EAST PRONG ROARING RIVER STREAM RESTORATION,
Wilkes County, North Carolina

ANNUAL MONITORING REPORT

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NC STATE UNIVERSITY

nc stream restoration institute

For:
North Carolina Wetlands Restoration Program

NCWRP

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1.0 Introduction

1.1 Review

This report is intended for use by North Carolina Department of Environment and Natural Resources (NCDENR) Wetland Restoration Program (NCWRP) for post construction monitoring assessment on East Prong Roaring River, Stone Mountain State Park, Wilkes County, North Carolina. This report was prepared pursuant to NCWRP's request to North Carolina State University (NCSU), and will serve as the monitoring plan to fulfill mitigation monitoring requirements.

1.2 Purpose

Morphological field investigation and data analysis was conducted on October 9 and November 1, 2001 in order to establish a procedure for post construction monitoring on the East Prong Stream restoration site. A three-person team from NCSU performed the field reconnaissance. A geomorphic survey was completed. This monitoring plan includes assessment of stream bank stability as well as stream morphology. Field reconnaissance involved the establishment of permanent cross-sections at riffles and pools, longitudinal profiles, and modified Wolman pebble counts. Vegetation monitoring was performed on June 28 and August 14, 2001 by a two-person team. Vegetation plots were established for continued monitoring. Photo reference locations were also established for continued monitoring.

2.0 Methodologies

The following is a discussion of the methodologies used in field reconnaissance (Rosgen Level II) and summary report documentation. This document will facilitate continued monitoring efforts and enable annual replication of the field reconnaissance that was performed.

The geomorphology of the stream was classified using the Rosgen classification system, and assessed based on the results of the survey data. The morphology of the stream is to be monitored a minimum of once a year for 5 years after construction.

2.1 Morphology

Cross-section geometry, longitudinal profile, and modified Wolman Pebble Count data were gathered during field reconnaissance. Two distinctive areas (upstream to downstream) along the stream corridor denoted as Reach 2 and Reach 4 were surveyed and established for monitoring. The location of each of these reaches begins and ends along each of the two longitudinal profiles. These areas are shown on the Plan View Drawings. Stream geometry and substrate data for each reach is located in Appendices A and B.

Cross-Sections

Monitoring – Permanent cross sections were established along the stream corridor of the restoration site. Cross-sections were taken in the two reaches established along the stream corridor denoted as Reach 2 and Reach 4. A minimum of one riffle and one pool cross-section was surveyed for each of the two reaches established. The locations of

each cross-section were marked to establish the exact transect location along the longitudinal profile. The cross-section data was compiled and plotted for each reach (Appendices A-B).

Rebar was used to mark the established location of each cross-section. Each rebar is referenced by left and right bank pin of each cross-sections surveyed (i.e. Left pin and Right pin for cross section 1). Each endpin (left and right) was driven vertically flush to ground on each side of bank to establish the outer limits of each cross-section surveyed. Wooden stakes (wrapped with surveyors tape) were also placed adjacent to the rebar marker to aid in locating the cross-sections in the field. All cross-section locations are shown on the Plan View Drawings.

Procedure – The following steps should be executed to ensure successful replication of cross-section location and surveying parameters. Data will be collected once a year for five (5) years. Cross-sections should be plotted over that of previous year(s) for comparison.

Minimum Equipment Needed:
Tape (at least 100') for cross-sections
Tape (at least 300') for profile
Surveyor's Level (Optical or Laser)
Surveyor's Rod
Camera
Rebar
Plan View Drawing or Site Map
Monitoring Report
Surveyors Tape (pink or orange)

General Procedure:

- Locate CROSS-SECTION on Plan View Drawing and in field
- Locate end points on banks marked with rebar
- Pull tape (100' tape) from left bank to right bank looking downstream at cross-section location between the two rebar endpins. The end of the tape (0'0") should be directly over the left rebar
- Locate permanent/temporary bench mark
- Set up Level/surveying equipment in location to limit visual constraints
- Survey any permanent/temporary benchmarks (refer to Appendices A-B and Plan View Drawings)
- Survey from left to right bank
- Survey distinctive points (i.e. top of bank, edge of water, bankfull features, thalweg, etc.) and any breaks in slope.

Table 1: Summary of Cross-Section Locations

Cross section	Longitudinal Station	Pebble Count	Cross Section Type
RCH 2 XSEC 1	0+26	NO	RIFFLE
RCH 2 XSEC 2	4+32	NO	POOL
RCH 2 XSEC 3	4+61	YES	RIFFLE
RCH 2 XSEC 4	11+01	YES	RIFFLE
RCH 4 XSEC 1	8+56	YES	RIFFLE
RCH 4 XSEC 2	11+86	YES	POOL
RCH 4 XSEC 3	21+14	NO	POOL
RCH 4 XSEC 4	24+83	NO	RIFFLE
RCH 4 XSEC 5	29+26	NO	POOL
RCH 4 XSEC 6	32+13	NO	RIFFLE
RCH 4 XSEC 7	38+21	NO	POOL

All cross-section locations are shown on Plan View Drawings.

All elevations along Reaches 2 and 4 are may be tied to permanent benchmarks and real elevations. (Refer to Appendices A-B & Plan View Drawings). All other elevations for Reaches 2 and 4 are based on relative elevations (TBM). Survey elevations in an area can be based on any rebar pins (TBM) set in field. The relative elevation at each pin is located in Appendix A-B.

Measure all significant breaks of slope that occurs across the channel. Outside the channel, measure important features including the active floodplain, bankfull elevations, and stream terraces.

Longitudinal Profile

The longitudinal profile will measure points along the thalweg of the stream channel. The profile will indicate the elevations of water surface, channel bed, floodplain (bankfull), and terraces. The elevations and positions of channel defining indicators and in-stream structures can also be monitored with this profile.

Monitoring – Longitudinal profiles were taken along the stream corridor of the restoration site for Reaches 2 and 4. The profiles were taken in two distinctive areas (upstream to downstream) along stream corridor denoted as Reach 2 and 4 (refer to Plan View Drawings). This data was compiled and plotted for each Reach (Appendices A-B).

Procedure – Conduct the longitudinal profile survey when conducting the cross-section surveys. Run tape beginning at the established STA 0 point and continue downstream to the established length of stream. Survey points at each station should include a thalweg, water surface, bankfull, and if appropriate, top of low bank. The start and end points of each longitudinal profile is shown on the Plan View Drawings. Each profile runs from up to downstream the entire length of the restored channel. Data will be collected once a year for five (5) years. Longitudinal profiles should be plotted over that of previous year(s) for comparison.

Modified Wolman Pebble Count

The composition of the streambed and banks is a good indicator of changes in stream character, channel form, hydraulics, erosion rates, and sediment supply. A pebble count gives a quantitative description of the bed material.

Monitoring – Pebble counts were performed at permanent cross sections within Reaches 2 and 4. Each pebble count consisted of 100 counts from left bankfull to right bankfull. This data was compiled and plotted for each area (Appendices A-B).

Procedure – Follow the basic steps for the Modified Wolman Pebble Count (Rosgen, Applied River Morphology). Perform count at each of the two reaches along the stream channel. Measure a minimum of 100 particles at a permanent cross section to obtain a valid count. Use a tally sheet to record the count. Data will be collected once a year for five (5) years. Pebble counts should be plotted over previous year(s) for comparison.

Success Criteria

Judgments on success or failure of restoration activities using this data will be subjective. It is expected that there will be some minimal changes in the cross sections, profile and/or substrate composition. Changes that may occur during the monitoring period will be evaluated to determine if they represent a movement toward a more unstable condition or are minor changes that represent an increase in stability.

2.2 Reference Photographs

Monitoring – Locations of the photograph points were established at distinguishing points along stream, including in-stream structures.

The order of photos taken are referenced by sheet number in the Photo Index found in Appendix D and in general are taken from upstream to downstream points along the stream corridor. Each photo point was established and either marked in field with a wooden stake or referenced by cross-section or stream feature/structure (i.e. rock vane). All photo points are located on the Plan View Drawings. Refer to Photo Index and Plan View Drawings for location of photo points.

Procedure – Photographs should be taken standing at the approximate location of established photo point, cross section location, and/or referenced stream feature/structure. Photographs will be taken throughout the monitoring period. Photos should be compared to previous year(s) photos to evaluate vegetative growth along the stream corridor of the restoration site and channel stability. All follow up monitoring photos should be taken at approximately the same location as in the initial photo point locations as established in this report. This aspect of monitoring will last for five (5) years.

Success Criteria – Photographs will be used to subjectively evaluate channel aggradation or degradation, bank erosion, success of riparian vegetation and effectiveness of in-stream structures and erosion control measures. Longitudinal photos should indicate the absence of developing bars within the channel or an excessive increase in channel depth or width. Photos should not indicate excessive bank erosion or continuing degradation of the bank over time. A series of photos over time should indicate successional maturation of riparian vegetation.

2.3 Vegetation

Monitoring – Survival of vegetation will be evaluated using survival plots and/or direct counts. Survival of bare root seedlings and live stakes will be evaluated along the stream corridor of the restoration site. The vegetation will be monitored for five (5) years before success or failure is determined.

Procedure – Vegetation survival inside the riparian buffer will be documented for a 5-year period through stem counts and photographic documentation of the entire length of the corridor in which buffers were planted. Documentation will occur at pre-established stations/plot areas. Vegetation survival of planted species will be confirmed. Determination of survival rates after initial survey should show 80 percent survival. If not, supplemental planting should be performed in winter following first year.

Plot Locations
Plots will be located adjacent to the stream and surveyed and for future replication. Plots will be located in areas large enough to obtain a representative sample of the planted population. Ideally, a sample size of 10 percent of the planted area should be surveyed. In some cases, plots will be located in areas such as outside meander bends or atop bankfull benches into the riparian buffer.

Plot Size
Two different types of plots need to be established to determine survivorship of stakes and bare root seedlings. Sizes and numbers of plots will depend on site conditions, particularly buffer width and project size. Ideally, rectangular plots up to 100 meters square will be used in determining survivability for bare root trees. These should be linear and parallel the stream channel. Stakes should be counted from beginning to end of outside meander bends if this is the sole location of stakes. If stakes are planted along runs, riffles, or glides, rectangular plots should again be used as with the bare root trees. Plot size will depend on site conditions and project size. Herbaceous cover can be incorporated into one of the two plots. Plot size for herbaceous cover should be no more than one meter square in size. Plot size will depend on site conditions and project size.

