern, and profile should be used as a blueprint for the channel restoration. A detailed design plan of the stream restoration shall be submitted to this office for review prior to construction.

The development of a monitoring plan for the design reach that would assesses geomorphologic and biological parameters will be required. The monitoring plan should include the protocol and provisions for providing reference photographs, channel stability analysis and biological data on a yearly basis. Reference photographs, both longitudinal and lateral, should be taken at least twice a year, preferably in winter and summer and at permanently established locations. Perpendicular transects or cross sections should be permanently established at selected points on the designed reach where channel width, depth, cross-sectional area, velocity data and lateral photographs will be collected and provided in the annual monitoring reports. Five cross sections per 1000 linear feet should be established in at least three out of every four pools and one out of every four riffles. Additional cross sections should be considered for areas where there are structures or other areas where there is a chance of failure. Benthic macroinvertebrate and fish community baseline surveys should be conducted and recorded for the reference reach and an approved site located immediately below the design reach. Benthic macroinvertebrate and fish community surveys shall be required within the restored reach and used to measure the biological component of the restored stream. These surveys shall commence one year following the restoration and continue for at least three years. This annual survey shall also be required of the site below the design reach, commencing one year following the restoration. The survey data collected shall be provided in the annual monitoring reports. The NCDENR *Interim, Internal Technical Guide: Benthic Macroinvertebrate Monitoring Protocols for Compensatory Stream Restoration Projects* can be used as a guideline. However, proper accepted sampling techniques and protocol must be used.

Finally, an as-built plan will be required for the design reach. The as-built should also include longitudinal profile data for the design reach, that should be monitored and data recorded annually. Design reach channel geometry measurements should also be a part of the as-built information. They will include sinuosity, meander wavelength, belt width, meander width ratio and radius of curvature. This plan should also show the location of all proposed attendant features, e.g. in-stream, bank protection or grade control structures, and the location of all sampling plots, transects, photography reference points, etc.

Also included in your proposal is the preservation of 3.6 acres of piedmont swamp hardwood forest and 6.1 acres of riparian buffer/piedmont levee forest, which would be

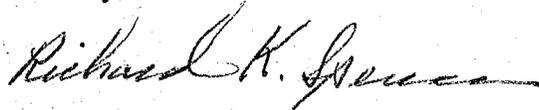
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acceptable under this compensatory mitigation package following confirmation and verification of the field boundaries. These sites should be delineated and scheduled for field verification at the same time as the reference site visits mention above.

For future mitigation plans, we would recommend that the practice of using a 7-day moving average to graph well data be discontinued. This type of data manipulation may lead to false interpretation of the data. It may be fine for trend analysis but smoothing the data in this matter masks the discrete daily events that occur and therefore does not give you a true picture of what may be happening on the site. The best way to present the data would be on a daily basis. Also, rainfall data should be provided on the same graph. This graphic comparison may provide information on the hydrology dynamics at the site. We have enclosed an example of the type of graphic representation that we would like to see in future mitigation plans.

We appreciate this opportunity to provide you with our comments. Should you have any questions or wish to discuss our comments further, please call me at 910-251-4172.

Sincerely,



Richard K. Spencer
NCDOT Project Coordinator

Enclosure

CF w/enclosure:

Mr. William Gilmore, PDEA
Mr. John Hennessy, DWQ
Ms. Cynthia van der Wiele, DWQ
Mr. David Cox, NCWRC
Ms. Marella Buncick, USFWS
Mr. Rob Bailey, KCI
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