

ANNUAL REPORT FOR 2006 (Year 3)



Caviness Mitigation Site
Randolph County
EEP Project No. 73

Submitted to:

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CAVINESS 2006 SUMMARY

The following report summarizes the monitoring activities that have occurred in 2006 at the Caviness Mitigation Site. The site is located in Randolph County, North Carolina. The site was designed during July 2003 and constructed in January 2004 by the North Carolina Department of Transportation (NCDOT). This report provides the monitoring results for the third year of monitoring. The Caviness Site will be monitored through the Year 2008 or until success criteria are met.

The Caviness Site was constructed to provide 3,250 linear feet of mitigation credit for stream impacts associated with Transportation Improvement Program (TIP) number U-2524. Per the letter from the Ecosystem Enhancement Program (EEP) to NCDOT dated August 25, 2004, the EEP has accepted the transfer of all offsite mitigation projects, including Caviness. The EEP project number for Caviness is 73. EEP is responsible for fulfilling the remaining monitoring requirements and future remediation for this project.

No hydrologic monitoring is required for this project; however, vegetation monitoring is required for five years. The 2006 vegetation monitoring revealed an average density of 691 trees per acre, which is above the 320 trees per acre minimum requirement.

The stream channel was visually inspected biannually during the spring and fall of 2006. The channel appears to be stable with herbaceous and woody vegetation covering the stream banks throughout the project reach. Some minor problem areas were noted and are discussed in this report.

A composite benthic macroinvertebrate sample was collected at two stations (12+00 and 24+00) along the restoration reach in September 2006. The North Carolina Division of Water Quality (NCDWQ) Qual-4 collection method was utilized. Overall, the Caviness restoration site has macroinvertebrate assemblages that are moderately to very pollution tolerant and characteristic of substrates with high amounts of sediment. Very few ephemeroptera, plecoptera, and trichoptera (EPT) taxa were collected. Those EPT taxa that were collected are pollution tolerant species.

1.0 INTRODUCTION: CAVINESS MITIGATION SITE

1.1 Project Description

The Caviness Mitigation Site is located in Randolph County between Asheboro and Coleridge near the intersection of Tommy Cox Rd. and NC 42 (Figure 1). The site provides 3,250 linear feet of stream restoration credit.

1.2 Project Objectives

The purpose of this report is to detail the vegetation monitoring and visual stream assessment in 2006 at the Caviness Mitigation Site. No hydrologic monitoring is required for this site. Table I describes the project objectives and mitigation structure.

Table I. Project Mitigation Structure and Objectives

Project Segment	Mitigation Type	Approach	Linear Footage or Acreage	Stationing	Comment
Tibbs Run	R	P1	2,255 ft	10+00 to 33+00	
West Branch	R	P1	810 ft	50+00 to 58+00	
Tibbs Run + West Branch			11 acres		Total buffer area

R=Restoration

P1=Priority 1

1.3 Project History and Background

Table II below describes the project activity and reporting history on the Caviness Mitigation Site.

Table II. Project Activity and Reporting History

Activity or Report	Scheduled Completion	Data Collection Complete	Actual Completion or Delivery
Restoration Plan	NA*	NA*	May 2001
Final Design-90%	NA*	NA*	July 2003
Construction	NA*	NA*	January 2004
Temporary S&E mix applied to reach/segments 1 & 2	NA*	NA*	NA*
Containerized and B&B plantings for each reach/segment	NA*	NA*	NA*
Mitigation Plan/As-built (Year 0 Monitoring-baseline) 2004			2004
Year 1 Monitoring 2004			2004
Year 2 Monitoring		November 2005	December 2005
Year 3 Monitoring Fall 2006	Dec-06	November 2006	December 2006
Year 4 Monitoring Fall 2007	Fall 2007		
Year 5 Monitoring Fall 2008	Fall 2008		

*Historical project documents necessary to provide this data were not available at the time of this report submission

Table III. Project Contact Table

Designer	HSMM 1305 Navaho Drive, Suite 303 Raleigh, NC 27609
Primary project design POC	Roy Currin (919) 878-5250
Construction Contractor Construction Contractor POC	NCDOT
Planting Contractor Planting Contractor POC	NA*
Seeding Contractor Planting Contractor POC	NA*
Seed Mix Sources	NA*
Nursery Stock Suppliers	NA*
Monitoring Performers 2004	NCDOT
Monitoring Performers 2005	Earth Tech 701 Corporation Center Drive, Suite 475 Raleigh, NC 27607
Stream Monitoring POC	Ron Johnson (919) 854-6210
Vegetation Monitoring POC	Ron Johnson (919) 854-6210
Wetland Monitoring POC	NA**

*Historical project documents necessary to provide this data were not available at the time of this report submission.