Timing
Vegetation sampling should be completed during the growing season. Ideally, this would be mid-summer in June or July. Sampling should be complete before the end of the growing season from August 1 to October 31.

Data Recorded
Numbers of live woody stems per plot by species for both stakes and bare roots will be recorded. Estimate of coverage of herbaceous vegetation along with dominant species will be recorded.

3.0 Summary

3.1 Morphology

Cross Sections
Field data was collected in 2000 and 2001 on the permanent cross sections throughout Reaches 2 and 4. Overlaying these sections, as shown in Appendices A and B, shows any changes that have taken place in the channel with regards to width/depth ratio, area, and entrenchment ratio. This is useful information over time to determine the stability of the channel. Most of the cross sections surveyed show little to no change from 2000 to 2001. The changes that did occur include deepening of pools (increased habitat), and a slight narrowing of the channel in some areas. These results indicate stability within the channel.

Longitudinal Profile
Longitudinal profiles conducted in 2000 and 2001 were surveyed and plotted together to show any changes in the bed form over the last year. Inverts of cross vanes were used as control points so that the annual surveys would be accurately compared. The results of the profiles revealed some deepening of the pools, little to no change in riffles, and proper functioning of the grade control structures.

Pebble Counts
The pebble count data collected in 2000 and 2001 was very revealing as to the degree of the coarsening of the channel substrate. There has not been a bankfull event since construction (to date) and yet, the bed material has coarsened up significantly, which indicated increased habitat and removal of fine material that was present immediately after construction.

3.2 Photo Points
The photo points taken along the channel in Reaches 2 and 4 show the vegetation that has come up and survived (such as transplants). Also, the channel appears stable with no development of unstable depositional features or erosion of the banks.

3.3 Vegetation
Bare root survival was above 80% in all plots, however, stem count was low in plots 3 and 4. Therefore, more stems will be planted in Winter 2002 to meet target number for mitigation.

Live stake survival was extremely low. This may be attributed to droughty conditions during growing season. More stakes will be installed in Winter 2002 to meet target number for mitigation.

Herbaceous cover was determined in bare root plots and was greater than 90% in all plots. No more seeding is required.

Deer browse continues to be a problem at this project site. Although deer repellant was applied to bare root stems and live stakes during the growing season, browse continued. It should be noted that natural regeneration was abundant throughout the project site and that browse was not a problem during the initial growing season for plant species that invaded the site naturally. Deer repellant will be applied again for the 2002 growing season, although more vigorously than during the first season. If browse continues, new strategies for dealing with this issue will have to be considered.

Kudzu was again treated during the first growing season post-construction. Only root sprouts were found scattered throughout Reach 4. All large growing vines had been eradicated during the initial treatment. Kudzu will be monitored and treated during successive growing seasons.

3.4 Future Work

Geomorphic, vegetative, and photographic monitoring will be performed on the constructed stream segment for five (5) years post construction to determine success.

All follow up monitoring photos should be compared to the previous year(s) documented photo points to assess any changes that may have occurred during the year. Cross-section geometry, longitudinal profile, and modified Wolman Pebble Count data gathered during field reconnaissance in all annual monitoring efforts should be compiled and plotted over the previous year(s) data. A comparison of data sets should be done and assessed for any indications of change toward a more unstable/stable condition. Vegetative monitoring results will be analyzed to determine if any replanting is necessary or if the target species are meeting survivability requirements.

Results of annual monitoring data will be provided to the Wetlands Restoration Program (WRP) and any agencies WRP deems necessary.

APPENDIX A

REACH 2:
STREAM GEOMETRY AND SUBSTRATE DATA

Longitudinal Profile - 2000 survey | **STONE MTN RESTORATION - REACH 2** | **03/19/2002**

Yadkin River Basin, Wilkes County, North Carolina

Dani Wise

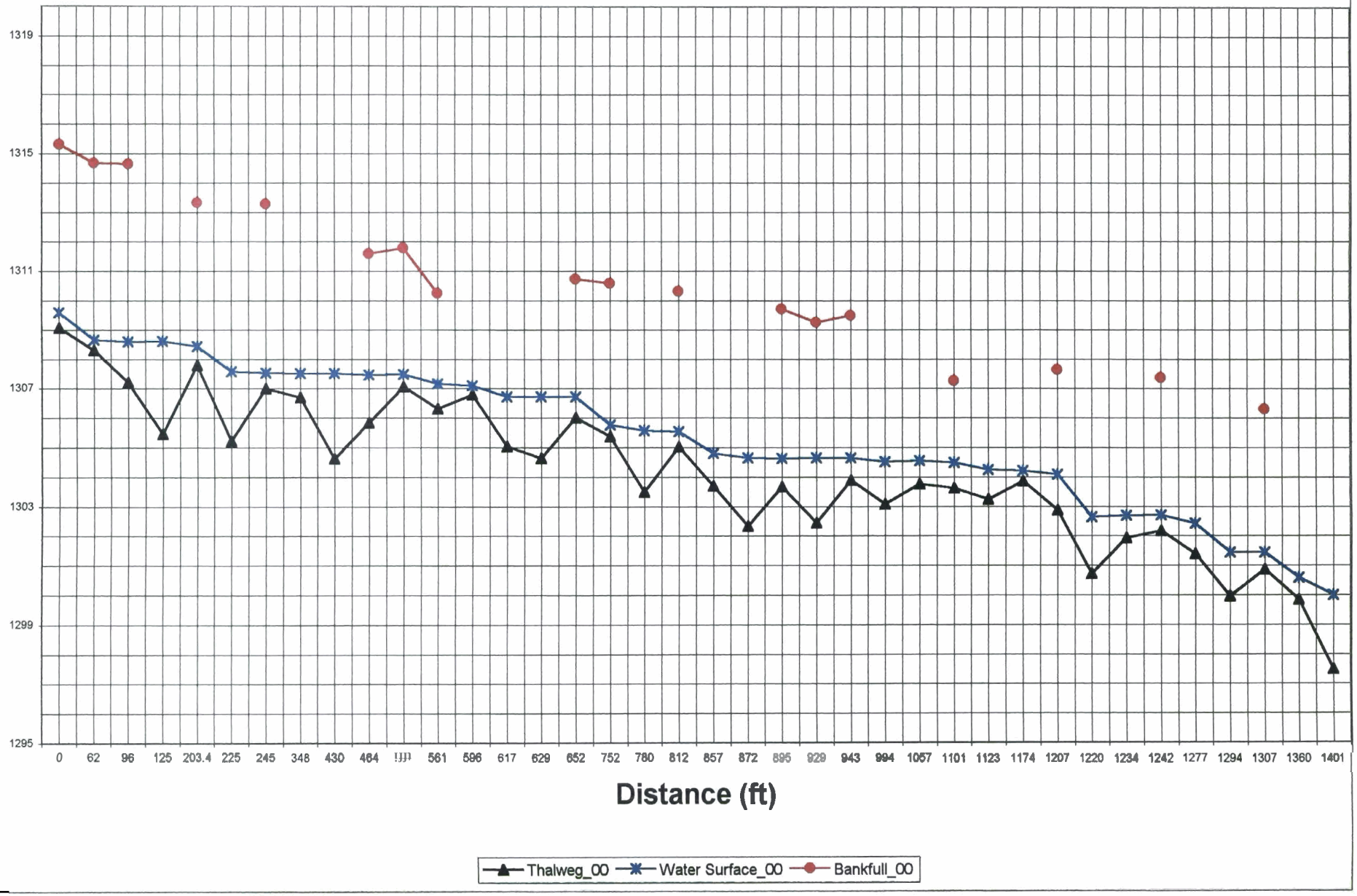
			STA (ft)	ELEV (ft)
		Head First Riffle	0	1309.59
		Head Last Riffle	1307	1301.44
Chan Slope (ft/ft)	0.0062	Valley Length (ft)	943	
Valley Slope (ft/ft)	0.0086	Channel Length (ft)	1307	
Sinuosity, K	1.39	Elev Change (ft)	8.15	

Turning Points

	BM	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TP13	TP14
FS		3.19													
BS	3.20	0.02													
ELEV	100.00	100.01	100.03	100.03	100.03	100.03	100.03	100.03	100.03	100.03	100.03	100.03	100.03	100.03	100.03
HI	**103.20**	**100.03**	**100.03**	**100.03**	**100.03**	**100.03**	**100.03**	**100.03**	**100.03**	**100.03**	**100.03**	**100.03**	**100.03**	**100.03**	**100.03**

