Hominy Swamp Stream Restoration

2004 Annual Monitoring Report

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February, 2005

Ecosystem Enhancement PROGRAM

NCDENR

NC STATE UNIVERSITY

2004 Hominy Swamp Monitoring Abstract

Hominy Swamp Creek was restored through the North Carolina Wetlands Restoration Program (NCWRP). The objectives of the project are to:

1.) Establish an stable dimension, pattern and profile on 2230 feet of Hominy Swamp Creek
2.) Improve habitat within Hominy Swamp Creek
3.) Establish an riparian buffer along Hominy Swamp Creek
4.) Incorporate this project into a watershed wide management plan

This is the 3rd year of the 5-year monitoring plan for Hominy Swamp Creek.

Table 1A. Background Information

Project Name	Hominy Swamp Creek
Designer's Name	KCI Associates of North Carolina, P.A. Landmark Center II, Suite 200 4601 Six Forks Road Raleigh, NC 27609
Contractor's Name	Unknown
Project County	Wilson County, North Carolina
Directions to Project Site	From Interstate I-264 take business 264 through the City of Wilson. Business 264 is also Raleigh Road continue on raleigh road until you reach Ripley Road. Head North on Ripley Road the site is on the right side (east) as soon as you turn of Raleigh Road.
Drainage Area	5.4 sq. mi.
USGS Hydro Unit	3020203020040
NCDWQ Subbasin	03-04-07 Neuse River Basin
Project Length	2,230 Linear feet
Restoration Approach	2,230 ft of priority 1 Natural Channel Design (dimension, pattern, and profile) with urban constraints
Date of Completion	September, 2001
Monitoring Dates	May, 2002; November, 2003; May, 2004

Results and Discussion

Overall, while the majority of the stream is functioning well and holding grade, the stream has areas of concern and areas of immediate need. Table 2 shows a summary of monitoring measurement results. Overall the project is performing well. Channel dimension and pattern are similar to as-built conditions with the exceptions of some limited areas of bank slumping. The channel profile is void of defined bed features and is dominated by runs and pools. Vegetation is not succeeding to levels required for mitigation credit. Placed structures are holding grade and functioning well.

Table 2. Summary of Channel Conditions

DIMENSION	Hominy Swamp Cross-section #1 Riffle			Hominy Swamp Cross-section #2 Riffle			Hominy Swamp Cross-section #3 Pool			Hominy Swamp Cross-section #4 Pool		
	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004
Bankfull Cross-sectional Area	62.3	87.2	52.7	53.1	53.9	59.8	76.3	64.9	54.3	88.3	107.5	113.8
Bankfull Width	25.0	24.6	16.8	21.6	18.3	19.0	31.8	33.1	27.7	23.5	26.8	24.9
Bankfull Mean Depth	2.5	3.5	3.1	2.5	3.0	3.2	2.4	2.0	2.0	3.8	4.0	4.6
Bankfull Max Depth	3.6	6.8	4.9	3.8	4.2	4.8	6.0	5.5	4.9	6.0	6.8	7.2

PATTERN	Hominy Swamp Design			Hominy Swamp As-built 2001			Hominy Swamp 2003			Hominy Swamp 2004		
	Minimum	Maximum	Median	Minimum	Maximum	Median	Minimum	Maximum	Median	Minimum	Maximum	Median
Meander Wave Length	182	255	N/A	Not Reported			115	227	155	115	227	155
Radius of Curvature	47	63	N/A	Not Reported			33	76	56	33	76	56
Beltwidth	N/A	N/A	85	Not Reported			32	69	46	32	69	46

PROFILE	Hominy Swamp Design			Hominy Swamp As-built 2001			Hominy Swamp 2003			Hominy Swamp 2004		
	Minimum	Maximum	Median	Minimum	Maximum	Median	Minimum	Maximum	Median	Minimum	Maximum	Median
Riffle Length	Not Reported			Not Reported			15	53	23	16	41	28
Riffle Slope	N/A	N/A	0.15%	Not Reported			0.02%	0.60%	0.19%	0.25%	0.73%	0.50%
Pool Length	35	49	N/A	Not Reported			30	73	52	32	115	53
Pool to Pool Spacing	91	128	N/A	Not Reported			64	178	107	45	165	108

SUBSTRATE	Hominy Swamp Cross-section #1 Riffle			Hominy Swamp Cross-section #2 Riffle			Hominy Swamp Cross-section #3 Pool			Hominy Swamp Cross-section #4 Pool		
	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004
d50	0.54	0.29	0.58	0.20	0.17	0.26	0.22	0.26	1.88	0.17	0.22	0.27
d84	2.00	0.58	1.88	0.63	0.49	0.67	13.65	5.88	17.73	3.74	0.62	0.75

VEGETATION 2003 Monitoring	Quad 1 - Hominy		Quad 2 - Hominy		Quad 3 - Hominy		Quad 4 - Hominy	
	Observed	Planted*	Observed	Planted*	Observed	Planted*	Observed	Planted*
Tree Stratum (stems/acre)	4080	520	5520	400	200	200	120	120
Shrub Stratum (% cover)	0.5	n/a	7	n/a	56	n/a	1	n/a
Herb Stratum (%cover)	147	n/a	78	n/a	24.5	n/a	87	n/a

VEGETATION 2004 Monitoring	Quad 1 - Hominy		Quad 2 - Hominy		Quad 3 - Hominy		Quad 4 - Hominy	
	Observed	Planted*	Observed	Planted*	Observed	Planted*	Observed	Planted*
Tree Stratum (stems/acre)	3520	320	4720	120	280	20	1600	120
Shrub Stratum (% cover)	1	n/a	57	n/a	65	n/a	38	n/a
Herb Stratum (%cover)	121	n/a	43	n/a	153	n/a	113	n/a

* Planted value represents number of stems observed alive that were planted.

The following areas of concern should be monitored closely and considered for repair as suggested:

Hominy Swamp Creek

- Easement Limits
  - NCWRP should work with landowners to ensure easement limits are maintained by the park maintenance workers
- Areas with bank slumping
  - Bank slumping has been noted at two locations on the stream on the right bank at STA. 6+50 for approximately 15 ft and on the left bank at STA. 11+10 for approximately 25 ft
  - Overland flow may need to be routed away from areas that show signs of bank erosion and slumping
- Areas lacking stream feature
  - The entire length of restored stream has on four existing riffle features, but as it can be observed from the as-build longitudinal profile there were not may riffles that showed up in the as-build survey
  - The restored stream lacks defined bedform
- Vegetation
  - Planting select trees in critical areas where there is localized erosion.
  - The site could benefit from larger containerized trees both for bank stability and aesthetics, although mitigation requirements are currently being met.
  - It is recommended to stake in areas where erosion is problematic, particularly on outside meander bends.
  - Although invasive vegetation has not consumed this project site, there are several species that should be controlled now, most importantly Chinese wisteria and Chinese privet.
  - Mowing should be halted within the specified limits of the riparian buffer.

Photos

The following are photographs of typical sections and areas of concern throughout the project.

Typical Pool

Typical Riffle

Typical Vegetation Plot.

Issue Photo 1. Mowing within easement limits to top of channel bank.

Issue Photo 2. Heavy recreational use within the buffer.

Issue Photo 3. Urban debris blockage.

Issue Photo 4 station 11+10.
Overland flow resulting in bank erosion.

Issue Photo 5 station 6+50.
Bank slump

Table of Contents

Tables and Figures

1.0 BACKGROUND INFORMATION

The background information for this report is referenced from previous monitoring reports conducted by KCI, Inc. The following was excerpted from 2002 KCI monitoring report:

> Project planning was initiated in 1999 for the implementation of an urban stream restoration project in Wilson, North Carolina (Figure 1).
>
> Phase I of the project consisted of the detailed analysis of the 5.4 square mile portion of the Hominy Swamp Creek watershed (located within USGS 14-digit Hydrologic Unit Code 03020203020040, NCDWQ Subbasin 03-04-07 of the Neuse River Basin) that contributes drainage to the project site. The watershed analysis, including the assessment of over 7 miles of stream channel, was conducted for the purpose of developing a clear understanding of existing system characteristics. The resulting Watershed Management Plan identified opportunities to improve water quality and overall system functions including targeted strategies such as wetland/riparian buffer preservation, stormwater BMP development/retrofitting, stream restoration, and community education.
>
> Following coordination with local leaders and citizens groups, Phase II of the project was initiated and focused on the restoration of approximately 2,000 linear feet of degraded stream within the Wilson Recreation Park. Detailed environmental assessments and engineering studies were conducted and design plans and documents were prepared to facilitate the stream and riparian buffer restoration. Implementation of the project was completed in September 2001.
>
> The restoration of this portion of Hominy Swamp Creek, located within the Wilson City Recreational Park, was conducted to correct identified system deficiencies including severe bank erosion, channel widening, and the loss of aquatic habitat resulting from stream channelization, the loss of riparian vegetation, and watershed development. The goal of the project was to develop a stable stream channel with reduced bank erosion, efficient sediment transport, enhanced warm water fisheries, and improved overall stream habitat and site aesthetics. Implementation of the project was completed in September 2001.

1.1 Goals and Objective

The goals and objectives of this project are as follows:

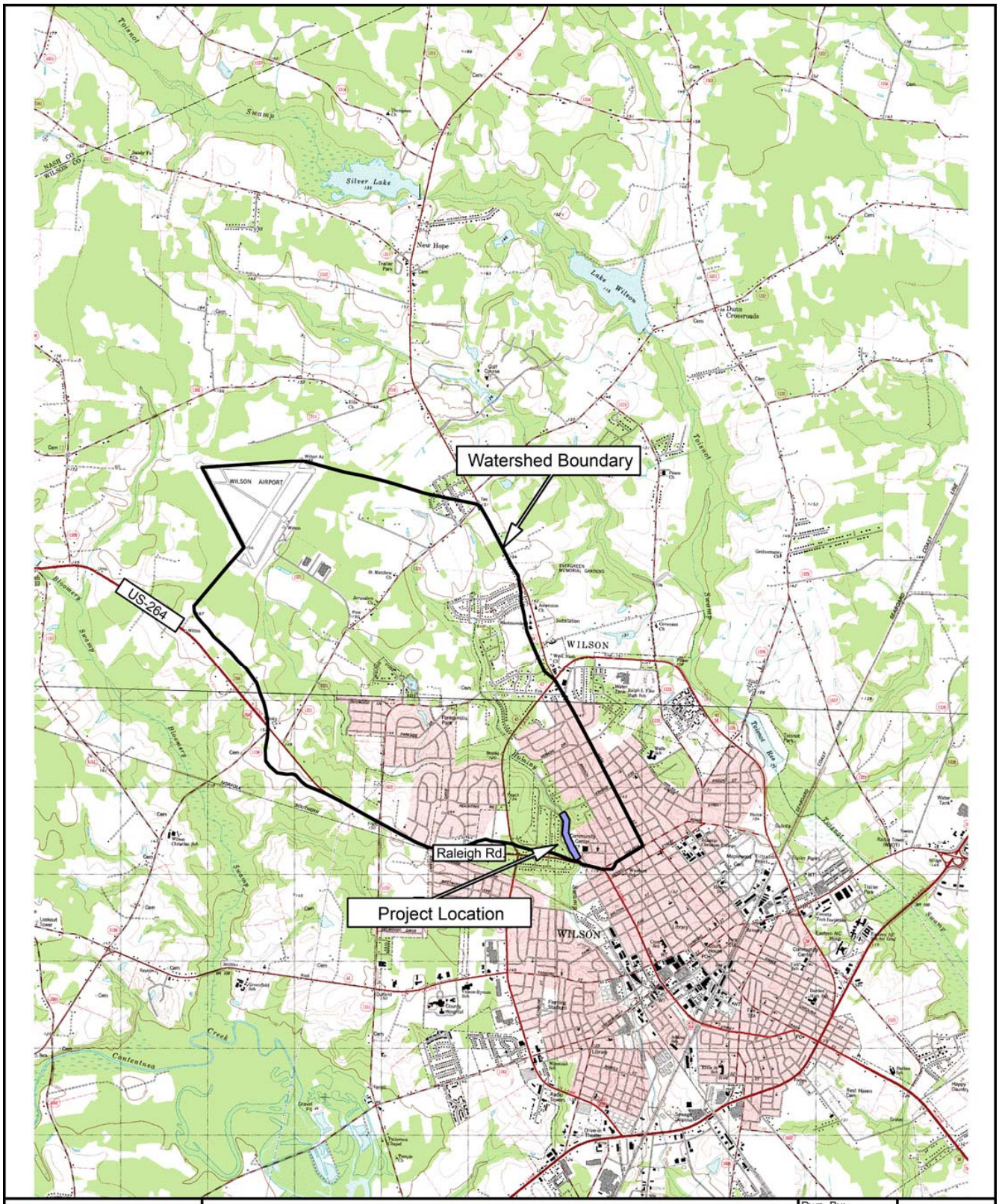
1.) Restore 2,230-linear feet of Hominy Swamp Creek through a priority 1 natural channel design approach.
2.) Establish a riparian zone surrounding restored section of Hominy Swamp Creek.
3.) Improve the habitat within the channel and the riparian zone.
4.) Incorporate this project into a watershed wide management plan.

1.2 Project Location

This project is located within the city limits of Wilson, North Carolina. From Raleigh, follow Interstate I-264 east take business 264 through the City of Wilson. Business 264 is also Raleigh Road continue on Raleigh road until you reach Ripley Road. Head North on Ripley Road the site is on the right side (east) as soon as you turn of Raleigh Road.

1.4 Project Description

A previously straight channel through the Wilson City Recreational Park, Hominy Swamp Creek was restored using channel dimension, pattern, and profile modifications and the establishment of riparian zone adjacent to the creek. Channel profile is maintained through the use of log and rock cross vanes. Channel pattern is maintained through the use of log single vanes and vegetation along the channel banks. Due to multiple urban constraints, pattern modifications were limited throughout the project.



NC STATE UNIVERSITY

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Raleigh, NC 27606

Project Location: Hominy Swamp

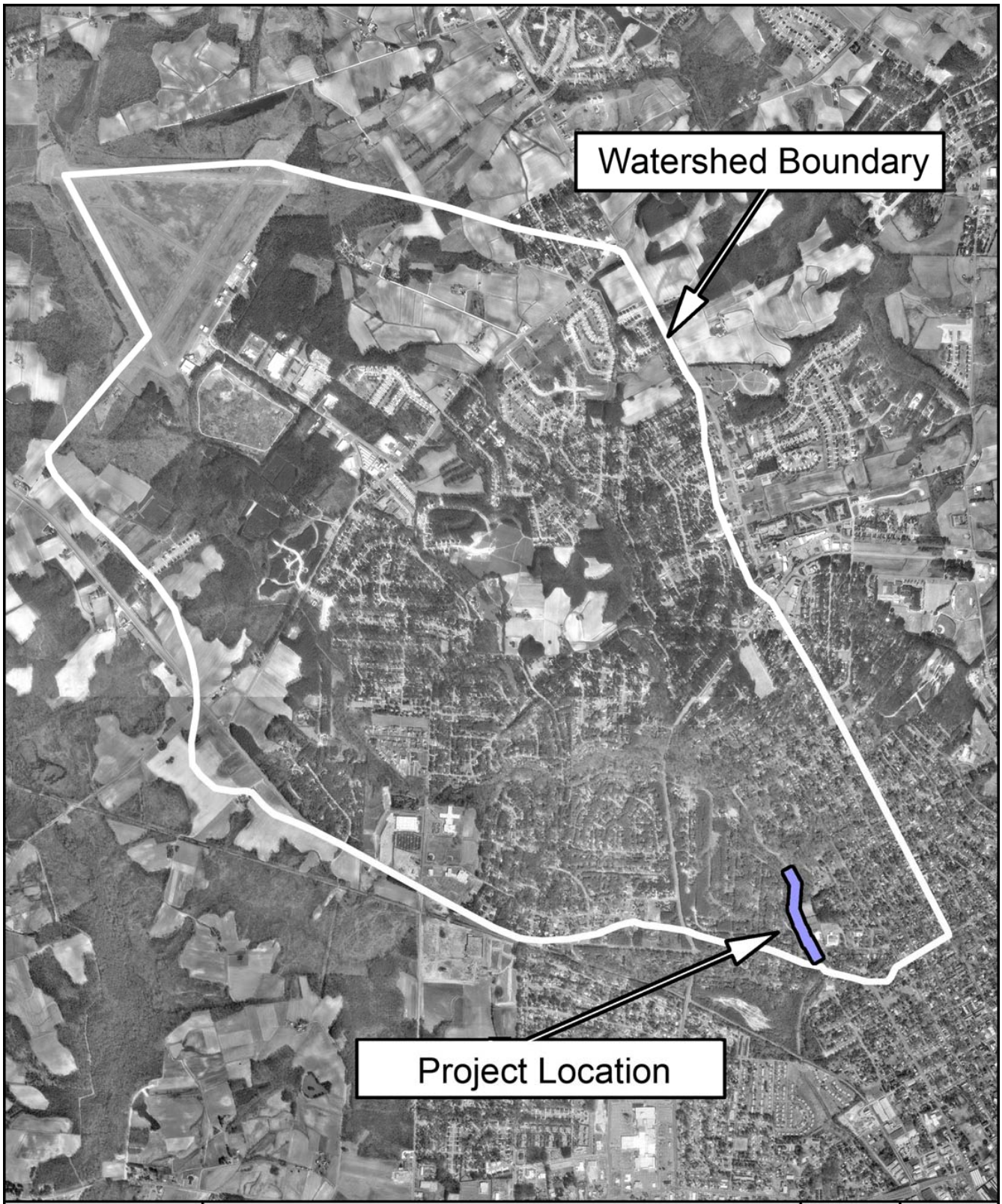
Wilson County, North Carolina

EEP Monitoring Report

SCALE 1:60,000

Dwn. By: MVH
Ckd By: DAB
Date: March 2004

FIGURE 1



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Aerial Watershed Photo: Hominy Swamp
Wilson County, North Carolina

EEP Monitoring Report

SCALE 1:30,000
0 1 MILE
0 1000 2000 3000 4000 5000 FEET

N

Dwn. By: MVH
Ckd By: DAB
Date: March 2004

FIGURE 2

Figure 3. Plan view of As-built conditions
(To be attached)
showing all structures with station numbers
showing vegetation permanent plots
showing permanent cross-sections and benchmarks
showing vegetation plots
showing monitoring gauges

Figure 4. Plan view of 2003 overlain on As-built
(To be attached)

2.0 YEAR 2004 RESULTS AND DISCUSSION

Year 2004 monitoring results are shown for Hominy Swamp Creek Monitoring.