**Not applicable.

Table IV. Project Background Table

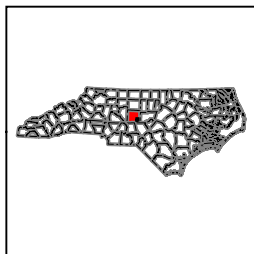
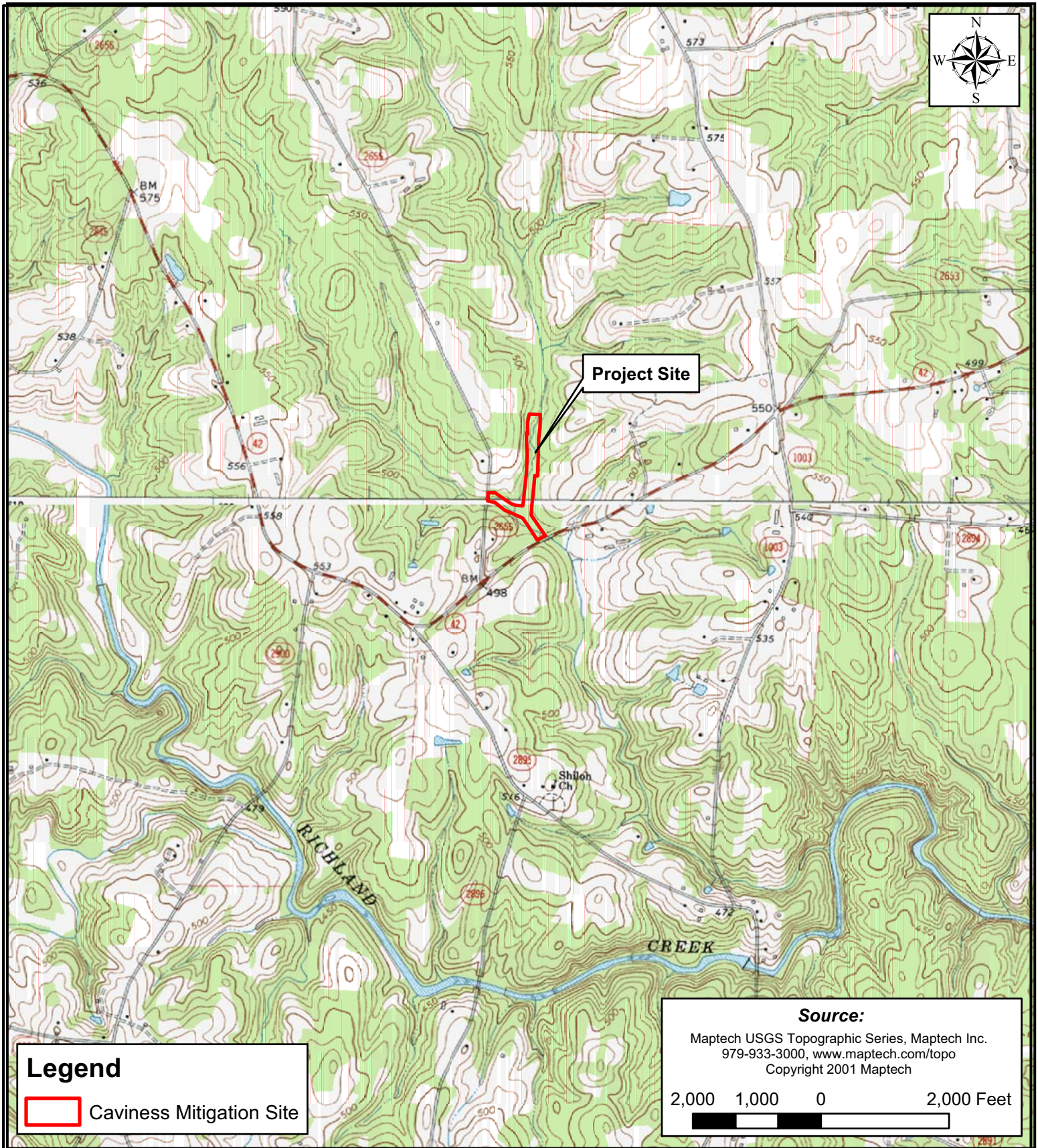
Project County	Randolph
Drainage Area	
Tibbs Run	3.3 sq. mi.
West Branch	1.13 sq mi.
Drainage impervious cover estimate (%)	
Tibbs Run	<1%
West Branch	<1%
Stream order	
Tibbs Run	3rd order
West Branch	2nd order
Physiographic region	Piedmont
Ecoregion	Carolina Slate Belt (45c)
Rosgen classification of As-built	E5
Cowardin classification	NA**
Dominant soil types	Georgeville silt loam
	Cecil sandy clay loam

