



DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS

P.O. BOX 1890
WILMINGTON, NORTH CAROLINA 28402-1890

IN REPLY REFER TO

June 13, 2001

Regulatory Division

SUBJECT: Mitigation Monitoring Reports



Mr. William D. Gilmore, P.E., Manager
Project Development and Environmental Analysis Branch
North Carolina Department of Transportation
Division of Highways
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Mr. Gilmore:

Please reference the March 16, 2001 meeting to discuss the Year 2000 wetland mitigation monitoring reports. In an effort to avoid duplication of effort among the regulatory field offices, we are again this year providing comments on all the plans under cover of this letter. General comments that apply to most or all of the reports have been provided first. Comments and recommendations specific to each report are provided last. With the exception of the general comments noted below, we feel that the reports are well structured and provide sufficient information to allow us to draw conclusions about the overall success of the sites. We want to stress that because the Natural Systems and Roadside Environmental Units have much more first-hand knowledge of the overall condition of these sites, we will continue to rely on them to be proactive in providing any necessary corrective measures.

As you are aware, data from several sites including Long Swamp, Gurley Tract, Huskanaw Swamp, Bull Farm, Mildred Woods, and Mud Creek indicate that the required success criteria will not be met over all or portions of these sites. In cooperation with your staff, we have initiated efforts to determine the extent of the area within these sites that have satisfied the requirements of the appropriate plan. Once this is complete, it will be necessary to determine if the site contains sufficient restoration, enhancement, or preservation to satisfy the requirements of the appropriate Department of the Army permit.

With the exception of the six projects identified above, please note that this correspondence will serve as our final comment on the subject reports and, accordingly, we are not expecting NCDOT to revise and resubmit the reports to address these comments. Our comments provide recommendations on actions that should take place and suggestions for improving next year's submittals.

General Comments:

1. Non-target species should not be included in the success criteria. Although it is important that you note their presence, they should not be included in the totals for the acceptable trees that are present. Obviously, the recruitment of target species is desirable, however, there appears to be a tendency to combine percent survival of planted species with total numbers of stems per acre. These are two separate measurement criteria. Unless stated otherwise, we will require a certain number of trees (usually 290), *five years old*, at the end of the five year monitoring period.
2. A recurring issue lies with the interpretation of monitoring well data. In several of the reports we have noted that the required hydrology parameter has only been met after a single large rainfall event. It is quite possible for rainfall to lie in the "normal" range for the month even though the entire amount fell in one discrete event. In this case, we cannot conclude that the required hydrology parameter has been met, especially when the data show a rapid draw-down of groundwater after such an event. This is especially true for flat-wood systems where we are accustomed to seeing a gradual draw-down that can extend over a period of several months during the early part of the growing season.
3. We encourage NCDOT to begin the process of identifying long-term management and disposition of the mitigation properties it owns.
4. If photos are taken of the site, keys to where photos are taken should be provided in the report.
5. We continue to note that success criteria, as stated in several of the monitoring reports do not reflect what is in the approved mitigation plans or in the permit conditions. It is imperative that the monitoring reports describe hydrologic and vegetative conditions on the site as it relates to the *approved success criteria*. We will provide you with the approved success criteria for these sites prior to next years report submittal.
6. For all multi-project mitigation sites (e.g., Dowd Dairy, Haws Run, Mildred Woods) the report must contain a current ledger and map showing the cumulative amount of area that has been debited from the site. This ledger must show the NCDOT TIP Number and the Corps of Engineers Action ID (permit) Number. In addition, the reports must contain a copy of a map showing the locations of the types of mitigation (e.g., restoration, enhancement, preservation) that exist on the site.
7. Several sites appear to be meeting the hydrological success only over certain portions of the site. The monitoring reports must provide a qualitative discussion of the aerial extent that the site is failing to meet the required success criteria and what remedial actions are proposed to correct these deficiencies.