2.1 Vegetation

Using the Draft Vegetation Monitoring Plan for NCWRP Riparian Buffer and Wetland Restoration Projects, 4 vegetation monitoring plots were randomly located within the riparian buffer of the Hominy Swamp project. No reference area was studied; therefore no comparisons could be made to reference conditions.

2.1.1 Results and Discussion

Vegetation within the riparian buffer of this unnamed tributary is overall considered mixed in success. The upper portion of the restoration site was well vegetated with live stakes and naturally regenerating native species. Several overbank events had recently occurred and herbaceous vegetation preserved the integrity of the stream bank in most areas. Native herbaceous plants were growing well. Shrubs, especially those from live stakes, were diverse and healthy. Planted bare root trees averaged 220 stems per acre for the upper two plots. Some of the larger planted trees had apparently been j-rooted during initial planting. Several of these trees had fallen over and inspection of the roots revealed that they had been poorly installed. This appeared to have led to root instability and susceptibility to wind throw. Several dead planted trees were noted within the upper portion of the project. Vegetation in the lower portion of the project was healthy, although numbers of planted bare root trees were lower; average was 120 stems per acre. It appeared that much of the buffer in this region had been mowed and the tree mortality was high as a result. Again, increased mortality was noted for planted specimens. Shrubs from stakes again were thriving along the streambanks. Herbaceous plants were less diverse but still dense. Extrapolation from the four plots resulted in an overall average of approximately 170 planted trees per acre for this restoration site. If natural regeneration is included with planted trees, the number is increased to an average of approximately 2530 trees per acre. Both of these estimates are based on a diverse mix of species as well. Natural regeneration continues to play an important role in the restoration of this site.

Invasive plant species on the site included Lonicera japonica (Japanese honeysuckle), Wisteria sinensis (Chinese wisteria), Ligustrum sinense (Chinese privet) and Microstegium vimineum. Chinese wisteria is choking much of the adjacent forest in the upper portion of the project. Several vines were noted within the riparian corridor. Because this plant spreads extensively by rhizomes, it is only a matter of time before it infests the riparian area. Chinese privet was sporadically spread throughout the area, no where abundant. Japanese honeysuckle and microstegium were prevalent throughout.

Recommendations include planting more trees to satisfy mitigation requirements. Mowing should be halted within the specified limits of the riparian buffer. It is recommended to stake in areas where erosion is problematic, particularly on outside meander bends. Although invasive vegetation has not consumed this project site, there are several species that should be controlled now, most importantly Chinese wisteria and Chinese privet.

2.2 Morphology

Restored channel dimension, pattern, profile and substrate were examined during the 2004 monitoring.

2.2.1 Results and Discussion

Hominy Swamp Creek is sand bed channel and therefore the dune and anti-dune characteristics of sand-bed sediment transport should be considered. The channel profile along Hominy Swamp Creek has not shown any significant changes in between monitoring periods. The channel profile along Hominy Swamp Creek has also not shown any significant changes in between the as-build profile and this year's monitoring. The stream profile of by the monitoring and as-build show very few riffle features in the stream. The mitigation report mentions that the design was to build a riffle/pool sequence plan form, but this intent was not displayed on the as-build survey. The number of defined riffles in the bedform has decreased from 6 in the 2001 as-build, to 4 in 2003 and there are now only two defined riffles. The two defined riffles are located at station 5+65 and station 11+50 both of these riffles are migratory sediment deposition in a dune antidune system. The location of riffles has changed significantly from year to year of monitoring this stream restoration. The riffle length average riffle length has also decreased to 28 ft in 2004 which is about the width of the bankfull channel. The average riffle slope has not change significantly and many of the riffles have been transformed into runs which are more defined in low gradient systems.

KCI cross section results were recalculated using NCSU techniques for consistency purposes. Data was examined but field identified features were retained. The same datum was used for bankfull for each year's monitoring results. Cross-sections 1 was not field located in 2003; the cross-section has been re-established and will be monitored in the re-established location and the original location if it can be field located during future monitoring periods. Cross-section 1 is a riffle and has shown an area decrease since construction. Over the 2002-2003 monitoring period channel riffle cross-section 2 along Hominy Swamp Creek did not show any significant change in cross-sectional area. Over the 2003-2004 monitoring period the area of cross-section 2 increased by 13% to 60 square feet. Pool cross-section 3 has significantly filled in with sediment the cross-sectional area has decreased 25% from 76 to 54 square feet. Cross section 3 is 120 ft upstream from a channel constriction due to a pedestrian bridge that may produce backwater through cross-section 3. The area of pool cross-section 4 has enlarged 30% from 89 to 114 square feet since construction, in the past year there has not been a significant change in the cross section area of pool cross-section 4.

Channel substrate in the riffle sections continue have very little change. The D50 has not significantly changed over the four cross sections. In riffle 1, the D50 decreased from 0.54mm to 0.29mm and back to 0.58mm, and in riffle 2 the D50 decreased from 0.20mm to 0.17mm and back to 0.26mm. The riffles are maintaining a medium sand substrate. The pool cross-section D50 has increased slightly, from 0.17mm to 0.27mm, but not a significantly. A possible cause of decrease in particle size is measurement technique. It is not know if previous surveyors used similar sampling technique. Future monitoring

should better evaluate channel substrate. In summary the substrate in the same as it was after construction which is medium sand.

Channel pattern appears to have been maintained since construction. A few of the outside meander bends are experiencing slight migration through bank slumping but no excessive migration is evident and no shoot cut-offs are apparent. The pattern aligns closely with the as-build pattern (Figure 4). Channel banks throughout Hominy Swamp Creek remains fairly stable, with the exception of two spot areas of bank slumping. Slumping is likely the result of the lack of deep rooting vegetation, steep stream banks, high stream velocities near the channel toe, and possible overland flow into the channel.

While lacking bedform this project has fairly stable banks and is able to transport the sediment supplied through the reach. There were no areas of concern noted due to high near bank stress and the bank erosion hazard index was used to rank the stream banks as having a moderate erodibility rating. Bed scour is primarily limited to meander beds and below structures where energy show be dissipated in a stream. Vegetation is growing well and there is a lot of volunteer growth on this project but does not meet the vegetation requirements of the Ecosystem Enhancement Program yet. This reach of Hominy Swamp is a run dominated sand bed stream but the system seems to be relatively stable with a constantly sifting bedform.

Table 1. Summary of Channel Conditions

DIMENSION	Hominy Swamp Cross-section #1 Riffle			Hominy Swamp Cross-section #2 Riffle			Hominy Swamp Cross-section #3 Pool			Hominy Swamp Cross-section #4 Pool		
	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004
Bankfull Cross-sectional Area	62.3	87.2	52.7	53.1	53.9	59.8	76.3	64.9	54.3	88.3	107.5	113.8
Bankfull Width	25.0	24.6	16.8	21.6	18.3	19.0	31.8	33.1	27.7	23.5	26.8	24.9
Bankfull Mean Depth	2.5	3.5	3.1	2.5	3.0	3.2	2.4	2.0	2.0	3.8	4.0	4.6
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PATTERN	Hominy Swamp Design			Hominy Swamp As-built 2001			Hominy Swamp 2003			Hominy Swamp 2004		
	Minimum	Maximum	Median	Minimum	Maximum	Median	Minimum	Maximum	Median	Minimum	Maximum	Median
Meander Wave Length	182	255	N/A	Not Reported			115	227	155	115	227	155
Radius of Curvature	47	63	N/A	Not Reported			33	76	56	33	76	56
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PROFILE	Hominy Swamp Design			Hominy Swamp As-built 2001			Hominy Swamp 2003			Hominy Swamp 2004		
	Minimum	Maximum	Median	Minimum	Maximum	Median	Minimum	Maximum	Median	Minimum	Maximum	Median
Riffle Length	Not Reported			Not Reported			15	53	23	16	41	28
Riffle Slope	N/A	N/A	0.15%	Not Reported			0.02%	0.60%	0.19%	0.25%	0.73%	0.50%
Pool Length	35	49	N/A	Not Reported			30	73	52	32	115	53
Pool to Pool Spacing	91	128	N/A	Not Reported			64	178	107	45	165	108

SUBSTRATE	Hominy Swamp Cross-section #1 Riffle			Hominy Swamp Cross-section #2 Riffle			Hominy Swamp Cross-section #3 Pool			Hominy Swamp Cross-section #4 Pool		
	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004
d50	0.54	0.29	0.58	0.20	0.17	0.26	0.22	0.26	1.88	0.17	0.22	0.27
d84	2.00	0.58	1.88	0.63	0.49	0.67	13.65	5.88	17.73	3.74	0.62	0.75

VEGETATION 2003 Monitoring	Quad 1 - Hominy		Quad 2 - Hominy		Quad 3 - Hominy		Quad 4 - Hominy	
	Observed	Planted*	Observed	Planted*	Observed	Planted*	Observed	Planted*
Tree Stratum (stems/acre)	4080	520	5520	400	200	200	120	120
Shrub Stratum (% cover)	0.5	n/a	7	n/a	56	n/a	1	n/a
Herb Stratum (%cover)	147	n/a	78	n/a	24.5	n/a	87	n/a

VEGETATION 2004 Monitoring	Quad 1 - Hominy		Quad 2 - Hominy		Quad 3 - Hominy		Quad 4 - Hominy	
	Observed	Planted*	Observed	Planted*	Observed	Planted*	Observed	Planted*
Tree Stratum (stems/acre)	3520	320	4720	120	280	20	1600	120
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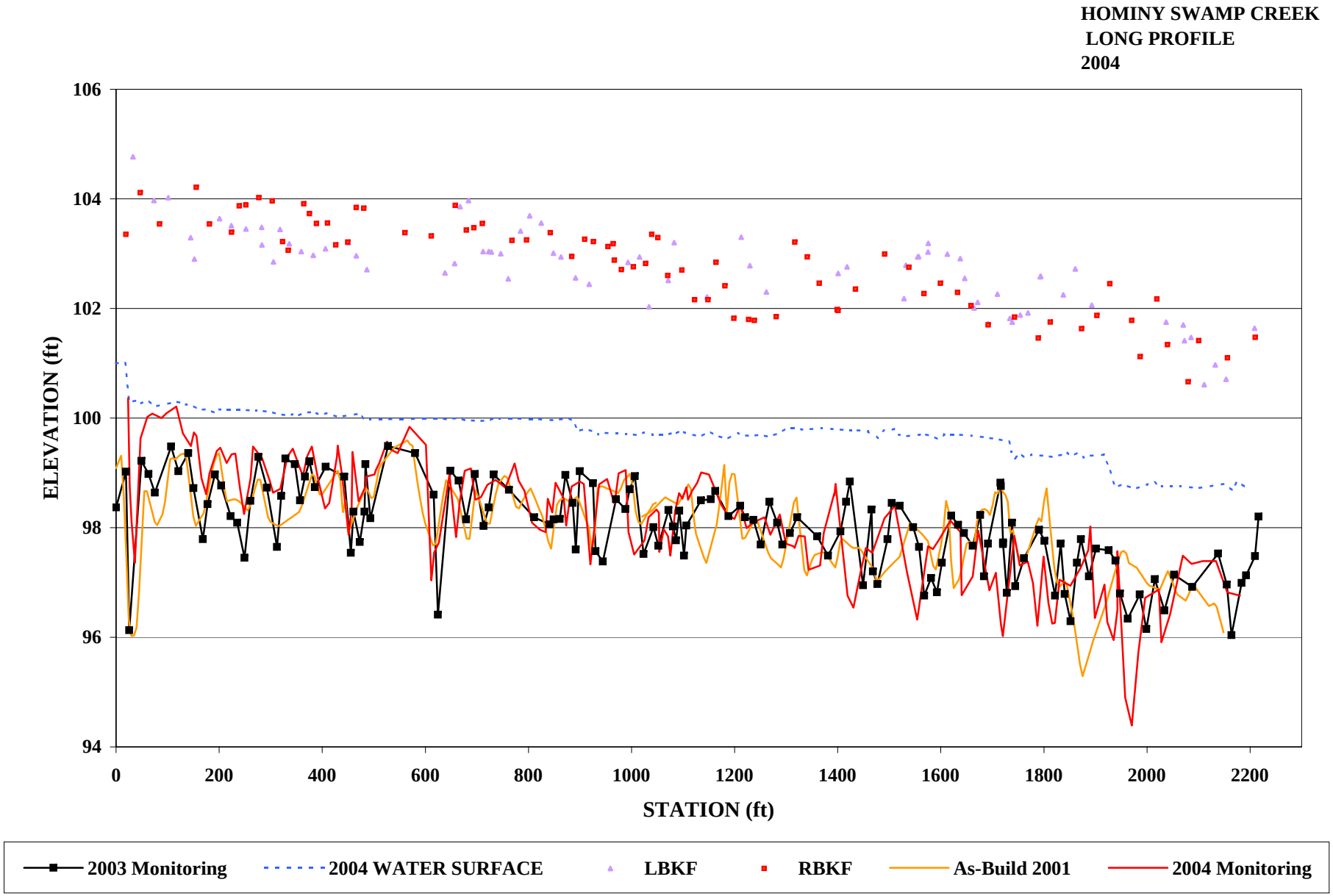
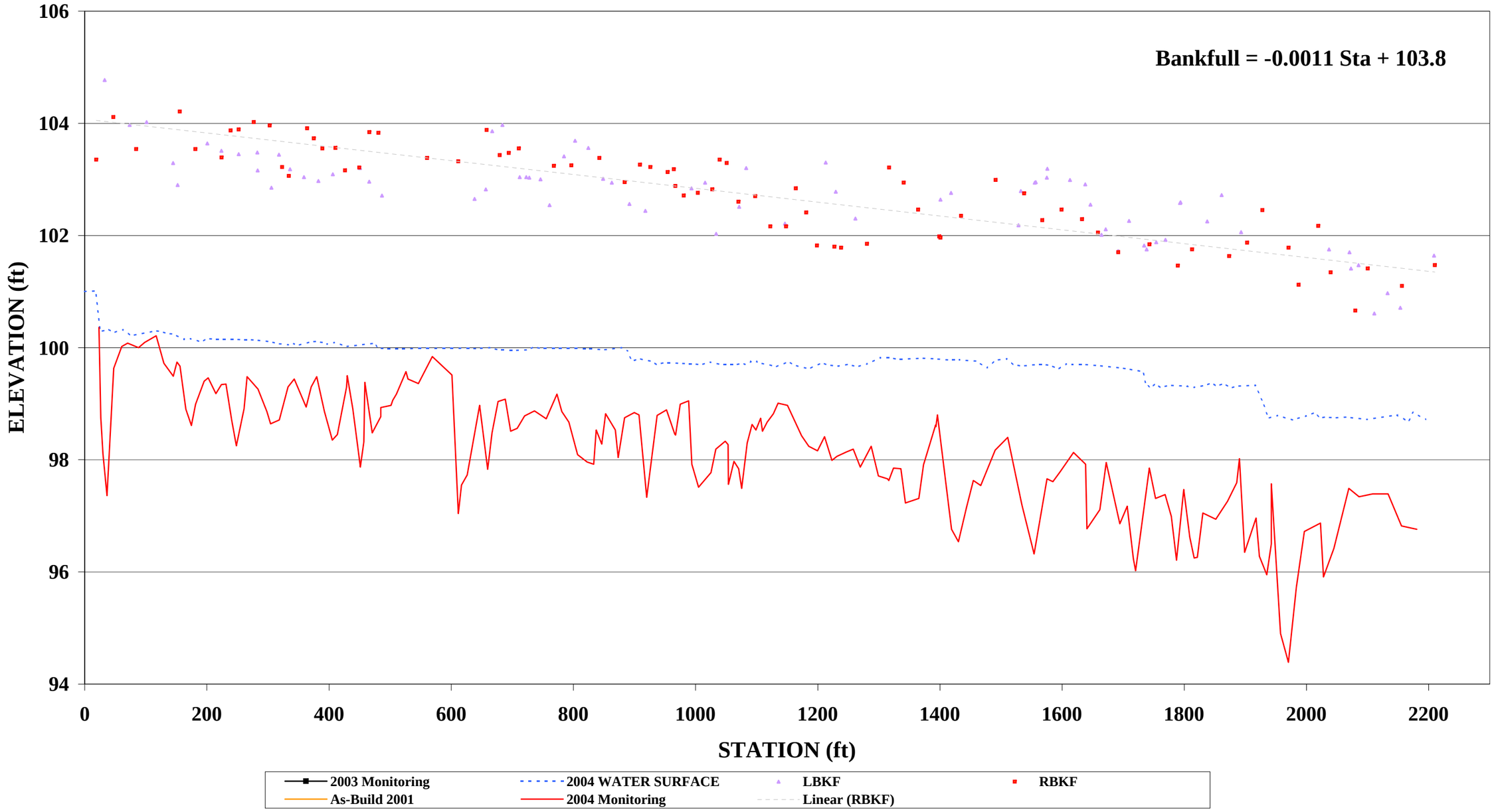
* Planted value represents number of stems observed alive that were planted.