Table IV. Project Background Table (Cont'd)

	Appling sandy loam Vance sandy loam
Reference site ID	North Branch of Deaton
	Tributary to Sandy Creek
	Tributary to Tibbs Run
	Mud Lick Creek
USGS HUC for Project and reference	3030003
NCDWQ sub-basin for project and reference	03-06-09
NCDWQ classification for project and reference	C (Tibbs Run)
	WS-III (Tributary to Sandy Creek)*
Any portion of project segment upstream of a 303d listed segment	No
Reasons for 303d listing or stressor	NA**
% of project easement fenced	100%

*Unable to locate other reference reaches from information provided.

**Not applicable.



**FIGURE 01
VICINITY MAP**

Caviness Stream Mitigation Site
 Randolph County, North Carolina

Map Produced: December 2006

2.0 VEGETATION: CAVINESS MITIGATION SITE

2.1 Vegetation Success Criteria

Success Criteria states that at least 320 stems per acre must survive after the completion of the third growing season and 260 stems per acre after the fifth growing season. If the desired vegetation has not been established, NCDOT will notify the appropriate agencies and will implement corrective measures.

2.2 Description of Species

The following species were planted in the mitigation area: (approximately 11 acres)

Fraxinus pennsylvanica, Green Ash

Quercus phellos, Willow Oak

Quercus alba, White Oak

Platanus occidentalis, Sycamore

Quercus falcata var. *falcata*, Southern Red Oak

2.3 Results of Vegetation Monitoring

Table V below contains the results of 2006 vegetation monitoring. The three vegetation plots are 0.057 acres in size and their locations are shown in Appendix A.

Table V. Caviness 2006 Vegetation Monitoring Results

Plot	Green Ash	Sycamore	Southern Red Oak	White Oak	Willow Oak	Year 3 Total	Baseline Total	Density (trees per acre)
1	2	12	2	11	6	33	41	575
2	21	26	1	10		58	55	1011
3	9	10	1	3	5	28	55	488
Average Density								691

Site Notes: Other species noted: blackberry (*Rubus argutus*), sweetgum (*Liquidambar styraciflua*), horse-nettle (*Solanum carolinense*), jewel weed (*Impatiens capensis*), privet (*Ligustrum sinense*), fescue (*Festuca sp.*).

2.4 Vegetation Conclusions

This site consists of approximately 11 acres of planted trees. There were three 50-foot x 50-foot vegetation monitoring plots established throughout the planting areas. The 2006 vegetation monitoring of the site revealed an average tree density of 691 trees per acre. This average is above the minimum success criteria of 320 trees per acre after year 3. Appendix A contains a site map and 2006 site photos.

3.0 STREAM: CAVINESS MITIGATION SITE

The stream channel was visually inspected biannually during the spring and fall of 2006. The channel appears mostly stable with herbaceous and woody vegetation covering the streambanks throughout the project reach. Five problem areas were noted (Appendix B). These areas will be visited again in spring 2007. Remedial actions may be necessary in upcoming years. There is evidence of beaver impacts to the stream that is causing a backwater effect on the lower end of the channel. Photos of the beaver dams are included in Appendix B.

Table VI. Verification of Bankfull Events

Date of Data Collection	Date of Occurrence	Method	Photo # (if available)
September 2006	Unknown	Visual	PA #4, Appendix B

Visual evidence of a bankfull event was observed during the vegetation survey in September 2006. The evidence included extensive wrack lines and a damaged fence at a ford crossing. Photos of this area are included in Appendix B.

Benthic Macroinvertebrate Survey

Benthic macroinvertebrate sampling was completed in November 2006. Results of laboratory analysis of the samples are provided in Table VII below.