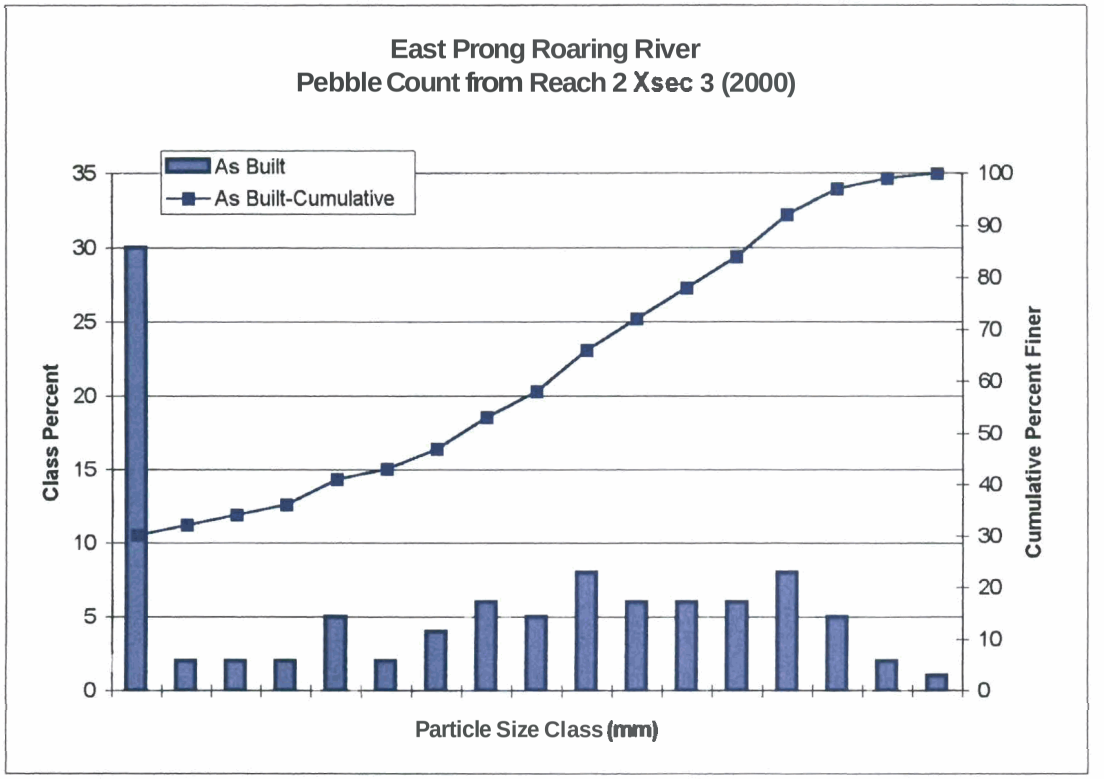
TP	NOTE	STA	HI	FS TW	FS WS	FS IB	FS BKF	FS LTOB	FS RTOB	ELEV TW	ELEV WS	ELEV IB	ELEV BKF	ELEV LTOB	ELEV RTOB
		0	1319.76	10.7	10.17		4.45			1309.06	1309.59		1315.31		
		62	1319.76	11.46	11.11		5.1			1308.3	1308.65		1314.66		
		96	1319.76	12.56	11.18		5.13			1307.2	1308.58		1314.63		
		125	1319.76	14.32	11.16					1305.44	1308.6				
		203.4	1319.76	11.98	11.34		6.45			1307.78	1308.42		1313.31		
		225	1319.76	14.55	12.19					1305.21	1307.57				
		245	1319.76	12.77	12.24		6.5			1306.99	1307.52		1313.26		
		348	1315.05	8.36	7.55		3.94			1306.69	1307.5				
		430	1315.05	10.44	7.55					1304.61	1307.5				
		464	1315.05	9.22	7.59		3.47			1305.83	1307.46		1311.58		
		531	1315.05	8	7.58		3.28			1307.05	1307.47		1311.77		
		561	1315.05	8.74	7.9		4.81			1306.31	1307.15		1310.24		
		596	1315.05	8.26	7.96					1306.79	1307.09				
		617	1315.05	10.02	8.34					1305.03	1306.71				
		629	1315.05	10.42	8.35					1304.63	1306.7				
		652	1315.05	9.05	8.35		4.34			1306	1306.7		1310.71		
		752	1314.02	8.65	8.27		3.44			1305.37	1305.75		1310.58		
		780	1314.02	10.53	8.47					1303.49	1305.55				
		812	1314.02	9	8.5		3.72			1305.02	1305.52		1310.3		
		857	1314.02	10.32	9.22					1303.7	1304.8				
		872	1314.02	11.7	9.39					1302.32	1304.63				
		895	1314.02	10.36	9.4		4.33			1303.66	1304.62		1309.69		
		929	1314.02	11.59	9.38		4.79			1302.43	1304.64		1309.23		
		943	1314.02	10.13	9.38		4.55			1303.89	1304.64		1309.47		
		994	1314.02	10.94	9.52					1303.08	1304.5				
		1057	1314.02	10.26	9.48					1303.76	1304.54				
		1101	1313.19	9.57	8.72		5.94			1303.62	1304.47		1307.25		
		1123	1313.19	9.96	8.95		5.83			1303.23	1304.24				
		1174	1313.19	9.34	8.99					1303.85	1304.2				
		1207	1313.19	10.32	9.12		5.56			1302.87	1304.07		1307.63		
		1220	1313.19	12.48	10.56					1300.71	1302.63				
		1234	1313.19	11.26	10.52		6.21			1301.93	1302.67				
		1242	1313.19	11.03	10.5		5.84			1302.16	1302.69		1307.35		
		1277	1313.19	11.81	10.78					1301.38	1302.41				
		1294	1313.19	13.23	11.75					1299.96	1301.44				
		1307	1313.19	12.33	11.75		6.9			1300.86	1301.44		1306.29		
		1360	1313.19	13.35	12.61					1299.84	1300.58				
		1401	1313.19	15.7	13.2					1297.49	1299.99				

Longitudinal Profile - 2000 survey



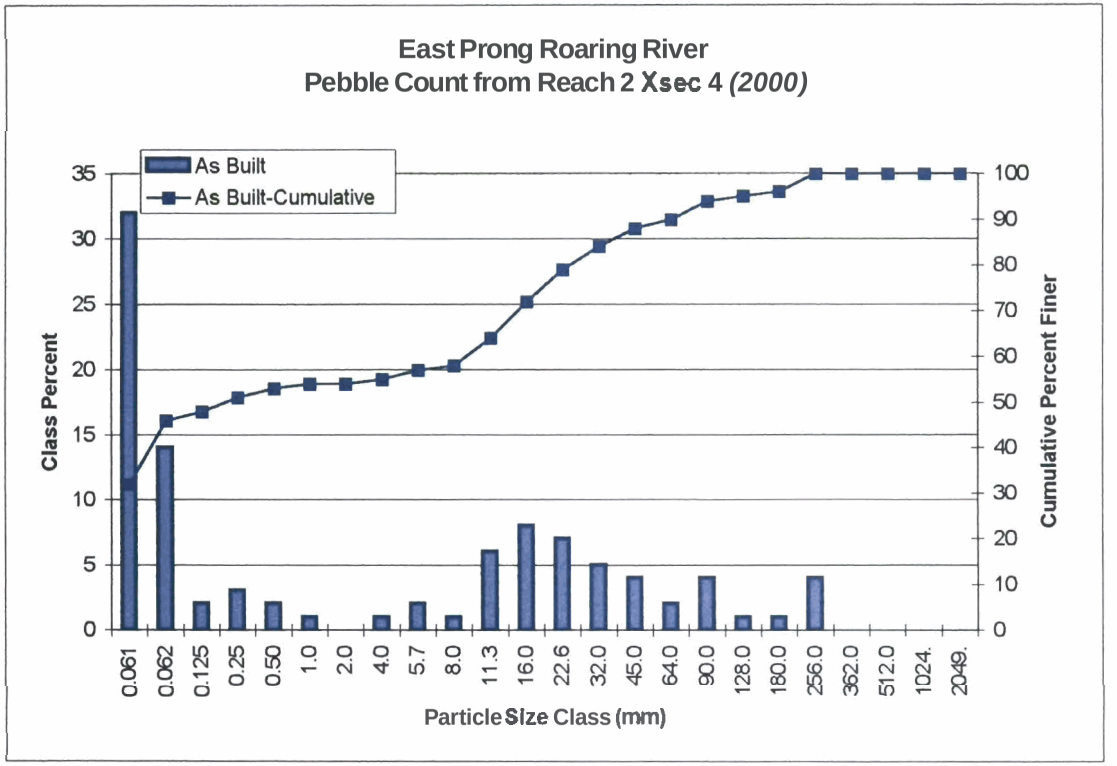
Reach 2 Perm X Sec 3	Approx. STA # 4+61	Survey Date 2000	
Particle Size (mm)	**Particle Size**	**Total**	**%Cumulative**
0.061	**Silt/Clay**	30	30
0.062	**Sand**	2	32
0.125		2	34
0.25		2	36
0.50		5	41
1.0	**G r a v e l**	2	43
2.0		4	47
4.0		6	53
5.7		5	58
8.0		8	66
11.3		6	72
16.0		6	78
22.6		6	84
32.0		8	92
45.0		5	97
64.0	**Cobble**	2	99
90.0		1	100
128.0			
180.0			
256.0	**Boulder**		
362.0			
512.0			
1024.0			
2049.0	**Bedrock**		

Particle Sizes (mm):	
D16	0.061
D35	0.2
D50	4
D84	28
D95	40



Reach 2 Perm X SEC 4	Approx. STA # 11+01	Survey Date 2000	
Particle Size (mm)	**Particle Size**	**Total**	**%Cumulative**
0.061	**Silt/Clay**	32	32
0.062	**Sand**	14	46
0.125		2	48
0.25		3	51
0.50		2	53
1.0	**G r a v e l**	1	54
2.0		0	54
4.0		1	55
5.7		2	57
8.0		1	58
11.3		6	64
16.0		8	72
22.6		7	79
32.0		5	84
45.0		4	88
64.0	**Cobble**	2	90
90.0		4	94
128.0		1	95
180.0		1	96
256.0	**Boulder**	4	100
362.0		0	100
512.0		0	100
1024.0		0	100
2049.0	**Bedrock**	0	100