HOMINY SWAMP CREEK
LONG PROFILE
2004
ELEVATION (ft)
106
104
102
100
98
96
94
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
STATION (ft)
2003 Monitoring
2004 WATER SURFACE
LBKF
RBKF
As-Build 2001
2004 Monitoring

HOMINY SWAMP CREEK
LONG PROFILE
2004



2.3 Areas of Concern

The following areas of concern should be monitored closely and considered for repair as suggested:

- Easement Limits
    - NCWRP should work with landowners to ensure easement limits are maintained by the park maintenance workers
- Areas with bank slumping
    - Bank slumping has been noted at two locations on the stream on the right bank at STA. 6+50 for approximately 15 ft and on the left bank at STA. 1+10 for approximately 25 ft
    - Overland flow may need to be routed away from areas that show signs of bank erosion and slumping
- Areas lacking stream feature
    - The entire length of restored stream has on four existing riffle features, but as it can be observed from the as-build longitudinal profile there were not may riffles that showed up in the as-build survey
- Vegetation
    - Planting select trees in critical areas where there is localized erosion.
    - The site could benefit from larger containerized trees both for bank stability and aesthetics, although mitigation requirements are currently being met.
    - It is recommended to stake in areas where erosion is problematic, particularly on outside meander bends.
    - Although invasive vegetation has not consumed this project site, there are several species that should be controlled now, most importantly Chinese wisteria and Chinese privet.
    - Mowing should be halted within the specified limits of the riparian buffer.

2.4 Photo Log

Hominy Swamp Creek Photo Log

Location #1 Downstream

2003

2004

2002

Location #2 Upstream

2003

2004

2002

Location #2 Downstream

2003

2004

2002

Location #3 Upstream

2003

2004

2002

Location #3 Downstream

2003

2004

2002

Location #4 Upstream

2003

2004

2002

Location #4 Downstream

2003

2004

2002

Location #5 Upstream

2003

2004

2002

Location #5 Downstream

2003

2004

2002

Location #6 Upstream

2003

2004

2002

Location #6 Downstream

2003

2004

2002

Location #7 Upstream

2003

2004

2002

Location #7 Downstream

2003

2004

2002

Location #8 Upstream

2003

2004

2002

Location #8 Downstream

2003

2004

2002

Location #9 Upstream

2003

2004

2002

Location #9 Downstream

2003

2004

2002

Location #10 Upstream

2003

2004

2002

Appendices

A. Methods
    1. Vegetation
    2. Morphology
B. Vegetation data
    1. Listed by plot
    2. Species, number and age
    3. Analysis of planted vs. natural recruitment
C. Morphology Data
    1. Cross-section data and plotted (DONE)
    2. Longitudinal data and plotted (DONE)
    3. Pebble count data and plotted (DONE)
    4. Pattern (DONE)

Project Name	Hominy Swamp Creek
Cross Section	#1
Feature	Riffle
Date	5/24/04
Crew	Bidelspach, Clinton

Cross-Section #1 location was moved in 2003

Photo of Cross-Section #1 - Looking Downstream

2004
2004 Survey

Station	Elevation	Notes
-2.22	106.52	
0	106.4	
15.04	106.06	
29.3	103.95	
31.92	103.14	
34.12	98.68	
38.15	99.23	
39.31	99.76	
43.25	99.73	
46.13	101.85	
47.72	103.82	
49.53	104.16	
51.77	103.56	
55.23	104.18	BKF
77.16	104.99	
94.4	105.27	
94.94	105.01	

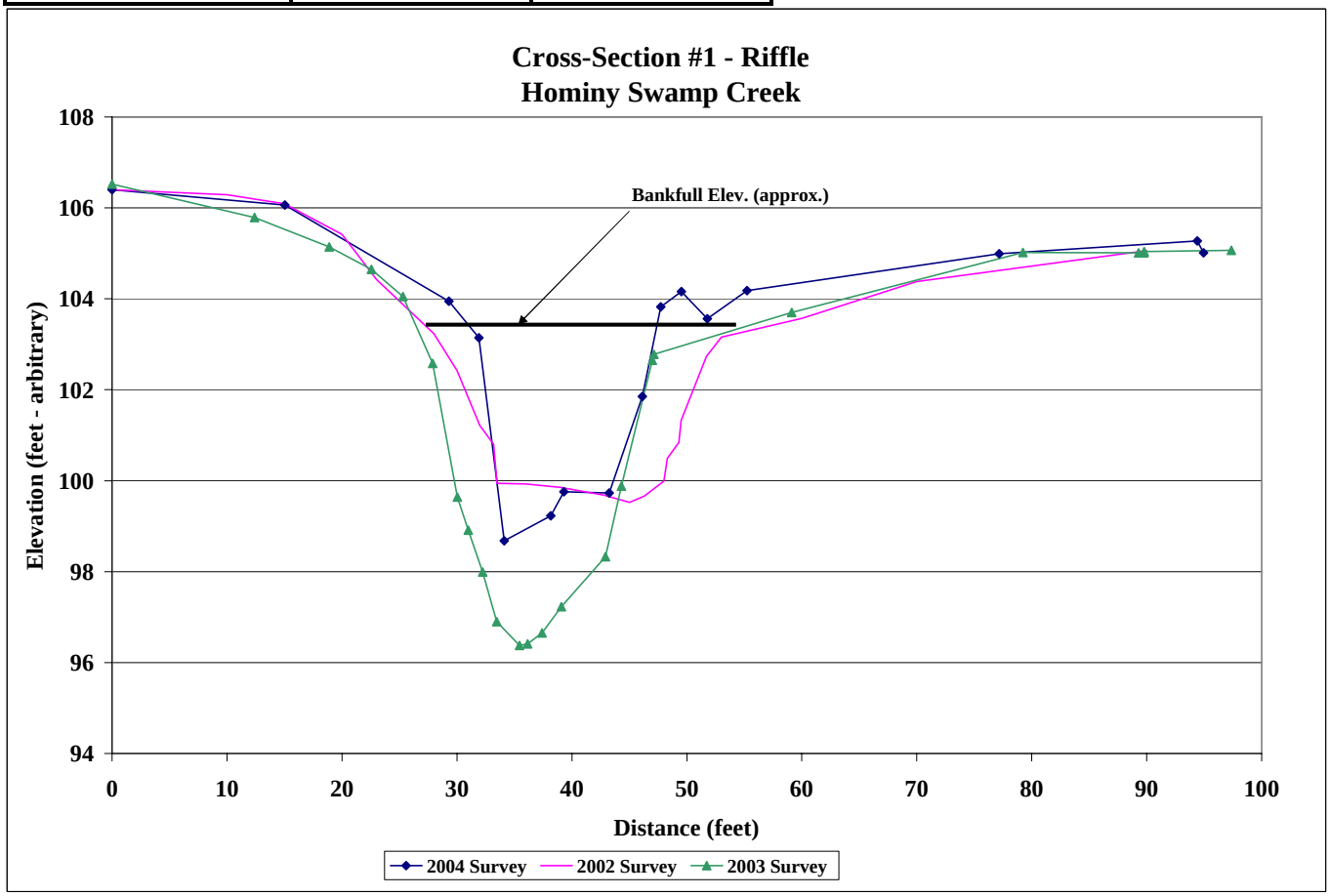
2002
2002 Survey

Station	Elevation	Notes
0	106.4	
10	106.29	
15	106.09	
20	105.42	
23	104.43	BKF
28	103.23	
30	102.42	
32	101.21	
33.2	100.8	
33.5	99.94	
36	99.93	
39	99.85	
42.8	99.68	
45	99.52	
46.3	99.66	
48	99.99	
48.3	100.49	
49.3	100.84	
49.5	101.32	
51.7	102.73	
53	103.16	
60	103.57	BKF
70	104.38	
90	105.06	

2003
2003 Survey

Station	Elevation	Notes
0	106.52	
12.4	105.79	
18.9	105.14	
22.55	104.65	
25.31	104.05	BKF
27.88	102.58	
30.03	99.64	
31	98.91	
32.24	97.99	
33.47	96.9	
35.45	96.38	
36.15	96.41	
37.39	96.65	
39.08	97.23	
42.9	98.33	
44.3	99.88	
47.0	102.65	
47.1	102.78	
59.1	103.7	
79.2	105.02	
89.3	105.01	
89.7	105.01	
89.8	105.04	BKF
97.4	105.07	

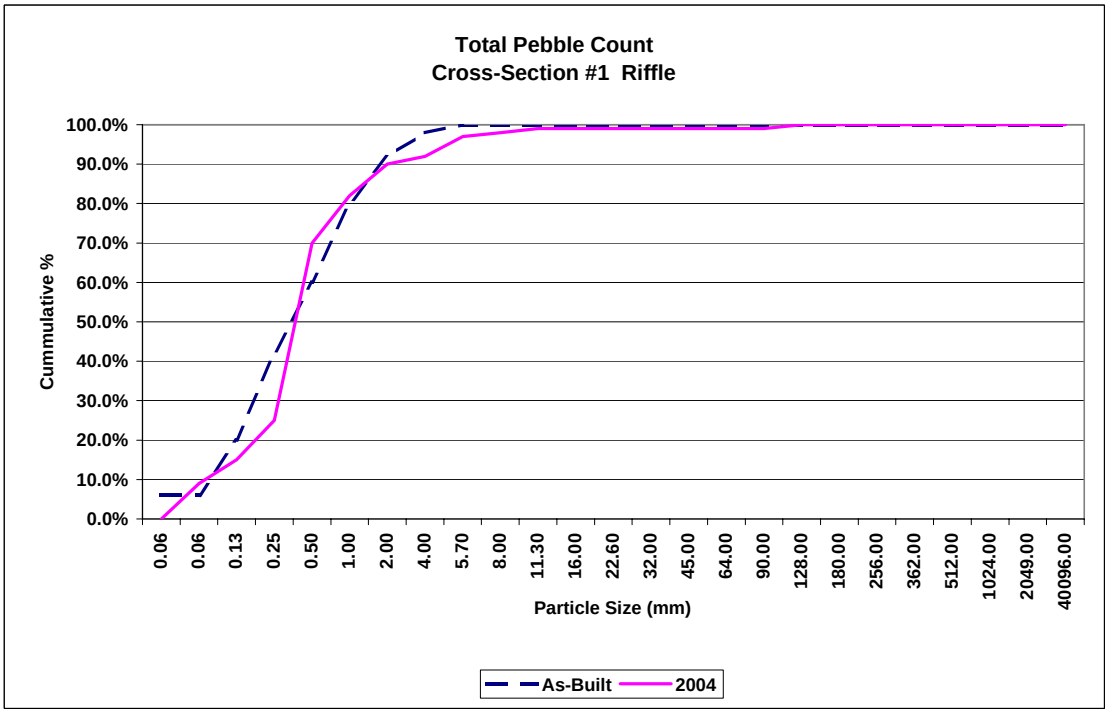
	2002	2003	2004
Area	62.3	87.2	52.7
Width	25.0	24.6	16.8
Mean Depth	2.5	3.5	3.1
Max Depth	3.6	6.8	4.9



Project Name	Hominy Swamp Creek
Cross Section	#1
Feature	Riffle
Date	5/24/04
Crew	Bidelspach, Clinton

			As-Built			2004			
Description	**Material**	**Size (mm)**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Bank**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	3	6.0%	6.0%	0	0	0.0%	0.0%
Sand	very fine sand	0.062	0	0.0%	6.0%	8	1	9.0%	9.0%
	fine sand	0.125	7	14.0%	20.0%	4	2	6.0%	15.0%
	medium sand	0.25	11	22.0%	42.0%	6	4	10.0%	25.0%
	course sand	0.50	9	18.0%	60.0%	30	15	45.0%	70.0%
	very course sand	1.0	10	20.0%	80.0%	8	4	12.0%	82.0%
Gravel	very fine gravel	2.0	6	12.0%	92.0%	2	6	8.0%	90.0%
	fine gravel	4.0	3	6.0%	98.0%	0	2	2.0%	92.0%
	fine gravel	5.7	1	2.0%	100.0%	2	3	5.0%	97.0%
	medium gravel	8.0	0	0.0%	100.0%	0	1	1.0%	98.0%
	medium gravel	11.3	0	0.0%	100.0%	0	1	1.0%	99.0%
	course gravel	16.0	0	0.0%	100.0%	0	0	0.0%	99.0%
	course gravel	22.6	0	0.0%	100.0%	0	0	0.0%	99.0%
	very course gravel	32	0	0.0%	100.0%	0	0	0.0%	99.0%
	very course gravel	45	0	0.0%	100.0%	0	0	0.0%	99.0%
Cobble	small cobble	64	0	0.0%	100.0%	0	0	0.0%	99.0%
	medium cobble	90	0	0.0%	100.0%	0	0	0.0%	99.0%
	large cobble	128	0	0.0%	100.0%	0	1	1.0%	100.0%
	very large cobble	180	0	0.0%	100.0%	0	0	0.0%	100.0%
Boulder	small boulder	256	0	0.0%	100.0%	0	0	0.0%	100.0%
	small boulder	362	0	0.0%	100.0%	0	0	0.0%	100.0%
	medium boulder	512	0	0.0%	100.0%	0	0	0.0%	100.0%
	large boulder	1024	0	0.0%	100.0%	0	0	0.0%	100.0%
	very large boulder	2049	0	0.0%	100.0%	0	0	0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0	0.0%	100.0%
TOTAL / %of whole count			50	100.0%		60	40	100.0%	

	d16	**d35**	**d50**	**d85**	**d95**
As-Built	0.16	0.32	0.54	2.00	3.93
2004	0.21	0.46	0.58	1.88	6.05
2003	0.08	0.19	0.29	0.58	0.70



Project Name	Hominy Swamp Creek
Cross Section	#2
Feature	Riffle
Date	5/24/04
Crew	Bidelspach, Clinton

2004
2004 Survey

Station	Elevation	Notes
0.0	104.3	
10.7	104.3	
22.8	103.7	
28.3	102.6	BKF
30.1	103.0	
32.6	102.8	
34.2	100.2	
36.8	98.2	
41.2	97.4	
43.2	97.5	
45.9	98.4	
47.5	99.2	
48.1	101.0	
51.5	101.5	
57.9	102.8	
68.4	103.9	
81.8	104.4	
81.8	104.5	