8. We discussed the issue of report timing relative to NCDOT's ability to perform any required remedial actions in following planting season. We agreed that tree counts could be performed earlier in the summer (June/July) and the hydrological data could be collected through the end of September with the remaining years data supplied at a later date. In addition, there is the possibility that the reports could be posted on NCDOT's web page to allow earlier review of the information. In all cases, we would expect NCDOT to either provide a remedial action plan in the report or perform the necessary actions prior to our review when it is obvious that certain actions must be taken to be insure that the site is successful.

9. In order to meet the established success criteria, vegetation and hydrologic monitoring must be concurrent. Therefore, if vegetation was planted the year before monitoring wells were installed, the 3 (or 5) -year monitoring cycle would begin during the first growing season that both vegetation and hydrology monitoring were in place.

10. If a site is clearly not meeting the required success criteria, NCDOT must discuss appropriate remedial actions it will undertake to correct the deficiencies. This includes methods to control excessive nuisance vegetation.

11. From the number of battery failures and other monitoring gauge problems reported in 2000, it is apparent that an overall gauge maintenance plan is needed for the mitigation sites. We continue to recommend that the placement of gauges at mitigation sites be coordinated with the Corps of Engineers prior to their installation.

12. The monitoring reports are inconsistent in addressing whether or not rainfall distribution patterns over the growing season and total annual rainfall are normal as defined by the WETS Tables.

Raleigh Field Office

1. Lake Wheeler Mitigation Site; R-2000, AID 199601917

a. Monitoring must continue on this site. NCDOT should not include non-targeted species for particular plots in the vegetation count and success densities (e.g., for Plot 10, in the wetland zone, Laurel Oak and Hickory were included, although they were not planted, and for Plots 4, 5 & 8, in the levee area, green ash were included, although they were not planted). Obviously, if large numbers of non-targeted species for a particular plot are observed, this should be noted in the monitoring report, but not included in the success calculations.

b. The report noted that beaver activity and standing water were observed on some of the plots. The report should indicate if these elements are adversely affecting the site and provide a remedial action plan, if necessary.

c. The photos should include a key or description to indicate where they were taken.

d. Several of the plots had very high percentages of green ash, to the extent that some of them would not have come close to meeting the success criteria if green ash were left out. The report should highlight this observation and discuss appropriate remedial actions.

2. **Gurley Mitigation Site; AID 199700095**

a. NCDOT must provide a map showing all areas that have been debited from this site.

b. NCDOT should not include non-targeted species for particular plots in the vegetation count and success densities (e.g., for Transect T4, in Zone 1, Black Gum and Water Tupelo were included, although they were not planted, and if they are not included, T4 doesn't meet the density requirement). Obviously, if large numbers of non-targeted species for a particular plot are observed, this should be noted in the monitoring report, but not included in the success calculations.

c. The report noted that beaver activity and standing water were observed on some of the plots. The report should indicate how and to what extent these elements are adversely affecting the site, and discuss if remediation is needed.

d. On page 1, paragraph 4, sentence 1, should read, "Hydrologic monitoring in 2000 showed seven of the 16 gauges recorded saturation for more than 12.5% of the growing season; two of these gauges are in riverine areas; ten of the 16 gauges recorded saturation for more than 5% of the growing season." It is noted that three of the gauges almost met the 8% required hydrology.

e. On page 4 & Appendix A. The Goldsboro rainfall data and the rain gauge data after 9/30/00 should be included in the graphs.

f. On page 8, paragraph 2 is confusing and partially contradictory. It would be better to just show for each gauge the dates when they were not functioning and explain why (e.g., GT9 did not record on 4/2/00 – 5/2/00; 5/17-31/00; and 6/2-29/00 because of battery malfunction.

g. On Page 8 the last sentence should read as: "and June and August, which were both slightly above average."

h. On Page 8, paragraph 2, the information on the gauge problems contradicts the graphs in Appendix A for gauges 8 and 15.

i. Figures 2 & 3 do not indicate where well GT-8 (GW-8) is located.

j. The last sentence on page 10 is unclear. If the results indicate potential problems on the site these problems should be analyzed in the report, and specific recommendations made (page 14).

k. Per the comments on the 1999 monitoring report, the report should include an update on the invasive species on the site.

l. Per the comments on the 1999 monitoring report, the report should include a vegetative assessment of the areas out of the vegetative plots/transects.