Particle Sizes (mm):	
D16	0.061
D35	0.1
D50	0.4
D84	40
D95	120



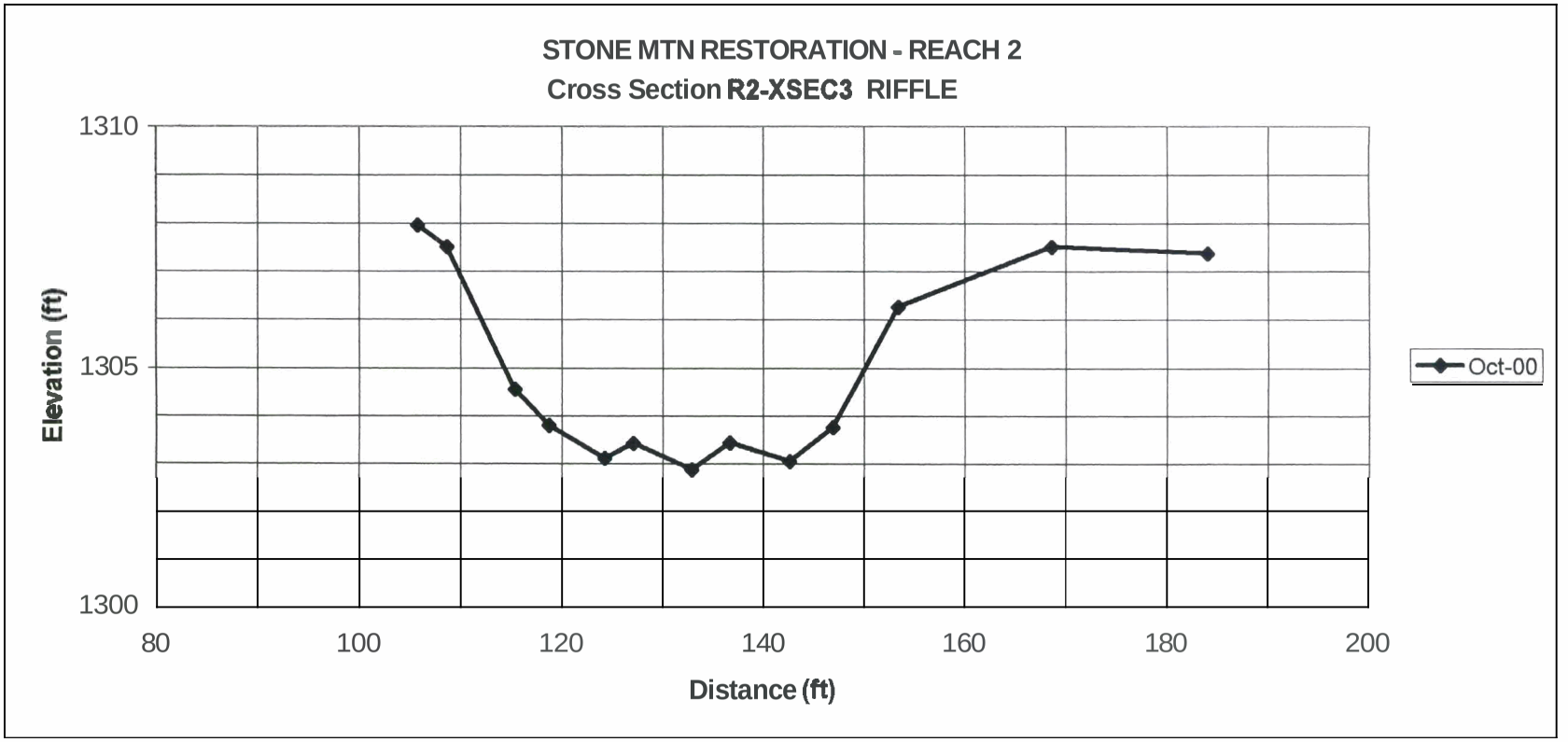
Cross Section R2-XSEC3 RIFFLE

STONE MTN RESTORATION - REACH 2
Yadkin River Basin, Wilkes County, North Carolina
Dani Wise

Oct-00

	Survey Data				Bkf Hydraulic Geometry		
NOTES	STA	HI	FS	ELEV	Depth	Width	Area
	105.7	1312.62	4.66	1307.96	0.00	0.00	0.00
LBKF	108.6	1312.62	5.1	1307.52	0.00	0.0	0.00
	115.3	1312.62	8.06	1304.56	2.96	6.7	9.92
	118.7	1312.62	8.83	1303.79	3.73	3.4	11.37
	124.2	1312.62	9.51	1303.11	4.41	5.5	22.39
	127	1312.62	9.2	1303.42	4.10	2.8	11.91
	132.8	1312.62	9.75	1302.87	4.65	5.8	25.38
	136.6	1312.62	9.19	1303.43	4.09	3.8	16.61
	142.6	1312.62	9.57	1303.05	4.47	6.0	25.68
	146.9	1312.62	8.86	1303.76	3.76	4.3	17.69
	153.4	1312.62	6.35	1306.27	1.25	6.5	16.28
RBKF	168.6	1312.62	5.1	1307.52	0.00	15.2	9.50
	184	1312.62	5.24	1307.38			

R2-XSEC3	Feature	Type	Wfpa	LBKF	RBKF	ELEVbkf	Wbkf	Dbkf	W/D	Abkf	Dmax	ER
Oct-00	RIFFLE	C4	300	108.6	168.6	1307.52	60.0	2.8	21.6	166.7	4.7	5.0



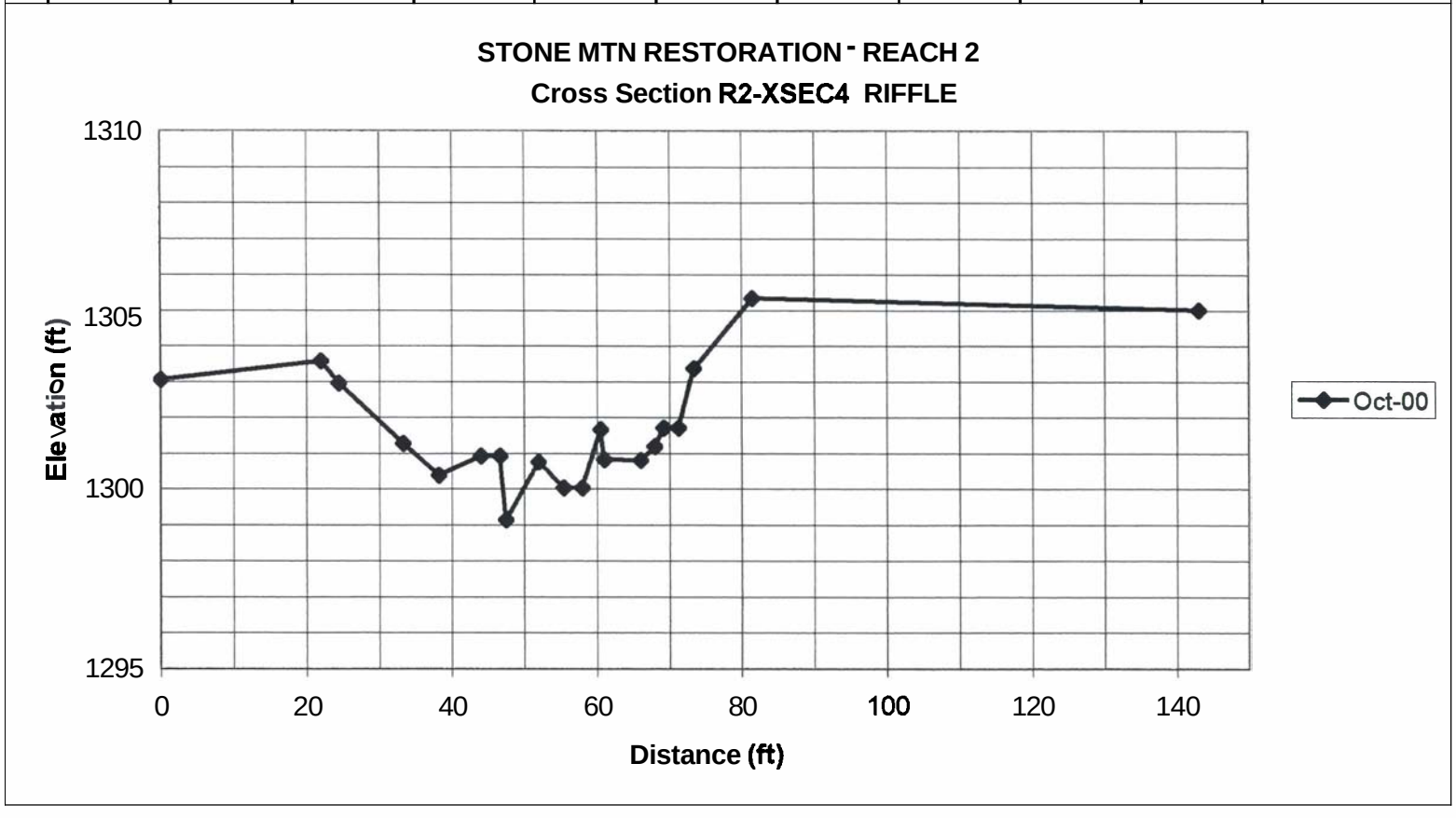
Cross Section R2-XSEC4 RIFFLE

STONE MTN RESTORATION - REACH 2
Yadkin River Basin, Wilkes County, North Carolina
Dani Wise

Oct-00

	Survey Data				Bkf Hydraulic Geometry		
NOTES	STA	HI	FS	ELEV	Depth	Width	Area
	0	1310.39	7.34	1303.05	0.00	0.0	0.00
LBKF	22	1310.39	6.82	1303.57	0.00	22.0	0.00
	24.4	1310.39	7.44	1302.95	0.62	2.4	0.74
	33.3	1310.39	9.12	1301.27	2.30	8.9	12.99
	38.2	1310.39	10.02	1300.37	3.20	4.9	13.48
	44	1310.39	9.47	1300.92	2.65	5.8	16.97
	46.7	1310.39	9.47	1300.92	2.65	2.7	7.16
	47.5	1310.39	11.26	1299.13	4.44	0.8	2.84
	52	1310.39	9.64	1300.75	2.82	4.5	16.34
	55.4	1310.39	10.37	1300.02	3.55	3.4	10.83
	58	1310.39	10.37	1300.02	3.55	2.6	9.23
	60.5	1310.39	8.73	1301.66	1.91	2.5	6.83
	61	1310.39	9.58	1300.81	2.76	0.5	1.17
	66	1310.39	9.6	1300.79	2.78	5.0	13.85
	68	1310.39	9.21	1301.18	2.39	2.0	5.17
	69.2	1310.39	8.69	1301.70	1.87	1.2	2.56
	71.3	1310.39	8.69	1301.70	1.87	2.1	3.93
RBKF	73.4	1310.39	7.02	1303.37	0.20	2.1	2.17
	81.4	1310.39	5.06	1305.33	0.00	0.0	0.00
	143	1310.39	5.4	1304.99	0.00	0.0	0.00

R2-XSEC4	Feature	Type	Wfpa	LBKF	RBKF	ELEVbkf	Wbkf	Dbkf	WID	Abkf	Dmax	ER
Oct-00	RIFFLE	C4	200	22.0	73.4	1303.57	51.4	2.5	20.9	126.2	4.4	3.9



Longitudinal Profile - 2001 Survey

STONE MTN RESTORATION - REACH 2
Yadkin River Basin, Wilkes County, North Carolina
Dani Wise

			STA (ft)	ELEV (ft)
		Head First Riffle	0	1309.59
		Head Last Riffle	1307	1301.44
Chan Slope (ft/ft)	0.0062	Valley Length (ft)	943	
Valley Slope (ft/ft)	0.0086	Channel Length ('	1307	
Sinuosity, K	1.39	Elev Change (ft)	8.15	