2002
2002 Survey

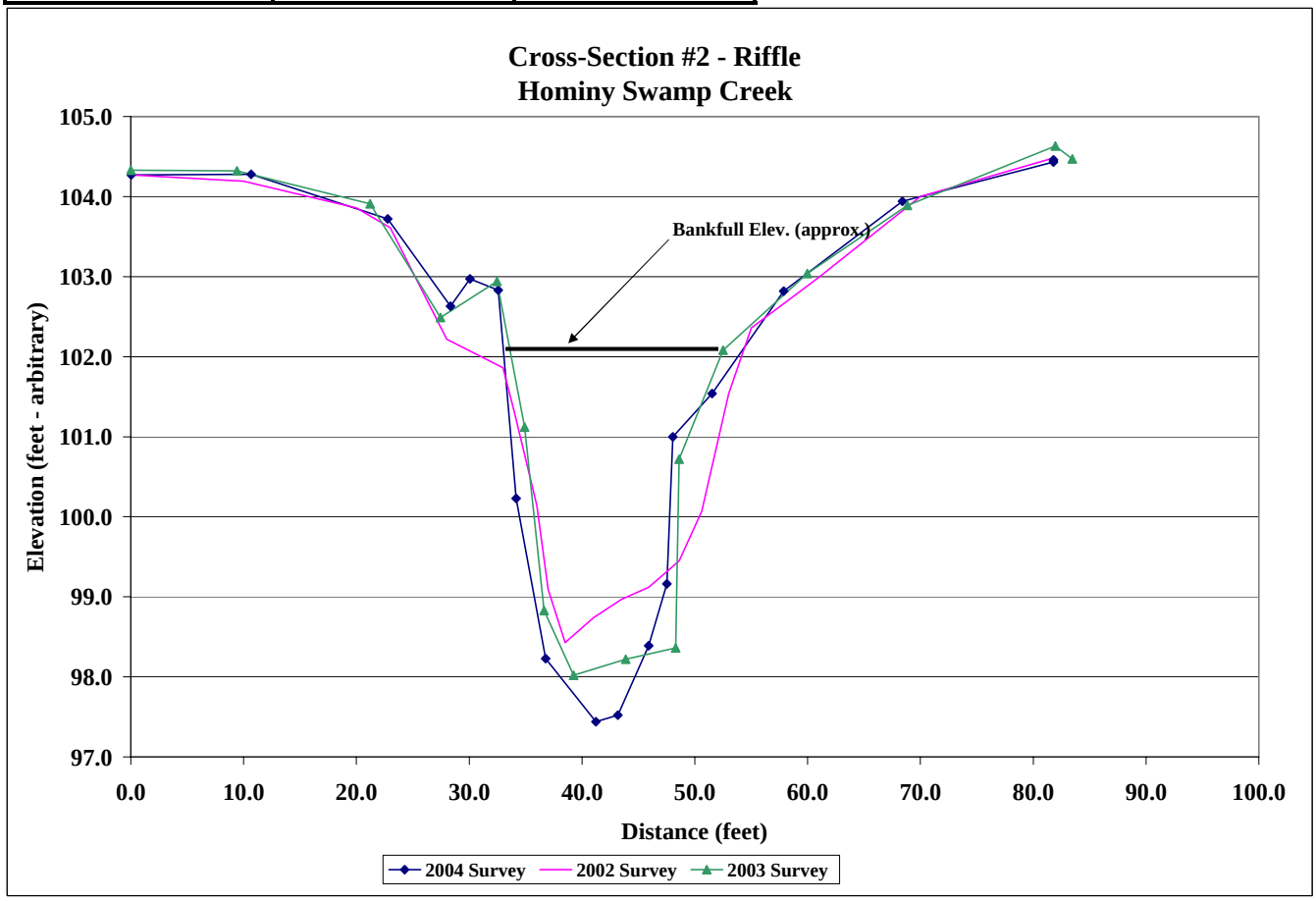
Station	Elevation	Notes
0.0	104.3	
10.0	104.2	
20.0	103.9	
23.0	103.6	
28.0	102.2	BKF
33.0	101.9	
34.0	101.3	
36.0	100.1	
37.0	99.1	
38.5	98.4	
41.0	98.7	
43.5	99.0	
45.9	99.1	
48.6	99.5	
50.6	100.1	
53.0	101.5	
55.0	102.4	BKF
61.0	103.0	
70.0	104.0	
82.0	104.5	

2003
2003 Survey

Station	Elevation	Notes
0.0	104.3	
9.4	104.3	
21.2	103.9	
27.5	102.5	BKF
32.5	102.9	
34.9	101.1	
36.7	98.8	
39.2	98.0	
43.9	98.2	
48.3	98.4	
48.6	100.7	
52.5	102.1	
60.0	103.0	
68.9	103.9	
82.0	104.6	
83.5	104.5	

Photo of Cross-Section #2 - Looking Upstream

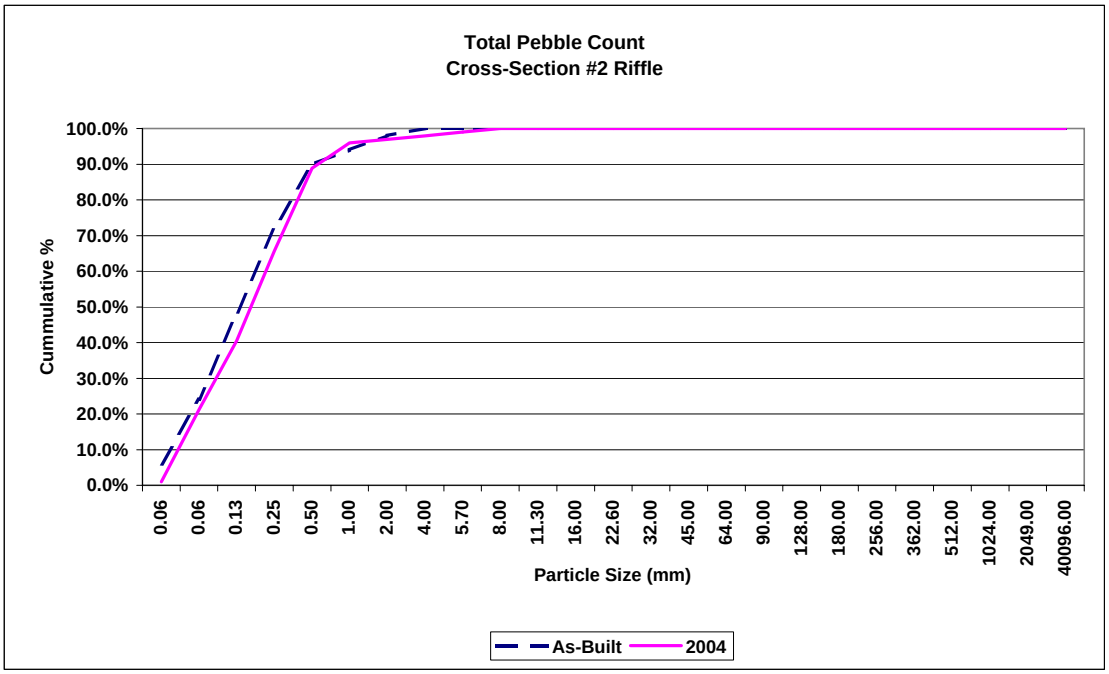
	2002	2003	2004
Area	53.1	53.9	59.8
Width	21.6	18.3	19.0
Mean Depth	2.5	3.0	3.2
Max Depth	3.8	4.2	4.8



Project Name	Hominy Swamp Creek
Cross Section	#2
Feature	Riffle
Date	5/24/04
Crew	Bidelspach, Clinton

			As-Built			2004			
Description	**Material**	**Size (mm)**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Bank**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	3	6.0%	6.0%	1	0	1.0%	1.0%
Sand	very fine sand	0.062	9	18.0%	24.0%	15	5	20.2%	21.2%
	fine sand	0.125	12	24.0%	48.0%	15	4	19.2%	40.4%
	medium sand	0.25	12	24.0%	72.0%	17	8	25.3%	65.7%
	course sand	0.50	9	18.0%	90.0%	14	9	23.2%	88.9%
	very course sand	1.0	2	4.0%	94.0%	2	5	7.1%	96.0%
G r a v e l	very fine gravel	2.0	2	4.0%	98.0%	1	0	1.0%	97.0%
	fine gravel	4.0	1	2.0%	100.0%	0	1	1.0%	98.0%
	fine gravel	5.7	0	0.0%	100.0%	0	1	1.0%	99.0%
	medium gravel	8.0	0	0.0%	100.0%	0	1	1.0%	100.0%
	medium gravel	11.3	0	0.0%	100.0%	0	0	0.0%	100.0%
	course gravel	16.0	0	0.0%	100.0%	0	0	0.0%	100.0%
	course gravel	22.6	0	0.0%	100.0%	0	0	0.0%	100.0%
	very course gravel	32	0	0.0%	100.0%	0	0	0.0%	100.0%
	very course gravel	45	0	0.0%	100.0%	0	0	0.0%	100.0%
Cobble	small cobble	64	0	0.0%	100.0%	0	0	0.0%	100.0%
	medium cobble	90	0	0.0%	100.0%	0	0	0.0%	100.0%
	large cobble	128	0	0.0%	100.0%	0	0	0.0%	100.0%
	very large cobble	180	0	0.0%	100.0%	0	0	0.0%	100.0%
Boulder	small boulder	256	0	0.0%	100.0%	0	0	0.0%	100.0%
	small boulder	362	0	0.0%	100.0%	0	0	0.0%	100.0%
	medium boulder	512	0	0.0%	100.0%	0	0	0.0%	100.0%
	large boulder	1024	0	0.0%	100.0%	0	0	0.0%	100.0%
	very large boulder	2049	0	0.0%	100.0%	0	0	0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0	0.0%	100.0%
TOTAL / %of whole count			50	100.0%		65	34	100.0%	

	d16	**d35**	**d50**	**d85**	**d95**
As-Built	0.08	0.14	0.20	0.63	1.88
2004	0.09	0.16	0.26	0.67	1.40
2003	0.07	0.11	0.17	0.49	0.67



Project Name Hominy Swamp Creek
Cross Section #3
Feature Pool
Date 5/24/04
Crew Bidelspach, Clinton

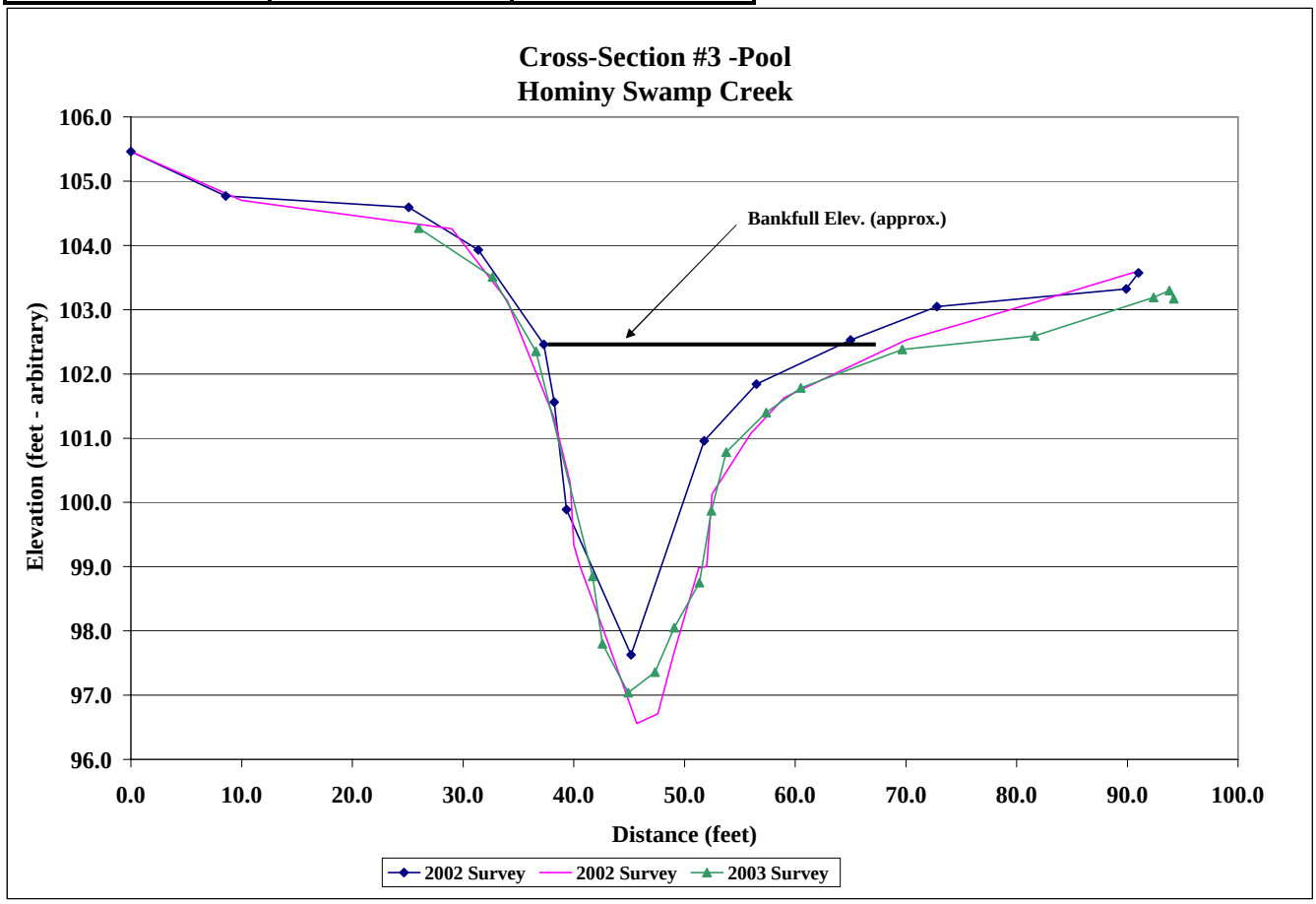
2002 2002 Survey		
Station	Elevation	Notes
0.0	105.5	
8.6	104.8	
25.1	104.6	
31.4	103.9	
37.3	102.5	
38.2	101.6	
39.4	99.9	
45.2	97.6	
51.8	101.0	
56.5	101.8	
65.0	102.5	BKF
72.8	103.1	
89.9	103.3	
91.0	103.6	

2002 2002 Survey		
Station	Elevation	Notes
0.0	105.5	
10.0	104.7	
29.0	104.3	
34.0	103.1	
38.2	101.3	
39.7	100.3	
40.0	99.3	
40.6	99.0	
43.0	97.9	
45.7	96.6	
47.6	96.7	
49.0	97.6	
51.3	99.0	
52.0	99.0	
52.5	100.1	
56.0	101.1	
59.0	101.6	
70.0	102.5	BKF
80.0	103.0	
91.0	103.6	

2003 2003 Survey		
Station	Elevation	Notes
26.0	104.3	
32.7	103.5	
36.6	102.4	
41.7	98.9	
42.6	97.8	
44.9	97.0	
47.3	97.4	
49.1	98.1	
51.3	98.8	
52.4	99.9	
53.8	100.8	
57.4	101.4	
60.5	101.8	
69.7	102.4	
81.6	102.6	BKF
92.4	103.2	
93.8	103.3	
94.2	103.2	

Photo of Cross-Section #3 - Looking Downstream

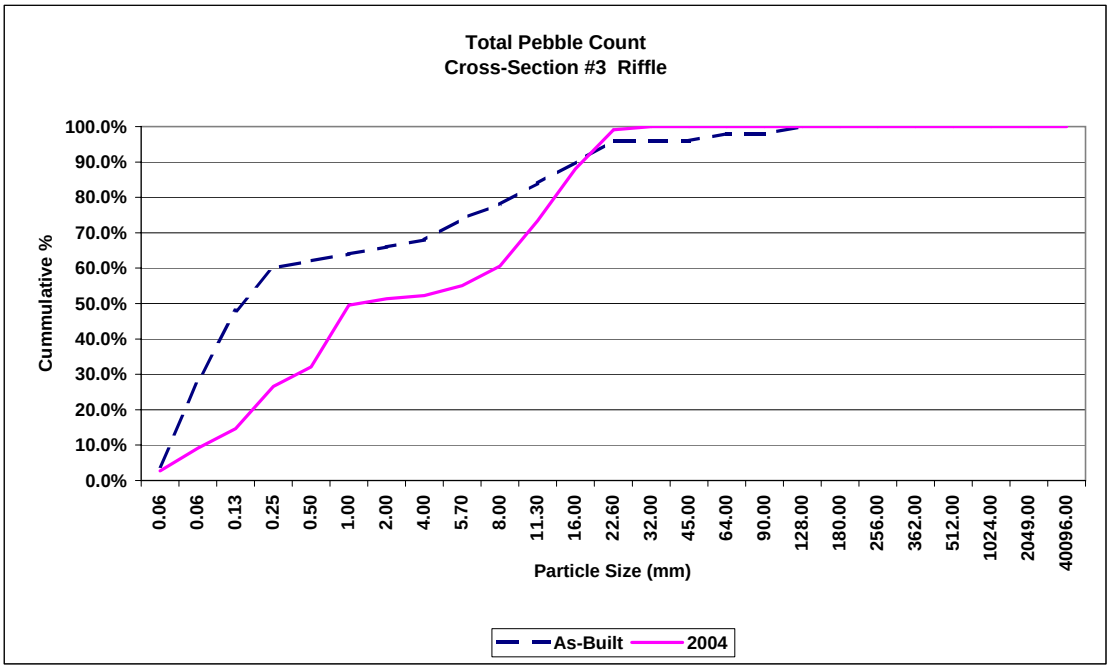
	2002	2003	2004
Area	76.3	64.9	54.3
Width	31.8	33.1	27.7
Mean Depth	2.4	2.0	2.0
Max Depth	6.0	5.5	4.9