3. **Mildred Woods Mitigation Site (199400662)**

a. The report should state that NCDOT recommends that annual vegetative monitoring be discontinued **temporarily** (until hydrologic modifications are made).

b. All of the gauges that met the criteria did so in periods when rainfall was above normal. This should be noted in the report's conclusions. Hydrology monitoring must show the site meeting the saturation criteria during times of rainfall within the normal or drier range to show success in meeting the hydrology criteria.

c. NCDOT needs to make clear what its recommendations are concerning the areas where the majority of the gauges are not meeting the expected hydrology. If remedial actions are proposed, this information must be provided to us as soon as possible. Disposition of areas on the tract that cannot be restored must be approved by the District Engineer.

d. NCDOT needs to make clear what its recommendations are concerning the areas of heavy competition, and heavy natural regeneration of non-target species, including plots 19 and 20. In addition, NCDOT needs to provide more specific data concerning the extent of invasive vegetation (i.e., acreages and locations) and provide an assessment of vegetation outside of the specific monitoring sites.

Asheville Field Office

1. **Little Sugar Creek Mitigation Site.**

a. Due to insufficient hydrology since this site was constructed, the lack of any trends toward improvement and a lack of clear direction toward remediation, we recommend that wetland mitigation at this site be abandoned and outstanding wetland mitigation credits be secured through the NC Wetland Restoration Program or another site. A permit modification request will be necessary to effect this change and should be submitted to us within 60 days. We would be willing to discuss with NCDOT the potential for stream channel mitigation credit at this site.

2. **Long Creek Mitigation Site**

a. Surface water depth graphs for LCS 5, LCS 6, and LCS 19 are missing from the report. The location of LCS 5 does not appear on Figure 2, Gauge Location Map.

b. It is unclear from the report if invasive plant species are becoming a problem at this site. The occurrence of certain species is noted but other issues such as density and distribution are not addressed.

c. Trends towards meeting the success criteria at this site are encouraging. However, with the pending construction of the North Charlotte Outer Loop (I-485) through the site, monitoring must continue through the construction phase of I-485 in order to determine whether this work will have any adverse effects on the mitigation area.

3. **Mallard Creek Mitigation Site**

a. We note that the waterline leak at Site 1 was repaired on December 2, 2000. This leak may explain the disparity in hydrology between Sites 1 and 2. Depending on the results of hydrology monitoring for this year, the 3-year monitoring cycle may have to be reset to the 2001 growing season.

b. All of the groundwater monitoring graphs at this location are reporting groundwater levels above the ground surface. It is unclear whether this is a graphing error or a problem with the gauges.

c. In order to conform to monitoring requirements at other mitigation sites, the hydrology success criterion for this location should be changed from within 10 inches to within 12 inches of the surface. NCDOT should request a permit modification to effect this change.

d. With the pending widening of Mallard Creek Church Road adjacent to Site 1, we believe that all monitoring should continue through the construction phase to determine whether this work will have any adverse effect on the mitigation area.

4. **Mud Creek Mitigation Site**

a. Monitoring of the vegetation manipulations within the wetland enhancement area must be initiated to document success of this effort. Vegetation monitoring was included in the Draft Mitigation Plan of March 12, 1997 and was further detailed in a July 28, 1997 letter from NCDOT. This monitoring must be initiated in order for NCDOT to receive enhancement credits for the 26.9-acre area. Without vegetation monitoring, this area will be considered for preservation credit only.

b. The referenced Figure 4 showing rainfall data is missing from the report.

c. The wetland creation area at this site has shown a marked lack of success in meeting hydrology success criteria for the past three years. In order to increase the surface water input to this area, the NCDOT should consider stream restoration of the ditched channel flowing through this area to increase surface flooding. Lowering the surface elevation of the site an additional 35 to 40 inches would not appear to be a practicable option. NCDOT should schedule an on-site meeting with Regulatory staff to determine if additional mitigation is required.