Table VII. 2006 Benthic Macroinvertebrate Survey Results

Order	Family	Species	Tolerance Value	No.
Odonata	Aeshnidae	Basiaeschna janata	7.4	4
Odonata	Aeshnidae	Boyeria vinosa	5.9	6
Odonata	Gomphidae	Gomphus spp	5.8	8
Odonata	Calopterygidae	Calopteryx spp	7.8	3
Odonata	Libellulidae	Libellula spp	9.6	2
Odonata	Coanagrionidae	Enallagma spp	8.9	36
Odonata	Coanagrionidae	Argia bipunctulata	8.2	7
Megaloptera	Sialidae	Sialis spp	7.2	4
Coleoptera	Hydrophilidae	Hydrochara occulta		2
Coleoptera	Haliplidae	Peltodytes sexmaculatus	8.7	2
Hemiptera	Corixidae		9	1
Ephemeroptera	Baetidae	Baetis spp		5
Ephemeroptera	Heptageniidae	Stenonema femoratum	7.2	1
Ephemeroptera	Caenidae	Caenis spp	7.4	1
Trichoptera	Phryganeidae	Ptilostomis spp	6.4	1
Diptera	Culcidae	Anopheles spp	8.6	3
Diptera	Chironomidae	Chironomus spp	9.6	20
Diptera	Chironomidae	Tanypus spp	9.2	2
Total Number of Taxa				108
Taxa Richness				18

A composite benthic macroinvertebrate sample was collected at two stations (12+00 and 24+00) along the restoration reach in September 2006. The North Carolina Division of Water Quality (DWQ) Qual-4 collection method was utilized. In addition to benthic sampling, DWQ habitat assessment forms were completed at each monitoring station. Benthos samples were preserved in alcohol and later identified to the lowest possible taxonomic level by an aquatic ecologist. Table VI lists the taxa collected, relative abundance, and tolerance values. The DWQ Standard Operating Procedures for Benthic Macroinvertebrates (2006) assigns tolerance values for common macroinvertebrates in North Carolina. Tolerance values range from 0 to 10 with low scores indicating species that are pollution intolerant.

Station 12+00 received a habitat score of 68 out of 95 possible points. Station 24+00 received a habitat score of 59 out of 95 possible points. Low scores at these locations are due to high substrate embeddedness at both sites as well as limited quality riffle habitat and bank instability. Overall, the Caviness restoration site has macroinvertebrate assemblages that range from moderately to very pollution tolerant and characteristic of substrates with high amounts of sediment. Very few ephemeroptera, plecoptera, and trichoptera (EPT) taxa were collected. Those EPT taxa that were collected are among the most pollution tolerant species.

APPENDIX A

**CAVINESS 2006 (YEAR 3)
SITE PHOTOGRAPHS AND
VEGETATION PLOT LOCATIONS**



Caviness 2006 Photo Point 1.



Caviness 2006 Photo Point 2.



Caviness 2006 Photo Point 3.



Caviness 2006 Photo Point 4.



Caviness 2006 Photo Point 5.



Pasture adjacent to Caviness stream.