Project Name	Hominy Swamp Creek
Cross Section	#3
Feature	Pool
Date	5/24/04
Crew	Bidelspach, Clinton

			As-Built			2004			
Description	**Material**	**Size (mm)**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Bank**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	2	4.0%	4.0%	3	0	2.8%	2.8%
Sand	very fine sand	0.062	12	24.0%	28.0%	5	2	6.4%	9.2%
	fine sand	0.125	10	20.0%	48.0%	3	3	5.5%	14.7%
	medium sand	0.25	6	12.0%	60.0%	7	6	11.9%	26.6%
	course sand	0.50	1	2.0%	62.0%	4	2	5.5%	32.1%
	very course sand	1.0	1	2.0%	64.0%	19	0	17.4%	49.5%
Gravel	very fine gravel	2.0	1	2.0%	66.0%	1	1	1.8%	51.4%
	fine gravel	4.0	1	2.0%	68.0%	1	0	0.9%	52.3%
	fine gravel	5.7	3	6.0%	74.0%	3	0	2.8%	55.0%
	medium gravel	8.0	2	4.0%	78.0%	6	0	5.5%	60.6%
	medium gravel	11.3	3	6.0%	84.0%	7	7	12.8%	73.4%
	course gravel	16.0	3	6.0%	90.0%	8	8	14.7%	88.1%
	course gravel	22.6	3	6.0%	96.0%	3	9	11.0%	99.1%
	very course gravel	32	0	0.0%	96.0%	0	1	0.9%	100.0%
	very course gravel	45	0	0.0%	96.0%	0	0	0.0%	100.0%
Cobble	small cobble	64	1	2.0%	98.0%	0	0	0.0%	100.0%
	medium cobble	90	0	0.0%	98.0%	0	0	0.0%	100.0%
	large cobble	128	1	2.0%	100.0%	0	0	0.0%	100.0%
	very large cobble	180	0	0.0%	100.0%	0	0	0.0%	100.0%
Boulder	small boulder	256	0	0.0%	100.0%	0	0	0.0%	100.0%
	small boulder	362	0	0.0%	100.0%	0	0	0.0%	100.0%
	medium boulder	512	0	0.0%	100.0%	0	0	0.0%	100.0%
	large boulder	1024	0	0.0%	100.0%	0	0	0.0%	100.0%
	very large boulder	2049	0	0.0%	100.0%	0	0	0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0	0.0%	100.0%
TOTAL / %of whole count			50	100.0%		70	39	100.0%	

	d16	**d35**	**d50**	**d85**	**d95**
As-Built	0.08	0.13	0.22	13.65	25.97
2004	0.21	0.87	1.88	17.73	24.33
2003	0.07	0.11	0.26	5.88	7.08



Project Name	Hominy Swamp Creek
Cross Section	#4
Feature	Pool
Date	5/24/04
Crew	Bidelspach, Clinton

2004
2004 Survey

Station	Elevation	Notes
0.0	104.7	
17.3	104.3	
28.6	103.2	
35.1	101.7	
38.8	99.4	
39.2	98.2	
39.7	97.4	
40.8	96.7	
43.8	95.5	
48.3	95.3	
51.0	95.8	
54.0	98.2	
60.0	102.5	BKF
60.6	102.9	
66.8	104.7	
77.8	104.9	
85.1	104.9	

2002
2002 Survey

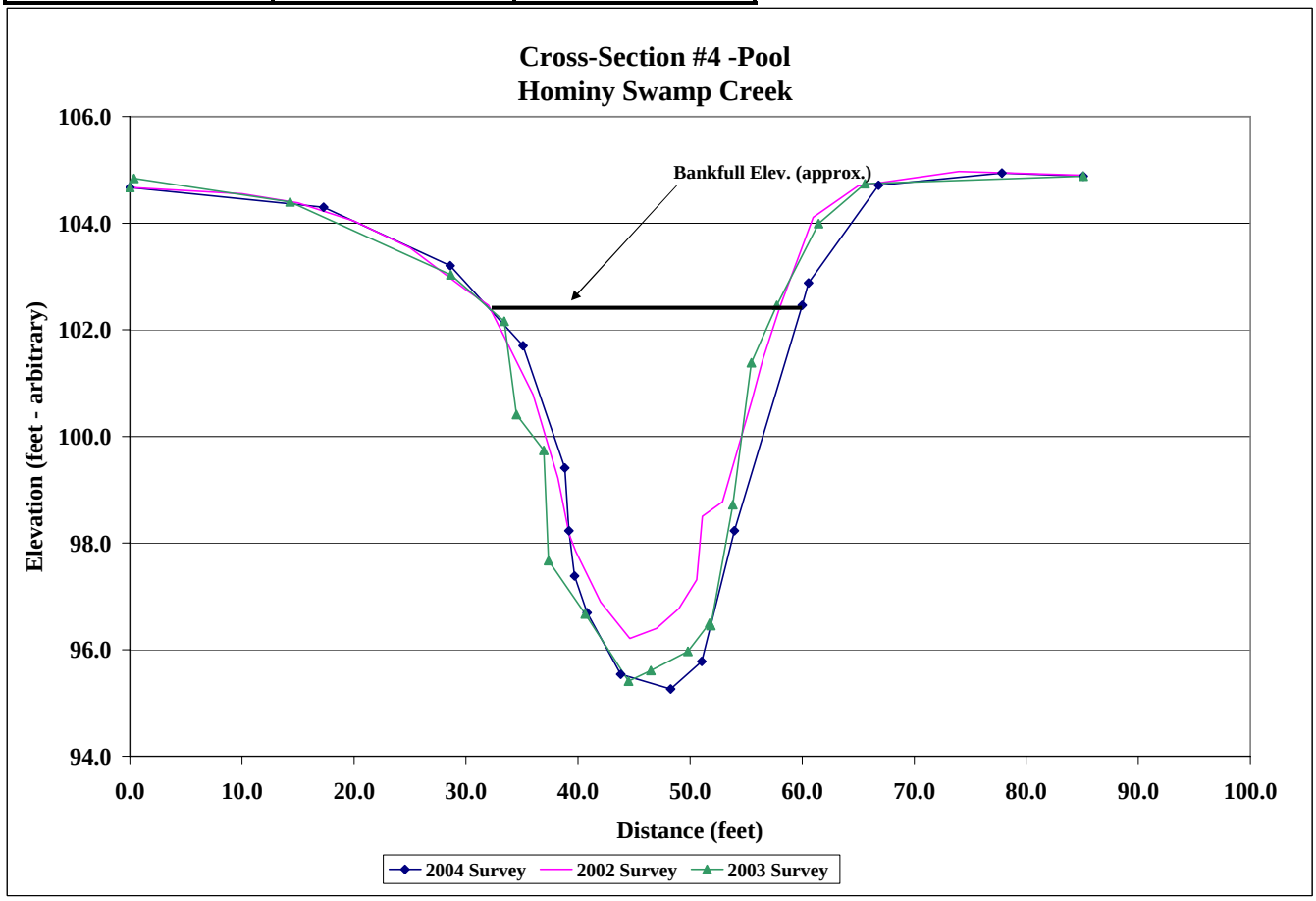
Station	Elevation	Notes
0.0	104.7	
10.0	104.6	
15.0	104.4	
20.0	104.0	
25.0	103.5	
30.0	102.8	
32.0	102.5	BKF
36.0	100.8	
38.2	99.2	
39.2	98.2	
39.8	97.8	
42.0	96.9	
44.6	96.2	
47.0	96.4	
49.0	96.8	
50.6	97.3	
51.1	98.5	
52.9	98.8	
55.5	100.7	
56.5	101.5	
58.0	102.4	BKF
61.0	104.1	
65.0	104.7	
74.0	105.0	
85.0	104.9	

2003
2003 Survey

Station	Elevation	Notes
0.0	104.7	
0.4	104.8	
14.3	104.4	
28.7	103.0	
33.4	102.2	
34.5	100.4	
36.9	99.7	
37.4	97.7	
40.6	96.7	
44.5	95.4	
46.5	95.6	
49.8	96.0	
51.7	96.5	
51.9	96.5	
53.8	98.7	
55.5	101.4	
57.7	102.5	BKF
61.5	104.0	
65.6	104.7	
85.1	104.9	

Photo of Cross-Section #4 - Looking Upstream

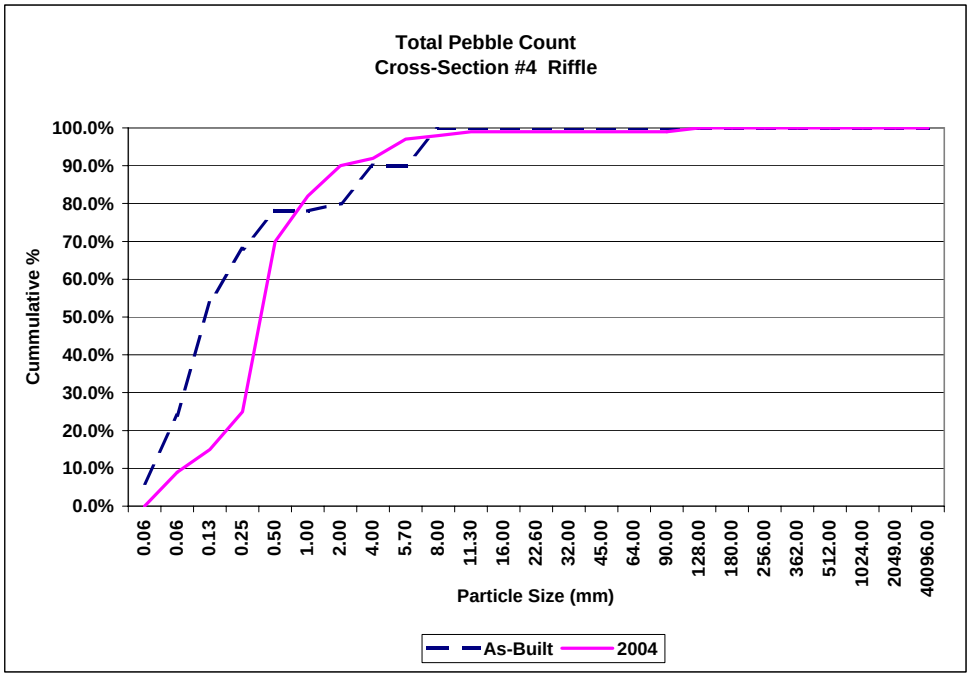
	2002	2003	2004
Area	88.3	107.5	113.8
Width	23.5	26.8	24.9
Mean Depth	3.8	4.0	4.6
Max Depth	6.0	6.8	7.2



Project Name	Hominy Swamp Creek
Cross Section	#4
Feature	Pool
Date	5/24/04
Crew	Bidelspach, Clinton

			As-Built			2004			
Description	**Material**	**Size (mm)**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Bank**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	3	6.0%	6.0%	10	2	11.9%	11.9%
Sand	very fine sand	0.062	9	18.0%	24.0%	6	5	10.9%	22.8%
	fine sand	0.125	15	30.0%	54.0%	9	8	16.8%	39.6%
	medium sand	0.25	7	14.0%	68.0%	15	10	24.8%	64.4%
	course sand	0.50	5	10.0%	78.0%	10	10	19.8%	84.2%
	very course sand	1.0	0	0.0%	78.0%	10	3	12.9%	97.0%
Gravel	very fine gravel	2.0	1	2.0%	80.0%	0	0	0.0%	97.0%
	fine gravel	4.0	5	10.0%	90.0%	0	1	1.0%	98.0%
	fine gravel	5.7	0	0.0%	90.0%	0	1	1.0%	99.0%
	medium gravel	8.0	5	10.0%	100.0%	0	1	1.0%	100.0%
	medium gravel	11.3	0	0.0%	100.0%	0	0	0.0%	100.0%
	course gravel	16.0	0	0.0%	100.0%	0	0	0.0%	100.0%
	course gravel	22.6	0	0.0%	100.0%	0	0	0.0%	100.0%
	very course gravel	32	0	0.0%	100.0%	0	0	0.0%	100.0%
	very course gravel	45	0	0.0%	100.0%	0	0	0.0%	100.0%
Cobble	small cobble	64	0	0.0%	100.0%	0	0	0.0%	100.0%
	medium cobble	90	0	0.0%	100.0%	0	0	0.0%	100.0%
	large cobble	128	0	0.0%	100.0%	0	0	0.0%	100.0%
	very large cobble	180	0	0.0%	100.0%	0	0	0.0%	100.0%
Boulder	small boulder	256	0	0.0%	100.0%	0	0	0.0%	100.0%
	small boulder	362	0	0.0%	100.0%	0	0	0.0%	100.0%
	medium boulder	512	0	0.0%	100.0%	0	0	0.0%	100.0%
	large boulder	1024	0	0.0%	100.0%	0	0	0.0%	100.0%
	very large boulder	2049	0	0.0%	100.0%	0	0	0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0	0.0%	100.0%
TOTAL / %of whole count			50	100.0%		60	41	100.0%	

	d16	**d35**	**d50**	**d85**	**d95**
As-Built	0.08	0.13	0.17	3.74	8.25
2004	0.07	0.16	0.27	0.75	1.38
2003	0.10	0.16	0.22	0.62	1.12



Point	Station	Elevation	Description
1171	23.34	100.36	CV
1169	26.31	98.75	T
1167	30	98.1	T
1165	36.52	97.36	T
1165	36.52	97.36	T
1163	47.45	99.63	T
1161	60.58	100.02	LV
1159	70.35	100.08	T
1157	88.28	100	T
1155	98.16	100.09	T
1153	117.07	100.21	T
1151	129.73	99.72	T
1149	144.99	99.49	T
1147	151.13	99.74	LV
1143	156	99.67	T
1145	165.67	98.9	T
1141	174.74	98.61	T
1139	181.42	98.99	T
1137	195.43	99.4	T
1135	201.99	99.46	T
1133	214.69	99.18	T
1131	223.9	99.34	T
1129	231.32	99.35	T
1125	240.59	98.71	LV
1092	248.36	98.25	T
1090	260.96	98.91	T
1088	265.85	99.48	T
1086	283.56	99.26	T
1084	298.24	98.86	T
1082	304.35	98.64	T
1080	318.62	98.71	T
1078	332.88	99.3	T
1076	342.98	99.44	T
1072	362.47	98.94	T
1070	370.71	99.3	T
1068	379.73	99.48	T
1066	392.33	98.86	T
1064	405.47	98.35	T
1062	413.61	98.45	T
1060	428.75	99.3	T
964	429.9	99.5	T
1056	438.98	98.91	T
962	442.01	98.66	T
1054	450.9	97.9	T
960	451.13	97.87	T
1052	456.97	98.32	T
958	458.76	99.38	T
1050	470.65	98.48	T
1048	484.62	98.77	T
954	484.69	98.93	T
1046	501.35	98.97	T
956	504.3	99.06	T
1044	510.34	99.17	T
952	525.85	99.57	T
1042	529.31	99.44	T
950	546.29	99.36	T
948	568.97	99.84	T
944	601.17	99.51	T
942	611.62	97.04	T
940	616.89	97.55	T
938	626.24	97.73	T
936	646.57	98.97	T
934	659.64	97.83	T
932	666.87	98.48	T
930	676.62	99.04	T
928	688.46	99.08	T
926	697.2	98.51	T
924	708.07	98.56	T
922	720.14	98.78	T
920	736.2	98.87	T
918	755.47	98.73	T
916	773.17	99.17	T
914	781.07	98.86	T
912	792.54	98.67	T
910	806.93	98.09	T
908	822.56	97.96	T
906	833.25	97.92	T
904	837.41	98.53	T
902	846.42	98.28	T
900	852.83	98.82	T
694	868.61	98.53	T
696	873.2	98.04	M
698	883.82	98.75	T