2001 Survey Data

TP	NOTE	STA	HI	FS TW	FS WS	FS BKF	FS LTOB	FS RTOB	ELEV TW	ELEV WS	ELEV BKF	ELEV LTOB	ELEV RTOB
		0	1319.21	9.89	9.45	4.15	4.15	3.65	1309.3	1309.8	1315.1	1315.1	1315.56
		38	1319.21	10.9	10.25	4.48	4.48	4.04	1308.3	1309	1314.7	1314.7	1315.17
		65	1319.21	11.2	10.58	4.62	4.62	4.24	1308	1308.6	1314.6	1314.6	1314.97
		77	1318.2	10.91	9.53	4.15	4.15		1307.3	1308.7	1314.1	1314.1	1318.2
		115	1318.2	13.21	9.58				1305	1308.6		1318.2	1318.2
		154	1318.2	10.15	9.6	5.54	4.61	5.54	1308.1	1308.6	1312.7	1313.6	1312.66
	CV	203	1318.2	10.23	9.73				1308	1308.5		1318.2	1318.2
		228	1318.2	12.91	10.17	4.73	4.73	4.66	1305.3	1308	1313.5	1313.5	1313.54
		240	1318.2	12	10.13	5.44	4.75	5.44	1306.2	1308.1	1312.8	1313.5	1312.76
		295	1318.2	11.92	10.24	6.49	5.44	6.49	1306.3	1308	1311.7	1312.8	1311.71
		334	1316.31	9.48	8.38	4.86	3.38	4.86	1306.8	1307.9	1311.5	1312.9	1311.45
		364	1316.31	10.65	8.41	5.3	4.37	5.3	1305.7	1307.9	1311	1311.9	1311.01
		448	1316.31	10.18	8.43	6	4.52	6	1306.1	1307.9	1310.3	1311.8	1310.31
		530	1316.31	9.02	8.43	5.27	4.25	5.27	1307.3	1307.9	1311	1312.1	1311.04
		596	1316.31	9.47	8.98	5.34	4.64	5.34	1306.8	1307.3	1311	1311.7	1310.97
		612	1316.31	12.57	9.2	5.05	5.05	5.03	1303.7	1307.1	1311.3	1311.3	1311.28
		633	1316.31	11.4	9.15	5.4	5.4	5.02	1304.9	1307.2	1310.9	1310.9	1311.29
		652	1316.31	10.09	9.26	5.38	5.27	5.38	1306.2	1307.1	1310.9	1311	1310.93
		760	1315.35	10.32	9.3	5.83	4.96	5.83	1305	1306.1	1309.5	1310.4	1309.52
		766	1315.35	11.14	9.37	5.62	5.23	5.62	1304.2	1306	1309.7	1310.1	1309.73
		803	1315.35	10.43	9.41	4.9	4.9	4.73	1304.9	1305.9	1310.5	1310.5	1310.62
		857	1315.35	12.06	10.07	6.88	6.88	5.17	1303.3	1305.3	1308.5	1308.5	1310.18
		885	1315.35	11.15	10.16	6.55	6.55	5.46	1304.2	1305.2	1308.8	1308.8	1309.89
		930	1315.35	11.86	10.19	6.71	6.71	5.94	1303.5	1305.2	1308.6	1308.6	1309.41
		974	1314.08	9.99	9.05	5.93	5.53	5.93	1304.1	1305	1308.2	1308.6	1308.15
		1006	1314.08	9.74	9.03	6.07	6.07	6.02	1304.3	1305.1	1308	1308	1308.06
		1057	1314.08	10.01	9.07	7.14	7.14	4.9	1304.1	1305	1306.9	1306.9	1309.18
		1073	1314.08	9.98	9.15	6.65	6.65	5.1	1304.1	1304.9	1307.4	1307.4	1308.98
		1123	1314.08	10.64	9.45	6.57	6.57	4.95	1303.4	1304.6	1307.5	1307.5	1309.13
		1143	1314.08	10.54	9.52	6.6	6.6	5.01	1303.5	1304.6	1307.5	1307.5	1309.07
		1207	1314.08	11.31	9.64	6.28	6.26	6.28	1302.8	1304.4	1307.8	1307.8	1307.8
		1214	1314.08	12.15	10.94	6.5	6.2	6.52	1301.9	1303.1	1307.6	1307.9	1307.56
		1241	1314.08	12.25	11.3	6.65	6.65		1301.8	1302.8	1307.4	1307.4	1314.08
		1277	1312.14	10.76	9.54	5	5	4.91	1301.4	1302.6	1307.1	1307.1	1307.23
		1307	1312.14	11.28	10.18	5.73	5.01	5.73	1300.9	1302	1306.4	1307.1	1306.41
		1360	1312.14	12.49	10.5	5.88	5.88	5.51	1299.7	1301.6	1306.3	1306.3	1306.63
		1401	1312.14	12.7	11.69	5.96	5.96	5.65	1299.4	1300.5	1306.2	1306.2	1306.49
		1411	1312.14	13.21	11.72	9.14		9.14	1298.9	1300.4	1303	1312.1	1303

Longitudinal Profile - 2001 Survey

STONE MTN RESTORATION - REACH 2

Yadkin River Basin, Wilkes County, North Carolina

Dani Wise

03/19/2002

	STA (ft)	ELEV (ft)
Head First Riffle	0	1309.59
Head Last Riffle	1307	1301.44
Valley Length (ft)	943	
Channel Length (f	1307	
Elev Change (ft)	8.15	

Chan Slope (ft/ft)	0.0062
Valley Slope (ft/ft)	0.0086
Sinuosity,K	1.39

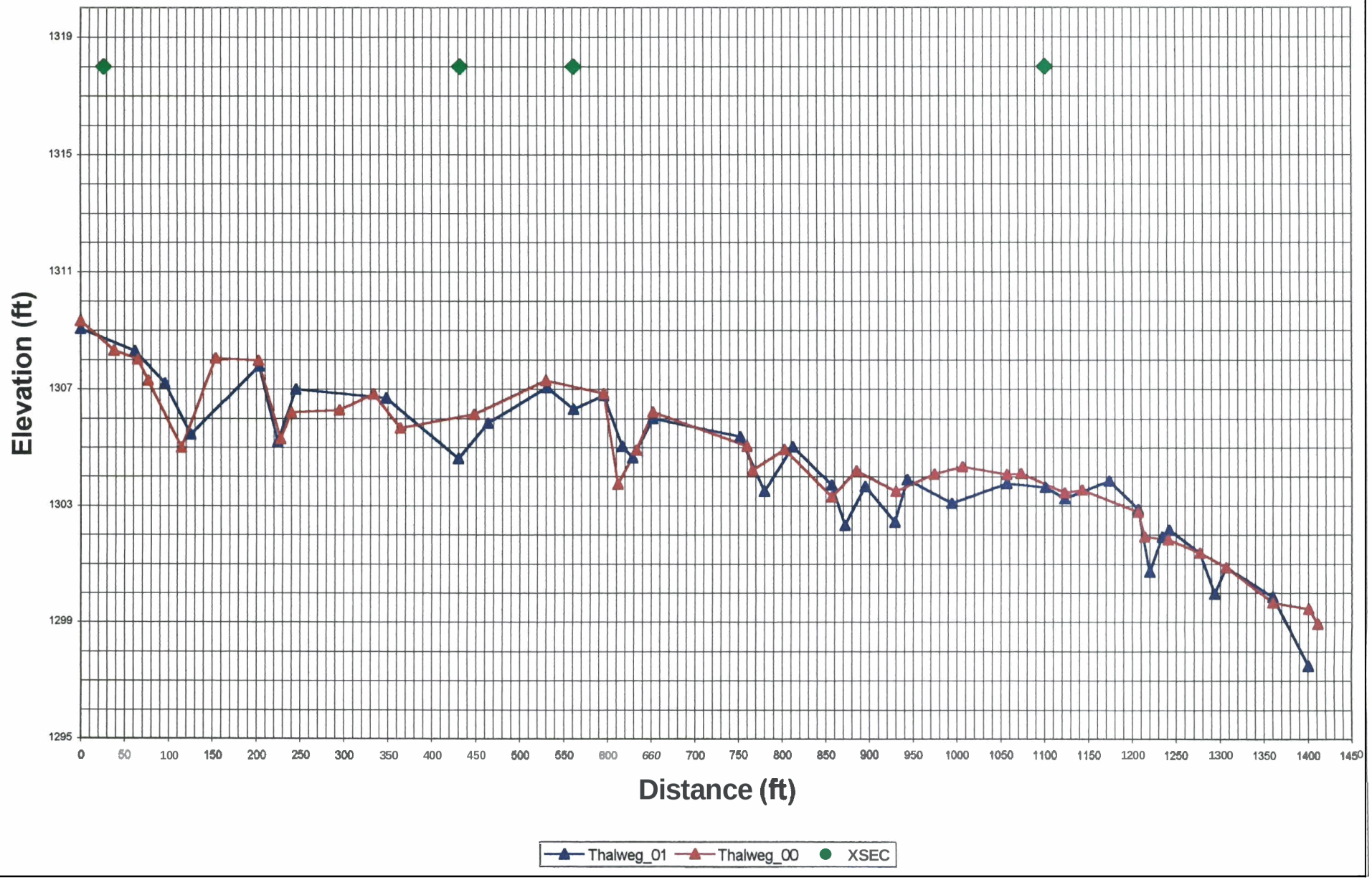
Turning Points

	BM	TP1
FS		3.19
BS	3.20	0.02
ELEV	100.00	100.01
HI	103.20	100.03

2000 Survey Data

TP	NOTE	STA	HI	FS TW	FS WS	FS IB	FS BKF	FS LTOB	FS RTOB	ELEV TW	ELEV WS	ELEV IB	ELEV BKF	ELEV LTOB	ELEV RTOB
		0	1319.76	10.7	10.17		4.45			1309.1	1309.6		1315.31		
		62	1319.76	11.46	11.11		5.1			1308.3	1308.7		1314.66		
		96	1319.76	12.56	11.18		5.13			1307.2	1308.6		1314.63		
		125	1319.76	14.32	11.16					1305.4	1308.6				
		203.4	1319.76	11.98	11.34		6.45			1307.8	1308.4		1313.31		
		225	1319.76	14.55	12.19					1305.2	1307.6				
		245	1319.76	12.77	12.24		6.5			1307	1307.5		1313.26		
		348	1315.05	8.36	7.55		3.94			1306.7	1307.5				
		430	1315.05	10.44	7.55					1304.6	1307.5				
		464	1315.05	9.22	7.59		3.47			1305.8	1307.5		1311.58		
		531	1315.05	8	7.58		3.28			1307.1	1307.5		1311.77		
		561	1315.05	8.74	7.9		4.81			1306.3	1307.2		1310.24		
		596	1315.05	8.26	7.96					1306.8	1307.1				
		617	1315.05	10.02	8.34					1305	1306.7				
		629	1315.05	10.42	8.35					1304.6	1306.7				
		652	1315.05	9.05	8.35		4.34			1306	1306.7		1310.71		
		752	1314.02	8.65	8.27		3.44			1305.4	1305.8		1310.58		
		780	1314.02	10.53	8.47					1303.5	1305.6				
		812	1314.02	9	8.5		3.72			1305	1305.5		1310.3		
		857	1314.02	10.32	9.22					1303.7	1304.8				
		872	1314.02	11.7	9.39					1302.3	1304.6				
		895	1314.02	10.36	9.4		4.33			1303.7	1304.6		1309.69		
		929	1314.02	11.59	9.38		4.79			1302.4	1304.6		1309.23		
		943	1314.02	10.13	9.38		4.55			1303.9	1304.6		1309.47		
		994	1314.02	10.94	9.52					1303.1	1304.5				
		1057	1314.02	10.26	9.48					1303.8	1304.5				
		1101	1313.19	9.57	8.72		5.94			1303.6	1304.5		1307.25		
		1123	1313.19	9.96	8.95		5.83			1303.2	1304.2				
		1174	1313.19	9.34	8.99					1303.9	1304.2				
		1207	1313.19	10.32	9.12		5.56			1302.9	1304.1		1307.63		
		1220	1313.19	12.48	10.56					1300.7	1302.6				
		1234	1313.19	11.26	10.52		6.21			1301.9	1302.7				
		1242	1313.19	11.03	10.5		5.84			1302.2	1302.7		1307.35		
		1277	1313.19	11.81	10.78					1301.4	1302.4				
		1294	1313.19	13.23	11.75					1300	1301.4				
		1307	1313.19	12.33	11.75		6.9			1300.9	1301.4		1306.29		
		1360	1313.19	13.35	12.61					1299.8	1300.6				
		1401	1313.19	15.7	13.2					1297.5	1300				