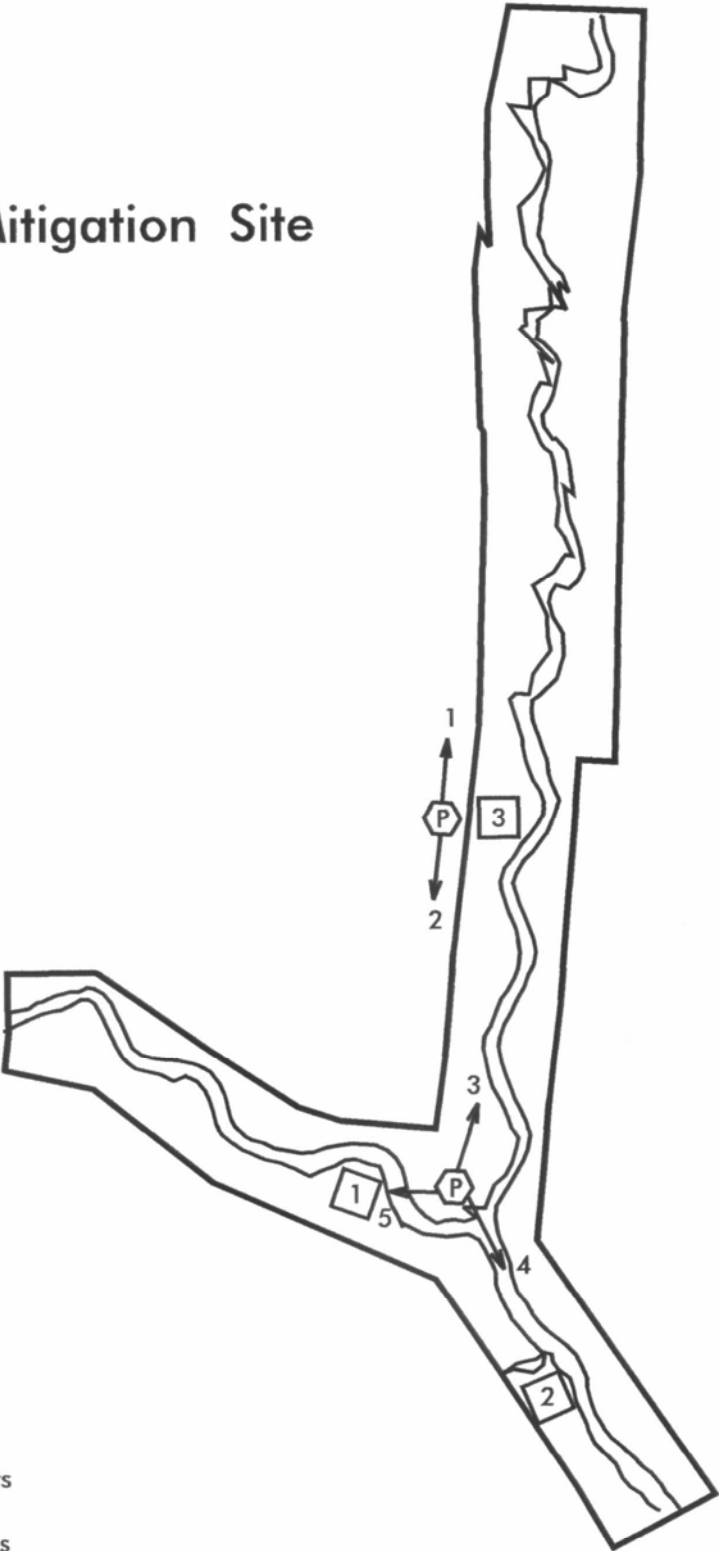




Typical riparian habitat at Caviness.



Beaver impoundment area near downstream end of project.

Caviness Mitigation Site



-  Monitoring Plots
-  Photo Locations

APPENDIX B

**CAVINESS 2006 (YEAR 3)
INTEGRATED PROJECT PROBLEM AREAS PLAN VIEW
BEAVER IMPACTS PHOTOGRAPHS**

CAVINESS 2006 (YEAR 3)
Integrated project problem areas plan view

**Exhibit Table B.1. Integrated Project Problem Areas
 Caviness (EEP Project No. 73)**

Feature Issue	Station Numbers	Suspected Cause	Photo Number
Left bank erosion at cross vane, will lead to structure failure	27+90	Incorrect installation, lack of bank stabilization	PA #1
	25+40	Incorrect installation, lack of bank stabilization	PA #2
Left bank slumping into stream behind log vane	21+00	Lack of bank stabilization, incorrect structure installation	PA #3
Cattle fencing is damaged and not functioning	18+75	High flow events and improper fence installation	PA #4
Cross vane failure	51+28	Improper installation, header rock set at too high of an elevation, water flowing underneath header rock	PA #5