Point	Station	Elevation	Description
1174	14.76	101.39	W
1172	23.96	101.34	W
1170	25.07	100.81	W
1168	29.95	100.98	W
1166	35.07	100.94	W
1164	48.27	100.9	W
1162	60.92	100.96	W
1160	70.01	100.95	W
1158	86.63	100.9	W
1156	97.85	100.92	W
1154	115.51	100.84	W
1152	129.63	100.85	W
1150	144.44	100.79	W
1148	151.74	100.88	W
1144	155.36	100.76	W
1146	164.83	100.79	W
1142	175.6	100.62	W
1140	181.68	100.81	W
1138	194.73	100.84	W
1136	201.52	100.77	W
1134	214.99	100.78	W
1132	223.32	100.82	W
1130	230.93	100.63	W
1128	238.39	100.63	W
1126	239.92	100.79	W
1093	248.51	100.54	W
1091	258.24	100.69	W
1089	267.32	100.59	W
1087	281.1	100.55	W
1085	299.03	100.75	W
1083	305.23	100.65	W
1081	321.25	100.58	W
1079	330.98	100.7	W
1077	344.51	100.58	W
1075	353.69	100.44	W
1073	362.31	100.63	W
1071	371.28	100.61	W
1069	377.19	100.64	W
1067	390.96	100.49	W
1065	403.98	100.47	W
1063	411.04	100.54	W
1061	430.27	100.53	W
965	430.6	100.49	W
1057	439.18	100.48	W
963	441.86	100.5	W
961	451.93	100.58	W
1053	457.09	100.52	W
959	459.21	100.57	W
1051	472.01	100.37	W
1049	483.33	100.54	W
955	485.51	100.55	W
1047	501.47	100.56	W
957	502.98	100.6	W
1045	509.97	100.54	W
953	525.91	100.6	W
1043	529.8	100.54	W
951	545.56	100.46	W
949	570.15	100.56	W
1027	571.34	100.54	W
947	586.1	100.58	W
945	601.97	100.5	W
943	611.49	100.47	W
941	617.91	100.4	W
939	626.77	100.41	W
937	646.26	100.49	W
935	660.03	100.53	W
933	667.49	100.5	W
931	676.49	100.47	W
929	688.52	100.51	W
927	695.91	100.38	W
925	708.46	100.43	W
923	721.01	100.48	W
921	737.62	100.45	W
919	755.36	100.5	W
917	773.45	100.54	W
915	781.25	100.49	W
913	793.31	100.54	W
911	807.61	100.5	W
909	822.4	100.5	W
907	833.13	100.54	W
905	836.88	100.48	W
903	846.43	100.42	W
901	853.74	100.5	W

Point	Station			Elevation	Description
14	5	60.48	560.48	103.38	BKF
18	6	11.48	611.48	103.32	BKF
21	6	58.11	658.11	103.88	BKF
22	6	79.49	679.49	103.43	BKF
23	6	94.24	694.24	103.47	BKF
24	7	10.6	710.6	103.55	BKF
26	7	68.24	768.24	103.24	BKF
27	7	96.56	796.56	103.25	BKF
28	8	42.44	842.44	103.38	BKF
29	8	84.09	884.09	102.95	BKF
30	9	9.15	909.15	103.26	BKF
31	9	26.07	926.07	103.22	BKF
32	9	54.3	954.3	103.13	BKF
33	9	66.86	966.86	102.88	BKF
56	6	38.15	638.15	102.65	BKF
57	6	56.75	656.75	102.82	BKF
58	6	67.12	667.12	103.86	BKF
61	6	83.76	683.76	103.97	BKF
64	7	12.11	712.11	103.04	BKF
67	7	27.84	727.84	103.03	BKF
148	12	61.6	1261.6	102.3	BKF
149	12	29.48	1229.48	102.78	BKF
150	12	12.91	1212.91	103.3	BKF
152	11	46.39	1146.39	102.21	BKF
153	10	82.85	1082.85	103.2	BKF
154	10	71.39	1071.39	102.51	BKF
156	10	33.61	1033.61	102.03	BKF
157	10	15.65	1015.65	102.94	BKF
158	9	93.29	993.29	102.84	BKF
162	9	17.79	917.79	102.44	BKF
163	8	91.61	891.61	102.56	BKF
165	8	62.93	862.93	102.94	BKF
166	8	48.61	848.61	103.01	BKF
167	8	24.56	824.56	103.56	BKF
168	8	2.62	802.62	103.69	BKF
169	7	84.64	784.64	103.41	BKF
170	7	60.94	760.94	102.54	BKF
171	7	46.15	746.15	103	BKF
172	7	22.94	722.94	103.04	BKF
177	12	80.57	1280.57	101.85	BKF
178	12	38.38	1238.38	101.78	BKF
179	12	27.38	1227.38	101.8	BKF
180	11	98.73	1198.73	101.82	BKF
181	11	81.09	1181.09	102.41	BKF
182	11	64.13	1164.13	102.84	BKF
183	11	48.21	1148.21	102.16	BKF
184	11	22.28	1122.28	102.16	BKF
185	10	97.69	1097.69	102.7	BKF
186	10	70.22	1070.22	102.6	BKF
187	10	50.96	1050.96	103.29	BKF
188	10	39.33	1039.33	103.35	BKF
189	10	27.4	1027.4	102.82	BKF
190	10	3.89	1003.89	102.76	BKF
191	9	80.61	980.61	102.71	BKF
192	9	64.45	964.45	103.18	BKF
199	14	0.79	1400.79	102.64	BKF
201	14	18.17	1418.17	102.76	BKF
209	15	28.54	1528.54	102.18	BKF
210	15	56.77	1556.77	102.95	BKF
211	15	75.08	1575.08	103.03	BKF
213	16	12.82	1612.82	102.99	BKF
214	16	37.77	1637.77	102.91	BKF
215	16	64.44	1664.44	102.01	BKF
216	16	91.66	1691.66	101.72	BKF
217	17	9.66	1709.66	102.26	BKF
218	17	34.15	1734.15	101.82	BKF
219	17	69.06	1769.06	101.92	BKF
220	17	93.1	1793.1	102.58	BKF
279	13	16.81	1316.81	103.21	BKF
282	13	40.82	1340.82	102.94	BKF
285	13	64.28	1364.28	102.46	BKF
286	13	98.86	1398.86	101.98	BKF
289	14	0.91	1400.91	101.96	BKF
296	14	34.7	1434.7	102.35	BKF
304	14	91.13	1491.13	102.99	BKF
314	0	18.96	18.96	101.86	BKF
315	0	47.08	47.08	102.62	BKF
316	0	84.22	84.22	102.05	BKF
317	1	1.22	101.22	102.53	BKF
320	1	55.8	155.8	102.72	BKF
323	1	81.24	181.24	102.05	BKF
326	0	32.71	32.71	103.28	BKF
329	0	73.49	73.49	102.48	BKF

700	899.6	98.84	R	692	860.41	100.47	W	332	1	44.61	144.61	101.8	BKF	
702	907.42	98.8	P	695	868.57	100.35	W	339	1	52.07	152.07	101.41	BKF	
704	920.03	97.33	M	697	872.89	100.41	W	345	2	0.84	200.84	102.15	BKF	
706	936.95	98.79	R	699	889.52	100.35	W	358	2	23.69	223.69	102.02	BKF	
708	952.43	98.89	T	701	899.38	100.3	W	361	2	52.18	252.18	101.96	BKF	
710	965.85	98.46	P	703	908.07	100.33	W	364	2	82.57	282.57	101.99	BKF	
712	967.2	98.44	M	705	919.85	100.15	W	369	2	24.01	224.01	101.9	BKF	
714	974.83	98.99	T	707	936.74	100.08	W	372	2	39.01	239.01	102.38	BKF	
716	988.78	99.05	P	709	953.85	100.01	W	375	2	52.14	252.14	102.4	BKF	
718	993.94	97.92	M	711	965.81	100.06	W	378	2	76.86	276.86	102.53	BKF	
720	1004.95	97.51	T	713	967.19	100.06	W	381	3	2.95	302.95	102.47	BKF	
726	1025.17	97.77	LV	715	973.43	100.04	W	384	3	23.33	323.33	101.73	BKF	
728	1033.15	98.19	U	717	988.3	100.07	W	389	3	34.32	334.32	101.57	BKF	
730	1048.52	98.33	T	719	994.35	100.01	W	392	3	64.02	364.02	102.42	BKF	
732	1053.06	98.27	P	721	1003.91	100.11	W	393	3	75.1	375.1	102.24	BKF	
734	1053.86	97.56	P	723	1013.89	100.08	W	396	3	89.11	389.11	102.06	BKF	
736	1062.71	97.97	G	725	1021.1	100.02	W	405	2	83.2	283.2	101.67	BKF	
742	1070.58	97.84	T	727	1025.44	100.01	W	416	3	5.56	305.56	101.36	BKF	
744	1075.32	97.49	PP	729	1033.43	99.97	W	417	3	17.93	317.93	101.95	BKF	
746	1084.58	98.3	T	731	1048.02	100.01	W	418	3	36.16	336.16	101.69	BKF	
748	1092.36	98.63	T	733	1052.75	100.01	W	419	3	59.05	359.05	101.55	BKF	
750	1098.68	98.53	R	735	1054.76	99.99	W	420	3	82.52	382.52	101.48	BKF	
752	1106.45	98.74	P	737	1061.97	100.04	W	421	4	6.3	406.3	101.6	BKF	
754	1109.4	98.51	P	740	1067.5	99.97	W	422	4	50.68	450.68	101.71	BKF	
756	1117.26	98.67	T	741	1069.18	100.04	W	423	4	65.89	465.89	101.47	BKF	
758	1127.21	98.82	T	743	1070.46	100.03	W	424	4	86.51	486.51	101.22	BKF	
760	1134.97	99.01	T	745	1074.84	100.18	W	431	4	80.78	480.78	102.34	BKF	
762	1150.45	98.97	T	747	1084.74	100.16	W	432	4	65.94	465.94	102.35	BKF	
764	1173.38	98.43	P	749	1092.39	100.18	W	433	4	49.47	449.47	101.72	BKF	
766	1185.42	98.24	M	751	1098.27	100.19	W	434	4	26.17	426.17	101.67	BKF	
768	1199.52	98.16	T	753	1106.73	100.13	W	436	4	10.54	410.54	102.07	BKF	
770	1211.05	98.41	T	755	1109.66	100.07	W	444	15	32.42	1532.42	102.79	BKF	
772	1223.27	97.99	T	757	1116.94	100.11	W	447	15	55.21	1555.21	102.94	BKF	
774	1231.51	98.06	T	759	1127.71	100.14	W	450	15	75.76	1575.76	103.19	BKF	
776	1246.68	98.14	T	761	1134.35	100.06	W	458	16	46.49	1646.49	102.55	BKF	
778	1258.13	98.19	T	763	1149.78	100.13	W	467	16	71.3	1671.3	102.11	BKF	
780	1269.5	97.87	M	765	1173.08	100.07	W	477	17	38.41	1738.41	101.75	BKF	
782	1287.58	98.24	T	767	1185.58	100.15	W	483	17	53.95	1753.95	101.88	BKF	
784	1299.32	97.71	M	769	1199.87	100.02	W	490	17	93.95	1793.95	102.59	BKF	
786	1314.17	97.66	T	771	1211	100.1	W	499	18	37.49	1837.49	102.25	BKF	
788	1316.28	97.63	T	773	1220.99	100.05	W	505	18	61.01	1861.01	102.72	BKF	
790	1324.1	97.85	T	775	1231.13	100.1	W	510	18	93.04	1893.04	102.06	BKF	
792	1336.04	97.84	T	777	1246.56	100.05	W	521	19	28.01	1928.01	102.45	BKF	
794	1343.39	97.23	T	779	1258.29	100.08	W	526	19	2.98	1902.98	101.87	BKF	
798	1365.49	97.31	T	781	1269.91	100.09	W	527	18	73.45	1873.45	101.63	BKF	
800	1373.02	97.91	T	783	1287.65	99.78	W	528	18	12.7	1812.7	101.75	BKF	
803	1392.95	98.62	T	785	1298.67	99.83	W	529	17	89.44	1789.44	101.46	BKF	
802	1393.51	98.59	T	888	1306.51	99.71	W	530	17	43.15	1743.15	101.84	BKF	
805	1395.88	98.8	LV	882	1306.84	99.6	W	531	16	92.07	1692.07	101.7	BKF	
9474	1418.88	96.76	T	787	1314.5	99.83	W	533	16	58.83	1658.83	102.05	BKF	
9475	1430.31	96.54	T	789	1316.5	99.86	W	534	16	32.64	1632.64	102.29	BKF	
9478	1443.85	97.16	T	791	1324.7	99.77	W	535	15	99.16	1599.16	102.46	BKF	
9479	1454.63	97.63	T	793	1334.86	99.86	W	536	15	67.6	1567.6	102.27	BKF	
9481	1466.8	97.54	T	795	1342.37	99.6	W	537	15	37.99	1537.99	102.75	BKF	
9483	1490.52	98.17	T	797	1352.75	99.92	W	551	20	36.88	2036.88	101.75	BKF	
9485	1510.89	98.4	U	799	1365.99	99.71	W	554	20	70.29	2070.29	101.7	BKF	
9487	1534.08	97.2	M	801	1373.72	99.84	W	566	20	72.84	2072.84	101.41	BKF	
9489	1553.98	96.32	T	804	1393.61	99.82	W	569	20	85.37	2085.37	101.47	BKF	
9492	1575.18	97.66	T	806	1396.32	99.8	W	572	21	10.98	2110.98	100.61	BKF	
9494	1584.75	97.61	U	9480	1455.72	99.64	W	575	21	32.63	2132.63	100.97	BKF	
9496	1596.99	97.79	T	9482	1467.84	99.71	W	578	21	53.71	2153.71	100.71	BKF	
9498	1618.53	98.13	T	9484	1490.47	99.61	W	579	22	8.91	2208.91	101.64	BKF	
9500	1638.3	97.92	T	9486	1511.52	99.65	W	585	22	10.06	2210.06	101.47	BKF	
9504	1640.49	96.77	M	9488	1533.89	99.64	W	586	21	56.43	2156.43	101.1	BKF	
9502	1661.75	97.11	T	9490	1552.51	99.58	W	587	21	0.36	2100.36	101.41	BKF	
9506	1672.2	97.95	R	9493	1575.69	99.53	W	588	20	79.96	2079.96	100.66	BKF	
9512	1694.34	96.86	T	9495	1581.11	99.59	W	589	20	39.77	2039.77	101.34	BKF	
9514	1706.42	97.17	T	9497	1597.44	99.67	W	590	20	19.4	2019.4	102.17	BKF	
9516	1716.6	96.23	T	9499	1619.31	99.62	W	591	19	87.11	1987.11	101.12	BKF	
9518	1720.24	96.02	M	9501	1638.83	99.5	W	592	19	70.63	1970.63	101.78	BKF	
9520	1742.71	97.85	T	9505	1642.45	99.33	W				0			
9522	1753	97.31	T	9503	1659.55	98.94	W				0			
9524	1768.62	97.38	T	9507	1672.44	99.5	W				0			
9526	1778.83	96.99	T	9509	1687.19	99.32	W				0			
9528	1787.22	96.21	M	9511	1689.99	99.22	W				0			
9530	1799.18	97.47	T	9513	1693.18	99.01	W				0			
9532	1809.06	96.62	P	9515	1707.18	99	W				0			
9579	1816.13	96.25	P	9517	1716.64	99.07	W				0			
9582	1821.41	96.26	M	9519	1718.64	98.86	W				0			
9585	1830.35	97.05	R	9521	1743.2	99.25	W				0			
9588	1851.49	96.94	T	9523	1753.83	99.25	W				0			
9364	1870.89	97.26	T	9525	1768.21	99.13	W				0			
9367	1885.82	97.59	V	9527	1777.86	99.23	W				0			
9370	1890.23	98.02	T	9529	1786.75	99.16	W				0			
9373	1894.89	97.11	T	9531	1799.46	99.17	W				0			
9374	1898.73	96.35	T	9533	1808.39	99.16	W				0			
9377	1917.42	96.96	T	9580	1816.43	99.02	W				0			