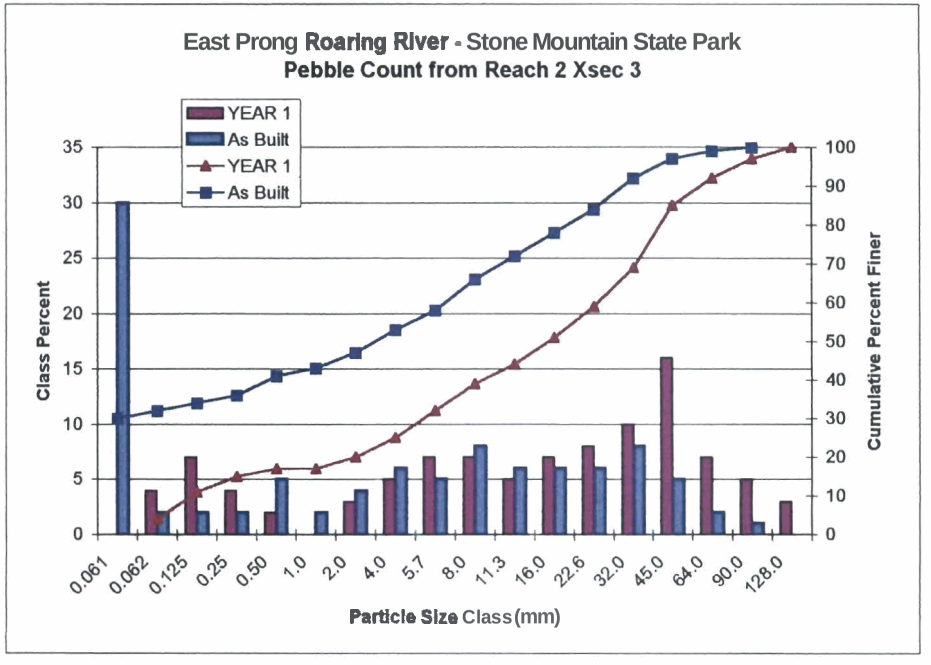
Longitudinal Profile - 2001 Survey



Reach 2 Perm X Sec 3	Approx. STA # 4+61	Survey Date 2000		Survey Date 2001	
Particle Size (mm)	Particle Size	Total	%Cumulative	Total	%Cumulative
0.061	Silt/Clay	30	30	0	
0.062	Sand	2	32	4	4
0.125		2	34	7	11
0.25		2	36	4	15
0.50		5	41	2	17
1.0	Gravel	2	43		17
2.0		4	47	3	20
4.0		6	53	5	25
5.7		5	58	7	32
8.0		8	66	7	39
11.3		6	72	5	44
16.0		6	78	7	51
22.6		6	84	8	59
32.0		8	92	10	69
45.0		5	97	16	85
64.0	Cobble	2	99	7	92
90.0		1	100	5	97
128.0				3	100
180.0					
256.0	Boulder				
362.0					
512.0					
1024.0					
2049.0	Bedrock				

Particle Sizes (mm):	
D16	0.061
D35	0.2
D50	4
D84	28
D95	40

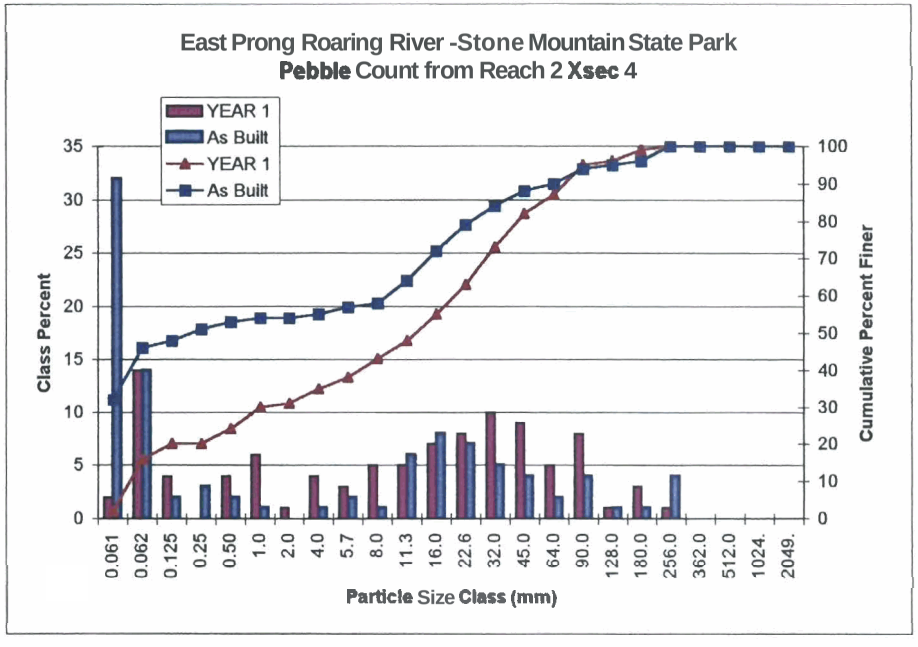
Particle Sizes (mm):	
D16	0.5
D35	8
D50	20
D84	50
D95	85



Reach 2 Perm X Sec 4	Approx. STA # 11+01	Survey Date 2000		Survey Date 2001	
Particle Size (mm)	Particle Size	Total	%Cumulative	Total	%Cumulative
0.061	Silt/Clay	32	32	2	2
0.062		14	46	14	16
0.125	Sand	2	48	4	20
0.25		3	51	0	20
0.50		2	53	4	24
1.0		1	54	6	30
2.0	G	0	54	1	31
4.0	r	1	55	4	35
5.7	a	2	57	3	38
8.0	v	1	58	5	43
11.3	e	6	64	5	48
16.0	l	8	72	7	55
22.6		7	79	8	63
32.0		5	84	10	73
45.0		4	88	9	82
64.0		2	90	5	87
90.0	Cobble	4	94	8	95
128.0		1	95	1	96
180.0		1	96	3	99
256.0		4	100	1	100
362.0	Boulder	0	100	0	100
512.0		0	100	0	100
1024.0		0	100	0	100
2049.0	Bedrock	0	100	0	100

Particle Sizes (mm):	
D16	0.061
D35	0.1
D50	0.4
D84	40
D95	120

Particle Sizes (mm):	
D16	0.1
D35	5.7
D50	14
D84	60
D95	120



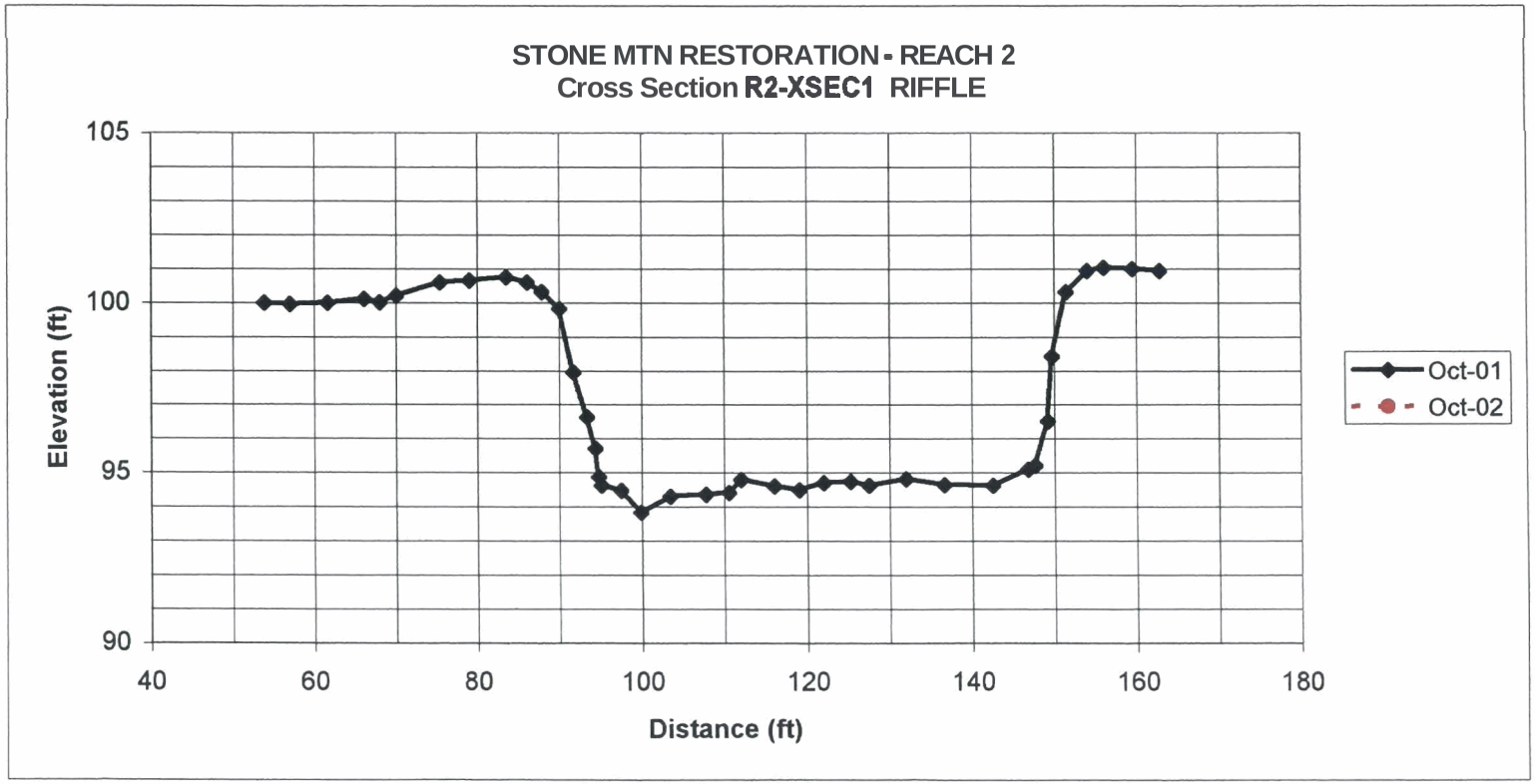
Cross Section R2-XSEC1 RIFFLE

STONE MTN RESTORATION - REACH 2
Yadkin River Basin, Wilkes County, North Carolina
Dani Wise