Washington Regulatory Field Office

1. Cox Farm Mitigation Site

a. Monitoring indicates that site does not meet hydrology success criteria and monitoring must continue for at least another year.

2. Mashoes Road Mitigation Site

a. Wells located on the Western Side of the site indicate the hydrologic success criterion has been met. However, on-site inspections conducted on February 7, 2001 revealed that the forested area near the ditch was drained. This problem was brought to NCDOT's attention during project design but NCDOT stated that the ditches would not drain the mitigation site. At least two new monitoring wells must be installed along a transect perpendicular to and within 20 feet of the roadside ditch to determine the drainage effects. These additional wells need to be installed as soon as possible.

b. The Western Side of the site was replanted due to desiccation of the original planted materials. NCDOT was informed in 1998 that mulch was needed to hold moisture and to protect the trees. You are again reminded to add mulch now to protect the most recent planting effort. We feel it is in NCDOT's best interest to protect the newly planted materials as each year that the site is planted resets the monitoring clock back to year one.

c. The Eastern Side of the site needs any final Phragmites treatment and the marsh must be planted in the spring of 2001.

d. The monitoring period for this site will begin with the submission of the Year 2001 report next year.

3. Manns Harbor Mitigation Site

a. Phragmites continues to be a problem at the site. Treatment and monitoring of this problem shall continue.

4. **Manteo Bypass Bridge Mitigation Site**

a. Site is not successful and needs to be planted in the Spring 2001 as recommended by NCDOT.

b. NCDOT will coordinate with Ron Sechler of the National Marine Fisheries Service to coordinate sampling protocols.

5. **Casey Mitigation Site**

a. This site contains 0.5 acres of open water and mudflats that were not specified in the original plan. However, this may not require remedial action, as the inclusion of mud flats into the site will not compromise the overall integrity or goals of the site. This change should be coordinated with the interested resource agencies including the NC Division of Coastal Management.

b. Monitoring shall continue at this site.

6. **Ballance Farm Mitigation Site**

a. Reference wells need to be installed and hydrological data collected throughout the year.

b. Vegetation and hydrological monitoring shall continue.

7. **Tucker Farm Wetland Mitigation Site**

a. An on-site investigation on February 27, 2001, revealed the northwestern section of the site might not meet wetland hydrology criteria. This conclusion is supported by the monitoring well data. As discussed at the March 16 meeting, NCDOT will install an additional well south of well TT-6 and between well TT-3 and well TT-10. These wells should be installed as soon as possible to capture the early growing season

8. **Lengyel Mitigation Site**

a. Surface gauges need to be repaired and data compared with reference area data.

b. Report must show channel location on the mitigation site.

c. Hydrological and vegetative monitoring shall continue.

9. **Pembroke Creek Mitigation Site**

- a. Hydrological and vegetative monitoring shall continue.
- b. It is not necessary to replant atlantic white cedar on the site.

10. **Huskanaw Swamp Mitigation Site**

- a. Nuisance species appear to be a problem.
- b. According to the report only one of three wells met success criteria.
- c. Hydrological and vegetative monitoring shall continue.

11. **Dismal Swamp Mitigation Site**

- a. Based on our review of the hydrologic data, which indicates a fairly rapid drainage response after rainfall events, it appears that site may still under the influence of artificial drainage. This issue should be discussed and investigated prior to next years monitoring report.
- b. A debit map must be provided for this site.
- c. Hydrologic and vegetative monitoring shall continue.

12. **Seven Springs Mitigation Site**

- a. We agree that the vegetation success criterion has been met and that vegetative monitoring may be discontinued.
- b. Only two of the six wells met the hydrologic success criteria in 2000. This is inconsistent with the previous results which only wells "A" and "D" did not meet success criteria. We recommend another year of hydrologic monitoring (both on-site and reference wells) to determine hydrologic trend between wells.