9380	1923.06	96.28	P	9586	1830.65	99.08	W	0
9381	1935.08	95.95	M	9589	1852.06	99.05	W	0
9385	1942.38	96.5	R	9365	1871.24	99.08	W	0
9379	1942.52	97.57	L	9368	1884.12	98.9	W	0
9389	1957.6	94.9	T	9371	1890.79	98.6	W	0
9392	1970.36	94.39	M	9375	1899.07	98.37	W	0
9395	1983.44	95.72	T	9378	1916.96	98.57	W	0
9398	1996.5	96.72	RT	9382	1935.21	98.51	W	0
9401	2022.78	96.87	T	9386	1942.22	98.43	W	0
9404	2027.98	95.91	T	9390	1957.89	98.26	W	0
9407	2044.74	96.42	T	9393	1970.46	98.13	W	0
9410	2069.41	97.49	T	9396	1983.35	98.24	W	0
9413	2086.16	97.34	T	9399	1996.65	98.37	W	0
9417	2108.18	97.39	T	9402	2023.32	98.36	W	0
9420	2133.7	97.39	T	9405	2028.8	98.26	W	0
9423	2155.67	96.82	T	9408	2044.3	98.35	W	0
9426	2180.64	96.76	T	9411	2069.92	98.29	W	0
				9414	2087.26	98.29	W	0
				9418	2108.49	98.49	W	0
				9421	2135.14	98.44	W	0
				9424	2156.48	98.4	W	0
				9427	2180.99	98.4	W	0
								0
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Point	Station	Elevation	Description	Point	Station	Elevation	Description	Point	Station	Elevation	Description
318	0+00.48	98.26	T	319	0+00.00	99.51	W	14	5+60.48	103.38	RB
321	0+19.69	98.91	V	322	0+17.80	99.52	W	18	6+11.48	103.32	RB
324	0+25.92	96.02	T	325	0+25.53	98.8	W	21	6+58.11	103.88	RB
327	0+39.15	95.11	TP	328	0+39.52	98.83	W	22	6+79.49	103.43	RB
330	0+49.43	97.62	T	331	0+48.74	98.78	W	23	6+94.24	103.47	RB
333	0+63.30	97.38	TP	334	0+62.99	98.83	W	24	7+10.60	103.55	RB
335	0+75.60	97.04	TM	336	0+75.74	98.72	W	26	7+68.24	103.24	RB
344	1+10.22	98.34	T	347	1+16.58	98.81	W	27	7+96.56	103.25	RB
346	1+16.67	97.76	T	349	1+27.00	98.79	W	28	8+42.44	103.38	RB
348	1+27.40	98.46	T	338	1+35.74	98.76	W	29	8+84.09	102.95	RB
337	1+35.73	97.88	TR	351	1+44.75	98.75	W	30	9+09.15	103.26	RB
350	1+45.34	97.43	TU	353	1+63.05	98.66	W	31	9+26.07	103.22	RB
352	1+63.90	97.76	T	355	1+73.31	98.67	W	32	9+54.30	103.13	RB
354	1+73.91	97.12	TP	357	1+90.82	98.61	W	33	9+66.86	102.88	RB
356	1+91.17	96.19	TM	360	2+00.25	98.67	W	56	6+38.15	102.65	LB
359	2+00.43	96.83	TG	363	2+14.09	98.66	W	57	6+56.75	102.82	LB
362	2+14.34	97.37	T	366	2+26.78	98.66	W	58	6+67.12	103.86	LB
365	2+26.89	97.17	T	368	2+45.10	98.66	W	61	6+83.76	103.97	LB
367	2+45.14	96.61	TM	371	2+58.65	98.65	W	64	7+12.11	103.04	LB
370	2+58.71	96.49	T	374	2+72.60	98.65	W	67	7+27.84	103.03	LB
373	2+72.46	95.85	T	377	2+84.23	98.64	W	148	12+61.60	102.3	LB
376	2+84.28	96.89	T	380	3+00.35	98.62	W	149	12+29.48	102.78	LB
379	2+99.88	97.69	T	383	3+17.10	98.58	W	150	12+12.91	103.3	LB
382	3+16.10	97.13	TP	386	3+33.33	98.56	W	152	11+46.39	102.21	LB
385	3+32.58	96.05	TM	388	3+42.14	98.58	W	153	10+82.85	103.2	LB
387	3+41.00	96.98	T	391	3+49.78	98.55	W	154	10+71.39	102.51	LB
390	3+49.59	97.66	TR	395	3+68.24	98.61	W	156	10+33.61	102.03	LB
394	3+67.81	97.56	T	398	3+79.26	98.62	W	157	10+15.65	102.94	LB
397	3+78.49	96.9	T	400	3+88.96	98.6	W	158	9+93.29	102.84	LB
399	3+88.24	97.33	T	402	3+96.94	98.57	W	162	9+17.79	102.44	LB
401	3+96.80	97.61	TR	404	4+08.54	98.6	W	163	8+91.61	102.56	LB
403	4+07.67	97.14	T	407	4+29.86	98.53	W	165	8+62.93	102.94	LB
406	4+29.24	97.51	T	411	4+74.92	98.59	W	166	8+48.61	103.01	LB
408	4+62.85	97.33	T	413	4+80.03	98.5	W	167	8+24.56	103.56	LB
410	4+74.91	95.94	TM	415	4+93.22	98.49	W	168	8+02.62	103.69	LB
412	4+79.80	96.69	T	8	5+15.09	99.98	W	169	7+84.64	103.41	LB
414	4+92.84	96.14	T	19	6+31.85	99.99	W	170	7+60.94	102.54	LB
425	5+01.89	96.69	T	17	6+40.18	99.98	W	171	7+46.15	103	LB
6	5+06.26	99.16	TP	60	6+63.23	100	W	172	7+22.94	103.04	LB
7	5+15.53	98.17	TM	63	6+76.60	99.96	W	177	12+80.57	101.85	RB
10	5+48.02	99.49	TR	68	7+07.47	99.95	W	178	12+38.38	101.78	RB
12	5+97.83	99.36	TP	71	7+25.26	99.96	W	179	12+27.38	101.8	RB
13	6+32.28	98.6	TP	73	7+35.03	100.01	W	180	11+98.73	101.82	RB
15	6+40.86	96.41	TM	76	7+44.55	99.99	W	181	11+81.09	102.41	RB
59	6+64.61	99.04	T	77	7+74.20	99.99	W	182	11+64.13	102.84	RB
62	6+77.43	98.86	TP	79	8+20.68	99.98	W	183	11+48.21	102.16	RB
65	6+91.71	98.15	TM	81	8+50.12	99.96	W	184	11+22.28	102.16	RB
69	7+08.73	98.98	T	85	8+78.97	100	W	185	10+97.69	102.7	RB
70	7+25.66	98.03	TM	87	8+88.43	99.94	W	186	10+70.22	102.6	RB
72	7+35.85	98.37	T	89	8+94.30	99.8	W	187	10+50.96	103.29	RB
74	7+45.02	98.97	TR	91	8+99.82	99.77	W	188	10+39.33	103.35	RB
75	7+74.79	98.69	TU	93	9+08.58	99.8	W	189	10+27.40	102.82	RB
78	8+20.82	98.19	TP	97	9+29.37	99.75	W	190	10+03.89	102.76	RB
80	8+50.18	98.06	TM	95	9+35.78	99.7	W	191	9+80.61	102.71	RB
82	8+57.61	98.15	T	99	9+48.02	99.73	W	192	9+64.45	103.18	RB
83	8+70.01	98.16	T	101	9+72.66	99.72	W	199	14+00.79	102.64	LB
84	8+79.34	98.96	T	103	9+89.92	99.71	W	201	14+18.17	102.76	LB
88	8+93.95	98.45	T	105	9+98.93	99.71	W	209	15+28.54	102.18	LB
90	8+99.90	97.6	T	107	10+08.25	99.69	W	210	15+56.77	102.95	LB
92	9+08.64	99.03	TR	109	10+24.10	99.74	W	211	15+75.08	103.03	LB
96	9+29.74	98.81	TU	111	10+40.52	99.7	W	213	16+12.82	102.99	LB
94	9+34.68	97.57	TP	113	10+49.61	99.7	W	214	16+37.77	102.91	LB
98	9+48.51	97.38	TM	115	10+68.46	99.7	W	215	16+64.44	102.01	LB
100	9+72.61	98.52	T	117	10+76.30	99.72	W	216	16+91.66	101.72	LB
102	9+90.52	98.34	T	119	10+80.87	99.7	W	217	17+09.66	102.26	LB
104	9+98.74	98.7	TR	121	10+90.77	99.75	W	218	17+34.15	101.82	LB
106	10+08.57	98.94	TP	123	11+00.23	99.75	W	219	17+69.06	101.92	LB
108	10+24.40	97.52	TM	125	11+04.14	99.73	W	220	17+93.10	102.58	LB
110	10+40.16	98.01	T	127	11+32.85	99.66	W	279	13+16.81	103.21	RB
112	10+49.34	97.67	T	129	11+52.08	99.75	W	282	13+40.82	102.94	RB
114	10+68.14	98.32	T	131	11+61.08	99.69	W	285	13+64.28	102.46	RB

116	10+75.57	98.02	TP
118	10+81.76	97.77	TM
120	10+89.62	98.31	T
122	10+99.12	97.49	T
124	11+04.22	98.04	TG
126	11+32.52	98.5	TR
128	11+51.72	98.52	T
130	11+60.67	98.67	T
132	11+84.91	98.21	T
134	12+06.30	98.4	TP
136	12+16.34	98.19	TM
138	12+32.90	98.14	TR
140	12+47.96	97.69	T
142	12+65.00	98.47	TR
144	12+80.65	98.09	TP
275	13+03.02	97.69	T
277	13+17.95	97.9	T
280	13+31.78	98.19	T
283	13+70.48	97.84	T
287	13+90.50	97.49	T
290	14+14.29	97.93	T
292	14+25.50	98.47	T
294	14+33.14	98.84	V
297	14+59.30	96.95	TM
300	14+76.95	98.33	T
302	14+79.80	97.2	T
305	14+89.96	96.97	TM
307	15+09.97	97.79	T
438	15+19.27	98.45	T
442	15+34.36	98.4	T
445	15+60.34	98.01	T
448	15+71.87	97.65	TP
451	15+82.70	96.76	TM
454	15+95.31	97.08	T
456	16+06.54	96.82	TM
459	16+16.91	97.36	T
461	16+34.87	98.22	T
463	16+48.19	98.05	T
465	16+59.64	97.9	T
468	16+77.72	97.67	T
471	16+93.08	98.23	T
473	17+00.68	97.11	T
475	17+08.62	97.71	T
478	17+31.30	98.82	VL
479	17+32.34	98.76	VL2
481	17+36.42	97.73	T
485	17+36.77	97.7	T
486	17+44.17	96.81	T
488	17+53.42	98.09	T
491	17+60.19	96.93	T
493	17+76.46	97.44	T
495	18+05.19	97.96	T
497	18+15.95	97.76	TP
501	18+34.46	96.76	TM
503	18+45.55	97.71	T
506	18+52.71	96.79	T
508	18+64.50	96.29	T
511	18+76.66	97.36	T
513	18+84.70	97.79	T
515	19+00.14	97.11	T
517	19+14.77	97.62	T
519	19+28.59	98.13	V
522	19+38.84	97.59	T
524	19+52.21	97.4	T
539	19+61.23	96.8	T
541	19+76.39	96.34	TP
543	19+99.05	96.78	T
546	20+12.09	96.15	T
549	20+22.12	97.49	T
552	20+29.04	97.06	T
555	20+46.97	96.49	T
557	20+63.17	97.13	T
558	20+63.71	97.14	T
561	20+97.64	96.92	T

133	11+85.44	99.62	W
135	12+06.63	99.73	W
137	12+15.52	99.69	W
139	12+33.46	99.67	W
141	12+48.37	99.7	W
143	12+65.39	99.66	W
145	12+80.97	99.71	W
276	13+02.96	99.82	W
278	13+17.72	99.82	W
281	13+31.34	99.79	W
284	13+68.95	99.81	W
288	13+90.39	99.8	W
291	14+13.33	99.78	W
293	14+25.79	99.78	W
295	14+32.53	99.78	W
298	14+58.80	99.76	W
301	14+77.57	99.64	W
306	14+90.23	99.77	W
308	15+09.61	99.8	W
439	15+19.19	99.7	W
443	15+34.22	99.67	W
446	15+59.69	99.7	W
449	15+71.52	99.7	W
452	15+81.55	99.68	W
455	15+94.49	99.62	W
457	16+06.95	99.71	W
460	16+16.71	99.7	W
462	16+34.73	99.7	W
466	16+59.66	99.68	W
472	16+92.72	99.64	W
476	17+08.47	99.62	W
480	17+32.49	99.57	W
482	17+36.60	99.38	W
484	17+36.73	99.38	W
487	17+44.11	99.28	W
489	17+52.80	99.36	W
492	17+60.32	99.29	W
494	17+75.89	99.33	W
496	18+04.70	99.31	W
498	18+16.18	99.29	W
502	18+34.38	99.33	W
504	18+45.86	99.37	W
507	18+52.98	99.31	W
509	18+64.09	99.36	W
512	18+77.22	99.28	W
514	18+84.91	99.31	W
518	19+15.95	99.33	W
520	19+28.01	99.05	W
523	19+37.84	98.74	W
525	19+52.49	98.79	W
542	19+76.97	98.71	W
544	19+99.47	98.78	W
547	20+13.76	98.84	W
550	20+22.37	98.74	W
553	20+29.50	98.76	W
556	20+47.87	98.75	W
559	20+64.52	98.76	W
562	20+99.01	98.72	W
565	21+48.44	98.8	W
568	21+66.46	98.68	W
571	21+74.69	98.84	W
574	21+95.18	98.72	W
577	22+03.50	98.98	W
581	22+22.20	98.98	W

286	13+98.86	101.98	RB
289	14+00.91	101.96	RB
296	14+34.70	102.35	RB
304	14+91.13	102.99	RB
314	0+18.96	101.86	RB
315	0+47.08	102.62	RB
316	0+84.22	102.05	RB
317	1+01.22	102.53	LB
320	1+55.80	102.72	RB
323	1+81.24	102.05	RB
326	0+32.71	103.28	LB
329	0+73.49	102.48	LB
332	1+44.61	101.8	LB
339	1+52.07	101.41	LB
345	2+00.84	102.15	LB
358	2+23.69	102.02	LB
361	2+52.18	101.96	LB
364	2+82.57	101.99	LB
369	2+24.01	101.9	RB
372	2+39.01	102.38	RB
375	2+52.14	102.4	RB
378	2+76.86	102.53	RB
381	3+02.95	102.47	RB
384	3+23.33	101.73	RB
389	3+34.32	101.57	RB
392	3+64.02	102.42	RB
393	3+75.10	102.24	RB
396	3+89.11	102.06	RB
405	2+83.20	101.67	LB
416	3+05.56	101.36	LB
417	3+17.93	101.95	LB
418	3+36.16	101.69	LB
419	3+59.05	101.55	LB
420	3+82.52	101.48	LB
421	4+06.30	101.6	LB
422	4+50.68	101.71	LB
423	4+65.89	101.47	LB
424	4+86.51	101.22	LB
431	4+80.78	102.34	RB
432	4+65.94	102.35	RB
433	4+49.47	101.72	RB
434	4+26.17	101.67	RB
436	4+10.54	102.07	RB
444	15+32.42	102.79	LB
447	15+55.21	102.94	LB
450	15+75.76	103.19	LB
458	16+46.49	102.55	LB
467	16+71.30	102.11	LB
477	17+38.41	101.75	LB
483	17+53.95	101.88	LB
490	17+93.95	102.59	LB
499	18+37.49	102.25	LB
505	18+61.01	102.72	LB
510	18+93.04	102.06	LB
521	19+28.01	102.45	RB
526	19+02.98	101.87	RB
527	18+73.45	101.63	RB
528	18+12.70	101.75	RB
529	17+89.44	101.46	RB
530	17+43.15	101.84	RB
531	16+92.07	101.7	RB
533	16+58.83	102.05	RB
534	16+32.64	102.29	RB
535	15+99.16	102.46	RB
536	15+67.60	102.27	RB
537	15+37.99	102.75	RB
551	20+36.88	101.75	LB
554	20+70.29	101.7	LB
566	20+72.84	101.41	LB
569	20+85.37	101.47	LB
572	21+10.98	100.61	LB
575	21+32.63	100.97	LB
578	21+53.71	100.71	LB
579	22+08.91	101.64	LB

564	21+48.08	97.53	T
567	21+64.27	96.96	T
570	21+73.37	96.04	T
573	21+93.55	96.99	T
576	22+02.88	97.13	T
580	22+20.27	97.48	T
583	22+26.98	98.17	V
582	22+27.08	98.2	V

585	22+10.06	101.47	RB
586	21+56.43	101.1	RB
587	21+00.36	101.41	RB
588	20+79.96	100.66	RB
589	20+39.77	101.34	RB
590	20+19.40	102.17	RB
591	19+87.11	101.12	RB
592	19+70.63	101.78	RB