01-Oct

	Survey Data				Bkf Hydraulic Geometry		
NOTES	STA	HI	FS	ELEV	Depth	Width	Area
	53.8	105.85	5.85	100	0.00	0.00	0.00
	57	105.85	5.9	99.95	0.00	0.00	0.00
	61.5	105.85	5.85	100	0.00	0.00	0.00
	66	105.85	5.75	100.1	0.00	0.00	0.00
	68	105.85	5.84	100.01	0.00	0.00	0.00
	70	105.85	5.65	100.2	0.00	0.00	0.00
	75.3	105.85	5.26	100.59	0.00	0.00	0.00
	79	105.85	5.19	100.66	0.00	0.00	0.00
	83.5	105.85	5.11	100.74	0.00	0.0	0.00
	86	105.85	5.25	100.6	0.00	0.0	0.00
	87.8	105.85	5.53	100.32	0.00	0.0	0.00
LBKF	90	105.85	6.02	99.83	0.00	0.0	0.00
	91.7	105.85	7.9	97.95	1.88	1.7	1.60
	93.3	105.85	9.22	96.63	3.20	1.6	4.06
	94.3	105.85	10.15	95.7	4.13	1.0	3.67
	94.7	105.85	10.98	94.87	4.96	0.4	1.82
	95	105.85	11.23	94.62	5.21	0.3	1.53
	97.4	105.85	11.38	94.47	5.36	2.4	12.68
	99.8	105.85	12.02	93.83	6.00	2.4	13.63
	103.4	105.85	11.54	94.31	5.52	3.6	20.74
	107.7	105.85	11.48	94.37	5.46	4.3	23.61
	110.5	105.85	11.42	94.43	5.40	2.8	15.20
	112	105.85	11.05	94.8	5.03	1.5	7.82
	116	105.85	11.24	94.61	5.22	4.0	20.50
	119	105.85	11.35	94.5	5.33	3.0	15.83
	122	105.85	11.14	94.71	5.12	3.0	15.68
	125.2	105.85	11.1	94.75	5.08	3.2	16.32
	127.5	105.85	11.23	94.62	5.21	2.3	11.83
	132	105.85	11.03	94.82	5.01	4.5	23.00
	136.6	105.85	11.2	94.65	5.18	4.6	23.44
	142.5	105.85	11.23	94.62	5.21	5.9	30.65
	146.8	105.85	10.74	95.11	4.72	4.3	21.35
	147.6	105.85	10.64	95.21	4.62	0.8	3.74
	149.2	105.85	9.34	96.51	3.32	1.6	6.35
	149.7	105.85	7.42	98.43	1.40	0.5	1.18
RBKF	151.4	105.85	5.54	100.31	0.00	0.0	0.00
	154	105.85	4.91	100.94	0.00	0.0	0.00
	156	105.85	4.82	101.03	0.00	0.0	0.00
	159.5	105.85	4.85	101	0.00	0.0	0.00
	162.8	105.85	4.91	100.94	0.00	0.0	0.00

R2-XSEC1	Feature	Type	Wfpa	LBKF	RBKF	ELEVbkf	Wbkf	Dbkf	W/D	Abkf	Dmax	ER
01-Oct	RIFFLE	C4	450	90.0	151.4	99.83	61.4	4.8	12.7	296.2	6.0	7.3



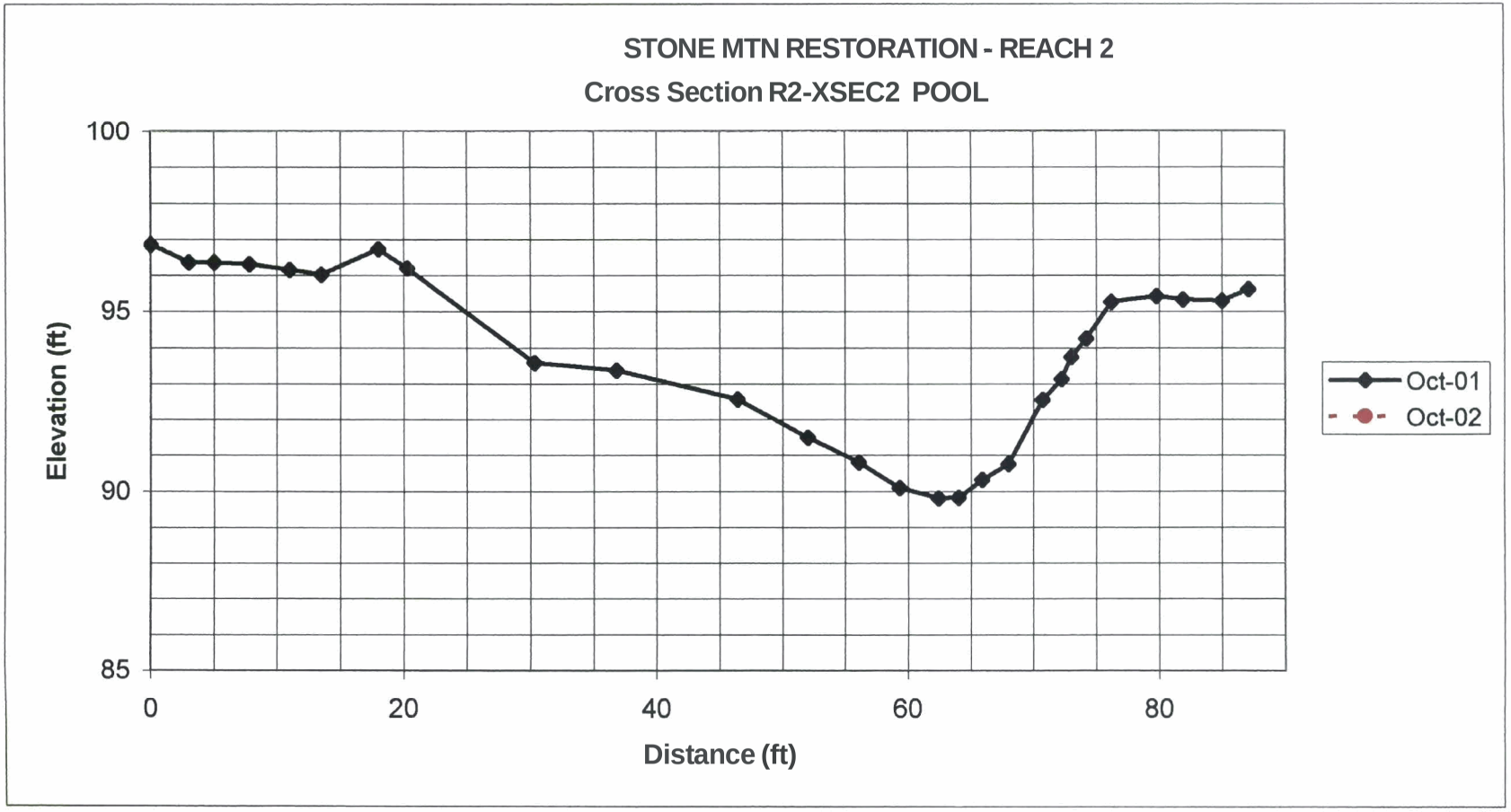
Cross Section R2-XSEC2 POOL

STONE MTN RESTORATION - REACH 2
Yadkin River Basin, Wilkes County, North Carolina
Dani Wise

01-Oct

	Survey Data				Bkf Hydraulic Geometry		
NOTES	STA	HI	FS	ELEV	Depth	Width	Area
	0	100	3.15	96.85	0.00	0.00	0.00
	3	100	3.65	96.35	0.00	0.00	0.00
	5	100	3.64	96.36	0.00	0.00	0.00
	7.8	100	3.7	96.30	0.00	0.00	0.00
	11	100	3.85	96.15	0.00	0.00	0.00
	13.5	100	3.99	96.01	0.00	0.00	0.00
LBKF	18	100	3.27	96.73	0.00	0.0	0.00
	20.3	100	3.81	96.19	0.54	2.3	0.62
	30.3	100	6.43	93.57	3.16	10.0	18.50
	36.8	100	6.64	93.36	3.37	6.5	21.22
	46.4	100	7.43	92.57	4.16	9.6	36.14
	52	100	8.51	91.49	5.24	5.6	26.32
	56.1	100	9.2	90.80	5.93	4.1	22.90
	59.3	100	9.91	90.09	6.64	3.2	20.11
	62.4	100	10.2	89.80	6.93	3.1	21.03
	64	100	10.18	89.82	6.91	1.6	11.07
	65.9	100	9.69	90.31	6.42	1.9	12.66
	68	100	9.25	90.75	5.98	2.1	13.02
	70.7	100	7.45	92.55	4.18	2.7	13.72
	72.2	100	6.88	93.12	3.61	1.5	5.84
	73	100	6.26	93.74	2.99	0.8	2.64
RBKF	74.2	100	5.75	94.25	2.48	1.2	3.28
	76.2	100	4.73	95.27	0.00	0.00	0.00
	79.8	100	4.58	95.42	0.00	0.00	0.00
	81.9	100	4.67	95.33	0.00	0.00	0.00
	85	100	4.71	95.29	0.00	0.00	0.00
	87.1	100	4.38	95.62	0.00	0.00	0.00

R2-XSEC2	Feature	Type	Wfpa	LBKF	RBKF	ELEVbkf	Wbkf	Dbkf	W/D	Abkf	Dmax	ER
01-Oct	POOL	C4	200	18.0	74.2	96.73	56.2	4.1	13.8	229.1	6.9	3.6