13. **Collington Mitigation Site**

- a. We will concur with the recommendations from the Division of Coastal Management.

Wilmington Field Office

- 1. **Bull Farm: TIP's R-512, U-508, and R-2211.**

a. It appears that that this site has equilibrated with respect to groundwater levels. We recommend that an on-site meeting be held to determine if additional mitigation is required to offset those areas within the site that have not demonstrated hydrologic success. We agree with NCDOT that all monitoring may be discontinued at this site.

2. **Dowd Dairy Farm.**

a. Last year we requested that that NCDOT install well transects perpendicular to the canal ditch on the north side of the property. The interim monitoring report does not indicate that this has occurred.

b. Year one monitoring will commence with the year 2001 monitoring report. /

3. **Haws Run**

a. NCDOT has corrected the erosion problem by reducing the slope along the edge of the pine savanna restoration area. It was agreed that any lost restoration areas would be replaced from either the Haws Run site or another separate mitigation site. Richard LeBlond has mapped all the game lands in the area and is evaluating a link between all these areas and the conservancy's land to form one large tract. We support the plan to fill the ditch along the east side adjacent to the Nature Conservancy property and the game land link being considered.

b. The road removal on the south end of the tract was described as enhancement in the planning document. If restoration credit is desired in this area, NCDOT must provide pre- and post- project hydrological data to demonstrate that restoration has occurred.

c. In the NCDOT letter dated September 7, 2000, we were informed that a revised map showing the location of debited areas within the site relative to the bottomland creation and savannah restoration areas and a revised monitoring well plan to show how the site has been drained from the adjacent rim ditches would be provided to us. This information has not been provided to us as of this date.

4. **Camp Lejune, Marine Corps Marsh Site.**

a. This site is currently being redesigned to ensure that it is subject to diurnal flooding. The revised plan will be forwarded to the agencies when it is complete. Remedial action at this site must be complete no later than June 1, 2002. NCDOT must obtain a permit modification to effect this change.

5. **Bogue Sound (Bridgers St).**

a. We concur with NCDOT's recommendation to continue vegetative monitoring of this site. Also recommend a field meeting and that supplemental planting be considered pending a field check.

b. NCDOT should begin to investigate other intertidal marsh restoration opportunities in the area. If Spartina alterniflora has not colonized the site after 5 years, we question whether additional planting would be successful.

6. **Haywood Weeks**

a. Monitoring of vegetation and hydrology must continue at this site.

7. **Spring Branch.**

a. Monitoring of this site must be continued for five years or until success criteria have been met, *whichever is later*.

8. **Long Swamp**

a. I have included a copy of our correspondence to you that was dated June 15, 2000. Many of the comments contained in this letter are still valid but have not been satisfactorily addressed. Perhaps most significantly, we still fail to see a comparison being made between the reference sites and the restoration areas. This is the hydrological success criterion for the site and must be provided in the report.

b. We remain very concerned that the wells only demonstrate free water near the surface after significant rainfall events and that a rapid drainage response is still present at the site. A comparison between these and the reference wells appears to show that the required hydrology parameter is still lacking. We recommend that NCDOT conduct a separate agency meeting at the site to determine if it will adequately provide the required compensatory mitigation.

c. It is our understanding that NCDOT is actively pursuing the additional 20 acres that is required for the Rockingham-Hamlet Bypass. An update on the status of this project should be provided as soon as possible.

9. **Little McQueen**

a. We concur with NCDOT's recommendation to continue vegetative monitoring in 2001.

10. **Bridge Maintenance Site**

a. NCDOT should be prepared to monitor nuisance species such as Typha and proceed with remedial action, if necessary.

We appreciate the opportunity to provide comments on these plans. If you have any questions or comments, please call Mr. Scott McLendon, Division Project Manager at 910-251-4725.

Sincerely,



E. David Franklin
Chief, NCDOT Team
Regulatory Division

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