Hominy Swamp Stream Restoration
Wilson County, NC

Quad 1

Tree Stratum

Species	Height (cm)	Diameter (mm)	Radius (mm)	Σ X-sec. (mm²)	Rel. x-sec (%)	Density	Rel. Density (%)	Rank (Importance)	Average
Quercus phellos	188	10	5	78.5	**73.3**	**6**	**6.8**	**1**	40.08045
	75	12	6	113.1					
	260	35	17.5	962.1					
	300	32	16	804.2					
	175	18	9	254.5					
	40	12	6	113.1					
Total			**59.5**	**2325.6**					
Pinus taeda	42	3	1.5	7.1	**0.2**	**65**	**73.9**	**2**	37.04638
	30	2	1	3.1					
	28	2	1	3.1					
	13	0.5	0.25	0.2					
	13	0.5	0.25	0.2					
	13	0.5	0.25	0.2					
	13	0.5	0.25	0.2					
	13	0.5	0.25	0.2					
	12	0.5	0.25	0.2					
	11	0.5	0.25	0.2					
	11	0.5	0.25	0.2					
	12	0.5	0.25	0.2					
	12	0.5	0.25	0.2					
	10	0.5	0.25	0.2					
	11	0.5	0.25	0.2					
	10	0.5	0.25	0.2					
	10	0.5	0.25	0.2					
	10	0.5	0.25	0.2					
	13	0.5	0.25	0.2					
	12	0.5	0.25	0.2					
	14	0.5	0.25	0.2					
	14	0.5	0.25	0.2					
	15	0.5	0.25	0.2					
	16	1	0.5	0.8					
	18	1	0.5	0.8					
	19	1	0.5	0.8					
	16	0.5	0.25	0.2					
	14	0.5	0.25	0.2					
	12	0.5	0.25	0.2					
	13	0.5	0.25	0.2					
	9	0.5	0.25	0.2					
	8	0.5	0.25	0.2					
	14	1	0.5	0.8					
	7	0.5	0.25	0.2					
	19	0.5	0.25	0.2					
	10	1	0.5	0.8					
	11	0.5	0.25	0.2					
	21	1.5	0.75	1.8					
	18	0.5	0.25	0.2					
	15	0.5	0.25	0.2					
	18	0.5	0.25	0.2					
	10	0.5	0.25	0.2					
	14	0.5	0.25	0.2					
	14	0.5	0.25	0.2					
	16	1	0.5	0.8					
	18	1	0.5	0.8					
	12	0.5	0.25	0.2					
	13	0.5	0.25	0.2					
	11	0.5	0.25	0.2					
	10	1	0.5	0.8					
	17	1	0.5	0.8					
	17	1	0.5	0.8					
	15	0.5	0.25	0.2					
	15	0.5	0.25	0.2					
	15	0.5	0.25	0.2					
	17	1	0.5	0.8					
	18	1	0.5	0.8					
	11	0.5	0.25	0.2					
	10	0.5	0.25	0.2					
	9	0.5	0.25	0.2					
	20	1.5	0.75	1.8					
	22	1.5	0.75	1.8					
	20	1.5	0.75	1.8					
	20	2	1	3.1					
	11	0.5	0.25	0.2					
Total			**24.75**	**7.3**					
Betula nigra	51	3	1.5	7.1	**0.9**	**3**	**3.4**	**7**	2.138013
	15	1	0.5	0.8					
	360	5	2.5	19.6					
Total		3	**4.5**	**27.5**					
Liquidambar styraciflua	25	3	1.5	7.1	**0.7**	**7**	**8.0**	**5**	4.348816
	15	1	0.5	0.8					
	19	2	1	3.1					

	19	2	1	3.1					
	19	2	1	3.1					
	19	2	1	3.1					
	19	2	1	3.1					
Total			**7**	**23.6**					
Liriodendron tulipifera	22	2	1	3.1	**0.1**	**1**	**1.1**	**9**	0.617721
Total		**2**	**1**	**3.1**					
Nyssa sp.	162	18	9	254.5	**8.0**	**1**	**1.1**	**4**	4.580853
Total			**9**	**254.5**					
Fraxinus sp.	210	20	10	314.2	**10.1**	**2**	**2.3**	**3**	6.201742
	45	3	1.5	7.1					
Total			**11.5**	**321.2**					
Salix nigra	450	6	3	28.3	**0.9**	**1**	**1.1**	**8**	1.014439
Total				**28.3**					
Acer negundo	20	2	1	3.1	**0.1**	**1**	**1.1**	**9**	0.617065
Total				**3.1**					
Paulownia tomentosa	100	15	7.5	176.7	**5.6**	**1**	**1.1**	**6**	3.354529
Total				**176.7**					
Overall Total				**3170.8**	**100.0**	**88.0**	**100.0**		

Total Trees per acre	3520
Planted trees per acre	320
Total Nat. Regen.Trees per acre	3200

Shrub Stratum

Species	**Cover (%)**	**Rel. cover (%)**	**Density**	**Rel. Density (%)**	**Rank (Importance)**
Alnus serrulata	0.5	50.0	2	0.2	2
Cornus amomum	0.5	50	11	0.8	1
Total			**13**		

Herb Stratum

Species	**Cover (%)**	**Rel. cover (%)**	**Rank (Importance)**
Digitaria sp.	70	57.9	1
Lonicera japonica	40	33.1	2
Rubus sp.	2	1.7	5
Agrostis sp.	4	3.3	3
Microstegium vimineum	3	2.5	4
Artemisia sp.	2		
Total	**121**	98.3	

VEGETATION 2003 Monitoring	Quad 1 - Hominy		Quad 2 - Hominy		Quad 3 - Hominy		Quad 4 - Hominy	
	Observed	Planted*	Observed	Planted*	Observed	Planted*	Observed	Planted*
Tree Stratum (stems/acre)	4080	520	5520	400	200	200	120	120
Shrub Stratum (% cover)	0.5	n/a	7	n/a	56	n/a	1	n/a
Herb Stratum (%cover)	147	n/a	78	n/a	24.5	n/a	87	n/a

VEGETATION 2004 Monitoring	Quad 1 - Hominy		Quad 2 - Hominy		Quad 3 - Hominy		Quad 4 - Hominy	
	Observed	Planted*	Observed	Planted*	Observed	Planted*	Observed	Planted*
Tree Stratum (stems/acre)	3520	320	4720	120	280	20	1600	120
Shrub Stratum (% cover)	1	n/a	57	n/a	65	n/a	38	n/a
Herb Stratum (%cover)	121	n/a	43	n/a	153	n/a	113	n/a

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Quad 2

Tree Stratum

Species	Height (cm)	Diameter (mm)	Radius (mm)	Σ X-sec. (mm²)	Rel. x-sec (%)	Density	Rel. Density (%)	Rank (Importance)	Average
Liquidambar styraciflu	34	3	1.5	7.1					
	27	3	1.5	7.1					
	25	3	1.5	7.1					
	25	3	1.5	7.1					
	25	3	1.5	7.1					
	37	4	2	12.6					
	20	2	1	3.1					
	20	2	1	3.1					
	21	2	1	3.1					
	21	2	1	3.1					
	20	2	1	3.1					
	16	2	1	3.1					
	25	3	1.5	7.1					
	29	3	1.5	7.1					
	22	2	1	3.1					
	19	2	1	3.1					
	16	1	0.5	0.8					
	15	1	0.5	0.8					
	17	1	0.5	0.8					
	17	1	0.5	0.8					
	17	1	0.5	0.8					
	13	1	0.5	0.8					
	12	0.5	0.25	0.2					
	11	0.5	0.25	0.2					
	12	0.5	0.25	0.2					
	10	0.5	0.25	0.2					
	29	3	1.5	7.1					
	29	3	1.5	7.1					
	29	3	1.5	7.1					
	30	3	1.5	7.1					
	25	2	1	3.1					
	25	2	1	3.1					
	25	2	1	3.1					
	25	2	1	3.1					
	25	2	1	3.1					
	25	2	1	3.1					
	25	2	1	3.1					
	22	1	0.5	0.8					
	24	2	1	3.1					
	24	2	1	3.1					
	24	2	1	3.1					
	15	1	0.5	0.8					
	15	1	0.5	0.8					
	28	3	1.5	7.1					
	33	3	1.5	7.1					
	25	2	1	3.1					
	30	3	1.5	7.1					
	34	3	1.5	7.1					
	10	0.5	0.25	0.2					
	36	7	3.5	38.5					
Total				**224.8**	**12.3**	**50**	**42.4**	**2**	27.31271
Ash spp.	170	35	17.5	962.1					
	44	5	2.5	19.6					
	100	16	8	201.1					
	15	2	1	3.1					
	26	3	1.5	7.1					
	30	3	1.5	7.1					
Total				**1200.1**	**65.4**	**6**	**5.1**	**1**	35.24435
Pinus sp.	33	2	1	3.1					
	25	1	0.5	0.8					
	25	1	0.5	0.8					
	25	1	0.5	0.8					
	25	1	0.5	0.8					
	25	1	0.5	0.8					
	25	1	0.5	0.8					
	40	3	1.5	7.1					
	42	3	1.5	7.1					
	40	3	1.5	7.1					
	42	3	1.5	7.1					
	41	3	1.5	7.1					
	15	1	0.5	31.4					
	40	3	1.5	7.1					
Total				**81.7**	**4.5**	**59.0**	**50.0**	**3**	27.22579
Liriodendron tulipifera	26	3	1.5	7.1					
	30	3	1.5	7.1					
Total				**14.1**	**0.8**	**2**	**1.7**	**5**	1.23269

Platanus occidentalis	310	20	10	314.2					
Total				**314.2**	**17.1**	**1**	**0.8**	**4**	8.984456
Overall Total				**1834.9**	**100.0**	**118.0**	**100.0**		100
Total Trees per acre						4720			
Planted trees per acre						120			
Total Nat. Regen.Trees per acre						4600			

Shrub Stratum

Species	**Cover (%)**	**Rel. cover (%)**	**Density**	**Rel. Density (%)**	**Rank (Importance)**
Cornus amomum	35	500.0	21	75.0	1
Rosa multiflora	1.5	21.4	5	17.9	3
Myrica cerifera	0.5	7.1	2	7.1	4
Salix nigra	20	285.7	19	67.9	2
	57	**814.3**	**47**	**167.9**	

Herb Stratum

Species	**Cover (%)**	**Rel. cover (%)**	**Rank (Importance)**
Impatiens capensis	0.5	1.2	4
Polygonum sp.	15	35.3	1
Carex spp.	10	23.5	2
Lonicera japonica	2	4.7	3
Juncus sp.	15	35.3	1
Total	**42.5**	100.0	

VEGETATION 2003 Monitoring	Quad 1 - Hominy		Quad 2 - Hominy		Quad 3 - Hominy		Quad 4 - Hominy	
	Observed	Planted*	Observed	Planted*	Observed	Planted*	Observed	Planted*
Tree Stratum (stems/acre)	4080	520	5520	400	200	200	120	120
Shrub Stratum (% cover)	0.5	n/a	7	n/a	56	n/a	1	n/a
Herb Stratum (%cover)	147	n/a	78	n/a	24.5	n/a	87	n/a

VEGETATION 2004 Monitoring	Quad 1 - Hominy		Quad 2 - Hominy		Quad 3 - Hominy		Quad 4 - Hominy	
	Observed	Planted*	Observed	Planted*	Observed	Planted*	Observed	Planted*
Tree Stratum (stems/acre)	3520	320	4720	120	280	20	1600	120
Shrub Stratum (% cover)	1	n/a	57	n/a	65	n/a	38	n/a
Herb Stratum (%cover)	121	n/a	43	n/a	153	n/a	113	n/a

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Quad 3

Tree Stratum

Species	Height (cm)	Diameter (mm)	Radius (mm)	Σ X-sec. (mm²)	Rel. x-sec (%)	Density	Rel. Density (%)	Rank (Importance)	Average
Quercus sp.	270	25	12.5	490.9	**97.4**	**3**	**42.9**	1	70.11196
	235	28	14	615.8					
	280	12	6	113.1					
Total				**1219.7**					
Liquidambar styraciflu	40	3	1.5	7.1	**2.6**	**4**	**57.1**	2	29.88804
	25	2	1	3.1					
	27	2	1	3.1					
	62	5	2.5	19.6					
Total				**33.0**					
Overall Total				**1252.7**	**100.0**	**7.0**	**100.0**		100
Total Trees per acre						280			
Planted trees per acre						120			
Total Nat. Regen.Trees per acre						160			

Shrub Stratum

Species	Cover (%)	Rel. cover (%)	Density	Rel. Density (%)	Rank (Importance)
Sambucus canadensi	40	71.4	19	50.0	1
Cornus amomum	15	26.8	10	26.3	2
Salix nigra	10	17.9	2	5.3	3
	65	**116.1**	**31**	**81.6**	

Herb Stratum

Species	Cover (%)	Rel. cover (%)	Rank (Importance)
Microstegium vimineu	3	2.0	3
Polygonum sp.	50	32.7	2
Diodia virginiana	100	65.4	1
Total	**153**	100.0	

VEGETATION 2003 Monitoring	Quad 1 - Hominy		Quad 2 - Hominy		Quad 3 - Hominy		Quad 4 - Hominy	
	Observed	Planted*	Observed	Planted*	Observed	Planted*	Observed	Planted*
Tree Stratum (stems/acre)	4080	520	5520	400	200	200	120	120
Shrub Stratum (% cover)	0.5	n/a	7	n/a	56	n/a	1	n/a
Herb Stratum (%cover)	147	n/a	78	n/a	24.5	n/a	87	n/a

VEGETATION 2004 Monitoring	Quad 1 - Hominy		Quad 2 - Hominy		Quad 3 - Hominy		Quad 4 - Hominy	
	Observed	Planted*	Observed	Planted*	Observed	Planted*	Observed	Planted*
Tree Stratum (stems/acre)	3520	320	4720	120	280	20	1600	120
Shrub Stratum (% cover)	1	n/a	57	n/a	65	n/a	38	n/a
Herb Stratum (%cover)	121	n/a	43	n/a	153	n/a	113	n/a

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Quad 1

Tree Stratum

Species	Height (cm)	Diameter (mm)	Radius (mm)	Σ X-sec. (mm²)	Rel. x-sec (%)	Density	Rel. Density (%)	Rank (Importance)	Average
Quercus phellos	145	25	12.5	490.9					
	130	22	11	380.1					
	15	2	1	3.1					
Total			**24.5**	**874.1**	**61.3**	**3**	**7.5**	**2**	34.39427
Pinus taeda	22	1	0.5	0.8					
	22	1	0.5	0.8					
	22	1	0.5	0.8					
	22	1	0.5	0.8					
	22	1	0.5	0.8					
	22	1	0.5	0.8					
	24	1	0.5	0.8					
	24	1	0.5	0.8					
	24	1	0.5	0.8					
	24	1	0.5	0.8					
	24	1	0.5	0.8					
	24	1	0.5	0.8					
	24	1	0.5	0.8					
	24	1	0.5	0.8					
	20	1	0.5	0.8					
	20	1	0.5	0.8					
	20	1	0.5	0.8					
	20	1	0.5	0.8					
	20	1	0.5	0.8					
	20	1	0.5	0.8					
	20	1	0.5	0.8					
	20	1	0.5	0.8					
	21	1	0.5	0.8					
	21	1	0.5	0.8					
	21	1	0.5	0.8					
	21	1	0.5	0.8					
	21	1	0.5	0.8					
	25	1	0.5	0.8					
	25	1	0.5	0.8					
	26	2	1	3.1					
	25	1	0.5	0.8					
	25	1	0.5	0.8					
Total			**16.5**	**1.6**	**0.1**	**32**	**80.0**	**1**	40.05507
Platanus occidentalis	130	17	8.5	227.0					
Total		17	**8.5**	**227.0**	**15.9**	**1**	**2.5**	**4**	9.207048
Liquidambar styraciflua	15	2	1	3.1					
	17	2	1	3.1					
	18	2	1	3.1					
Total			**3**	**9.4**	**0.7**	**3**	**7.5**	**5**	4.080396
Diospyros virginiana	157	20	10	314.2					
Total			**10**	**314.2**	**22.0**	**1**	**2.5**	**3**	12.26322
Overall Total				**1426.3**	**100.0**	**40.0**	**100.0**		

Total Trees per acre	1600
Planted trees per acre	120
Total Nat. Regen.Trees per acre	1480

Shrub Stratum

Species	Cover (%)	Rel. cover (%)	Density	Rel. Density (%)	Rank (Importance)
Cornus amomum	20	53.3	41	52.6	1
Salix nigra	15	40.0	18	23.1	2
Sambucus canadensis	2	5.3	8	10.3	4
Aronia arbutifolia	0.5	1.3	11	14.1	3
total	**37.5**	**100**	**78**	**100**	

Herb Stratum

Species	Cover (%)	Rel. cover (%)	Rank (Importance)
Digitaria sp.	70	61.9	1
Rubus sp.	2	1.8	3
Lonicera japonica	40	35.4	2
Sorghastrum nutans	1	0.9	3
Total	**113**	100.0	

VEGETATION 2003 Monitoring	Quad 1 - Hominy		Quad 2 - Hominy		Quad 3 - Hominy		Quad 4 - Hominy	
	Observed	Planted*	Observed	Planted*	Observed	Planted*	Observed	Planted*
Tree Stratum (stems/acre)	4080	520	5520	400	200	200	120	120
Shrub Stratum (% cover)	0.5	n/a	7	n/a	56	n/a	1	n/a
Herb Stratum (%cover)	147	n/a	78	n/a	24.5	n/a	87	n/a

VEGETATION 2004 Monitoring	Quad 1 - Hominy		Quad 2 - Hominy		Quad 3 - Hominy		Quad 4 - Hominy	
	Observed	Planted*	Observed	Planted*	Observed	Planted*	Observed	Planted*
Tree Stratum (stems/acre)	3520	320	4720	120	280	20	1600	120
Shrub Stratum (% cover)	1	n/a	57	n/a	65	n/a	38	n/a
Herb Stratum (%cover)	121	n/a	43	n/a	153	n/a	113	n/a