Caviness 2006, PA #1



Caviness 2006, PA #2



Caviness 2006, PA #3



Caviness 2006, PA #4



Caviness 2006, PA #5



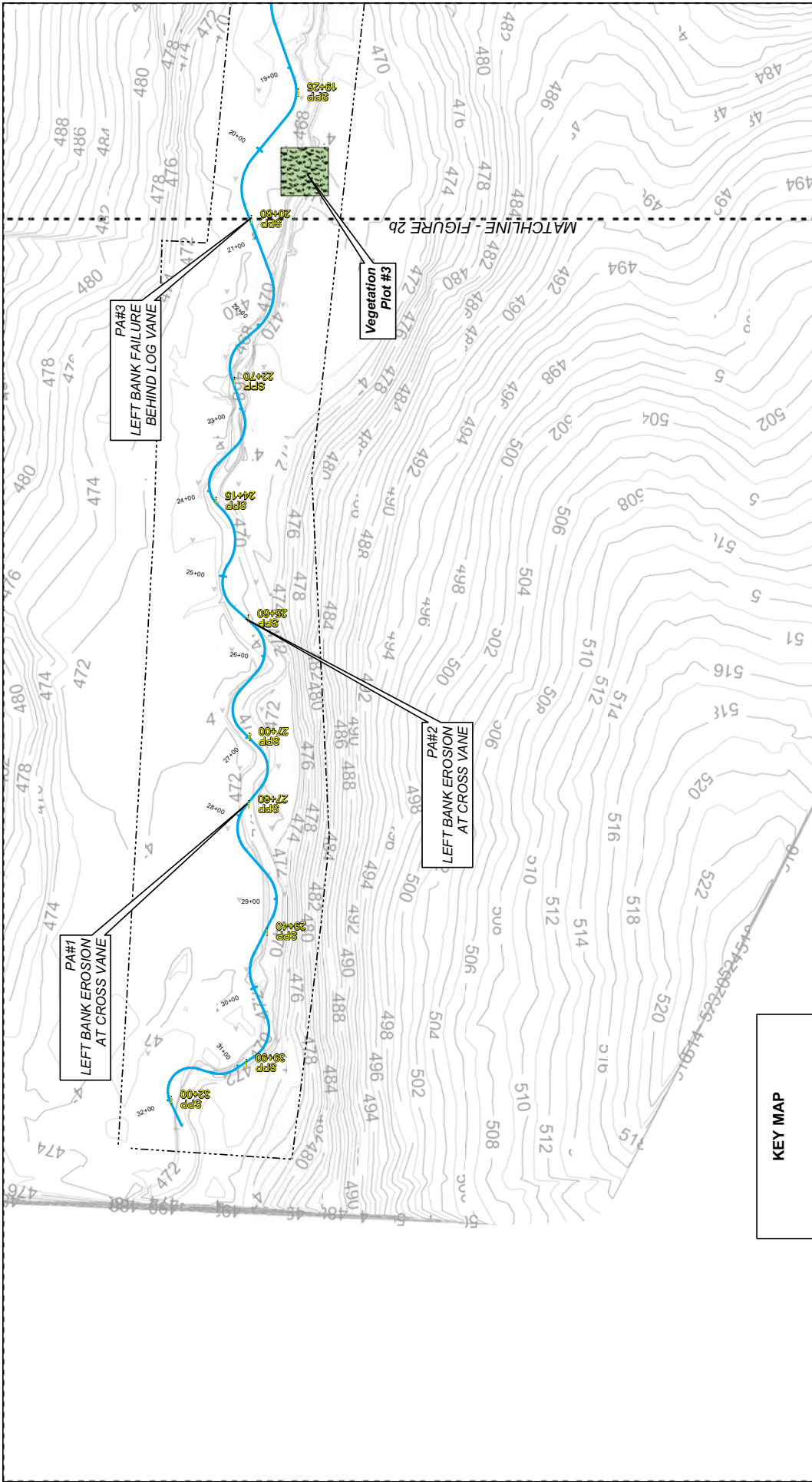
Beaver impoundment, looking upstream (March 2006)



Beaver impoundment, looking upstream (September 2006)



Beaver impoundment, looking downstream (September 2006)



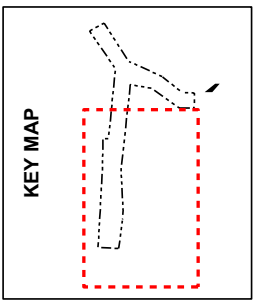
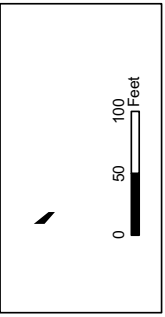
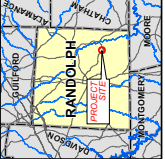
PA#3
LEFT BANK FAILURE
BEHIND LOG VANE

Vegetation
Plot #3

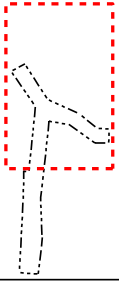
PA#2
LEFT BANK EROSION
AT CROSS VANE

PA#1
LEFT BANK EROSION
AT CROSS VANE

**INTEGRATED PROJECT PROBLEM AREAS
2006 (YEAR-3) PLAN VIEW
CAVINESS MITIGATION SITE**
Randolph County, North Carolina



KEY MAP



**INTEGRATED PROJECT PROBLEM AREAS
2006 (YEAR-3) PLAN VIEW
CAVINESS MITIGATION SITE**
Randolph County, North Carolina