Cross Section R2-XSEC3 RIFFLE | **STONE MTN RESTORATION - REACH 2** | **03/19/2002**

Yadkin River Basin, **Wilkes** County, North Carolina

Dani Wise

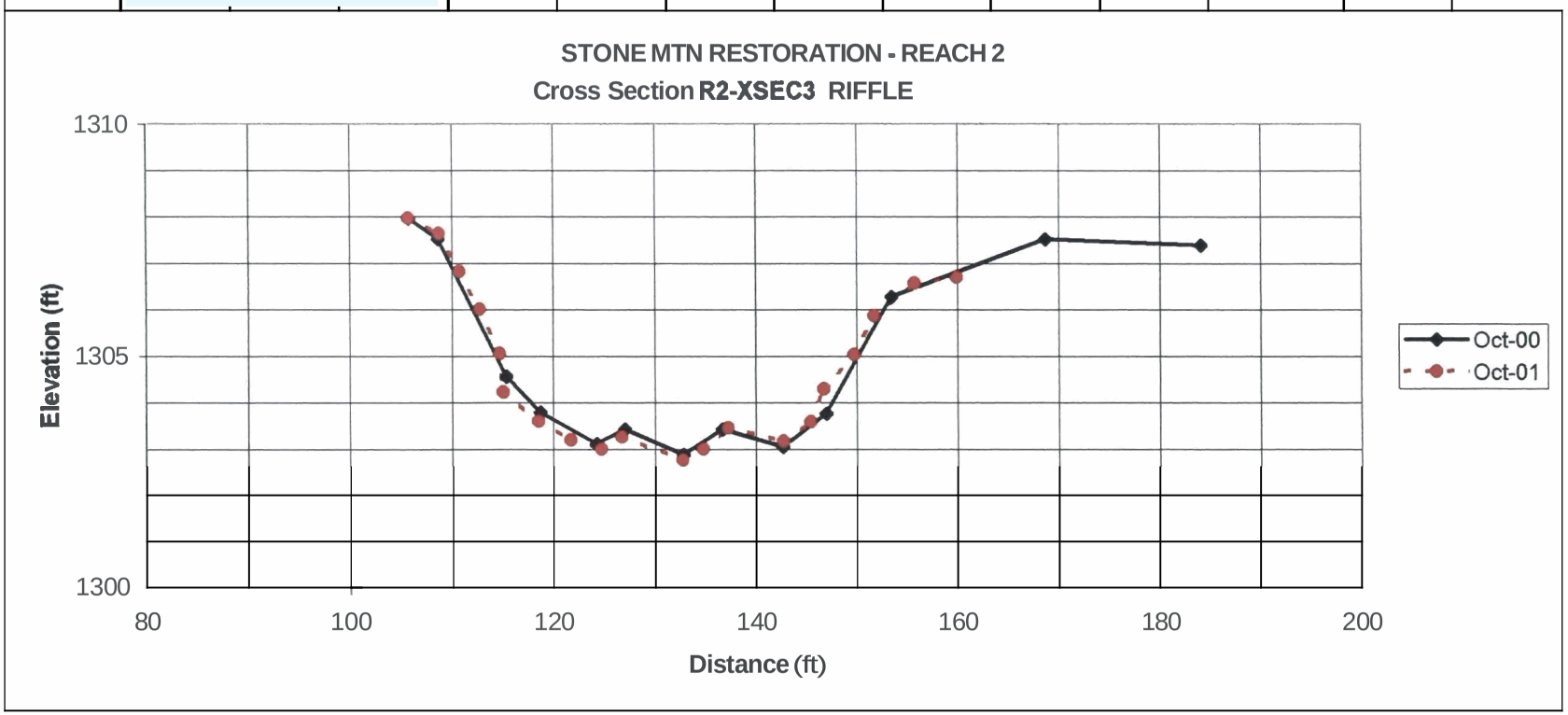
Oct-00

NOTES	Survey Data STA	HI	FS	ELEV	Bkf Hydraulic Geometry Depth	Width	Area
	105.7	1312.62	4.66	1307.96	0.00	0.00	0.00
LBKF	108.6	1312.62	5.1	1307.52	0.00	0.0	0.00
	115.3	1312.62	8.06	1304.56	2.96	6.7	9.92
	118.7	1312.62	8.83	1303.79	3.73	3.4	11.37
	124.2	1312.62	9.51	1303.11	4.41	5.5	22.39
	127	1312.62	9.2	1303.42	4.10	2.8	11.91
	132.8	1312.62	9.75	1302.87	4.65	5.8	25.38
	136.6	1312.62	9.19	1303.43	4.09	3.8	16.61
	142.6	1312.62	9.57	1303.05	4.47	6.0	25.68
	146.9	1312.62	8.86	1303.76	3.76	4.3	17.69
	153.4	1312.62	6.35	1306.27	1.25	6.5	16.28
RBKF	168.6	1312.62	5.1	1307.52	0.00	15.2	9.50
	184	1312.62	5.24	1307.38			

Oct-01

adjust	Survey Data STA	ELEV	Bkf Hydraulic Geometry Depth	Width	Area
78	105.7	1307.96	0.00	0.0	0.00
81	108.7	1307.63	0.00	0.0	0.00
83	110.7	1306.81	0.82	2.0	0.82
85	112.7	1306	1.63	2.0	2.45
87	114.7	1305.05	2.58	2.0	4.21
87.3	115	1304.22	3.41	0.3	0.90
90.8	118.5	1303.6	4.03	3.5	13.02
94	121.7	1303.19	4.44	3.2	13.55
97	124.7	1302.99	4.64	3.0	13.62
99	126.7	1303.25	4.38	2.0	9.02
105	132.7	1302.76	4.87	6.0	27.75
107	134.7	1303	4.63	2.0	9.50
109.5	137.2	1303.45	4.18	2.5	11.01
115	142.7	1303.16	4.47	5.5	23.79
117.7	145.4	1303.58	4.05	2.7	11.50
119	146.7	1304.29	3.34	1.3	4.80
122	149.7	1305.02	2.61	3.0	8.93
124	151.7	1305.85	1.78	2.0	4.39
128	155.7	1306.56	1.07	4.0	5.70
132.2	159.9	1306.69	0.94	4.2	4.22

R2-XSEC3	Feature	Type	Wfpa	LBKF	RBKF	ELEVbkf	Wbkf	Dbkf	WID	Abkf	Dmax	ER
Oct-00	RIFFLE	C4	300	108.6	168.6	1307.52	60.0	2.8	21.6	166.7	4.7	5.0
Oct-01	RIFFLE	C4	300	81.0	132.2	1307.63	51.2	3.3	15.5	169.2	4.9	5.9



Cross Section R2-XSEC4 RIFFLE

STONE MTN RESTORATION - REACH 2 0311912002
Yadkin River Basin, Wilkes County, North Carolina
Dani Wise

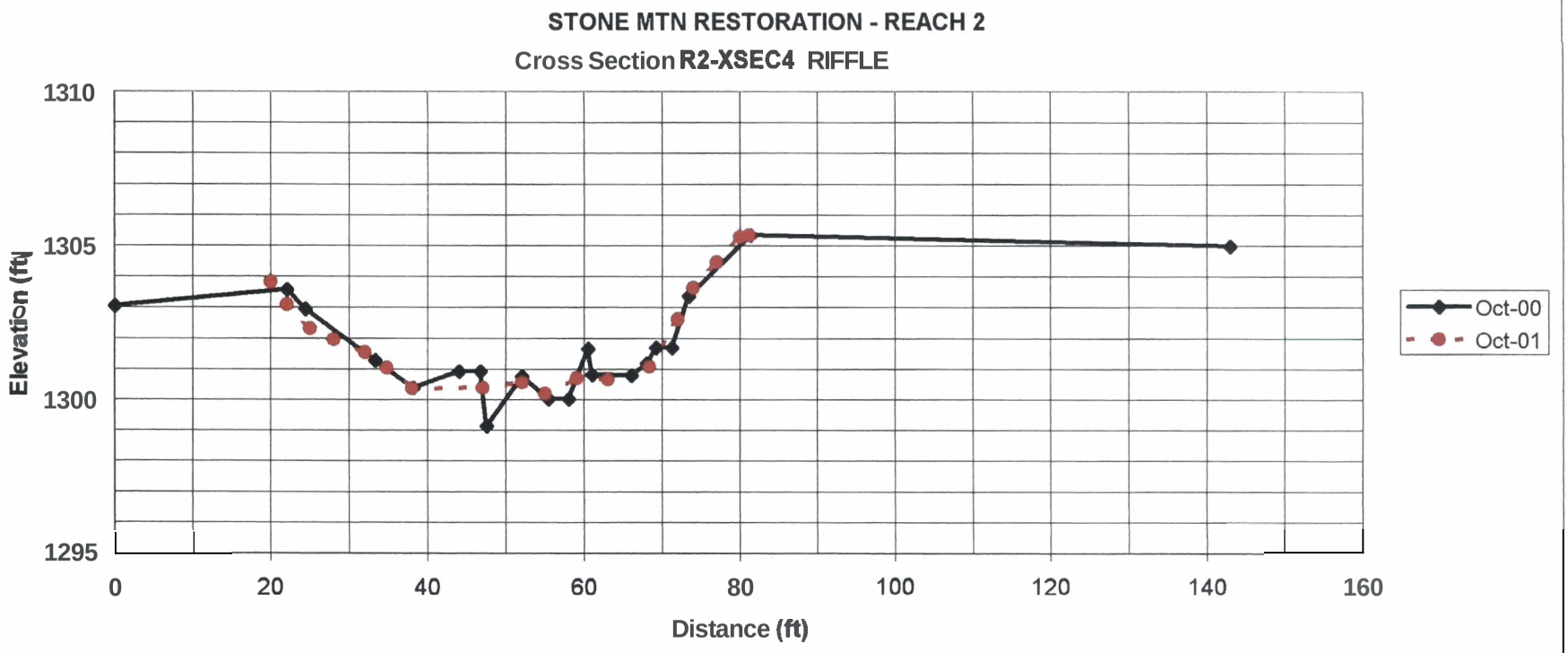
Oct-00

	Survey Data				Bkf Hydraulic Geometry		
NOTES	STA	HI	FS	ELEV	Depth	Width	Area
	0	1310.39	7.34	1303.05	0.00	0.0	0.00
LBKF	22	1310.39	6.82	1303.57	0.00	22.0	0.00
	24.4	1310.39	7.44	1302.95	0.62	2.4	0.74
	33.3	1310.39	9.12	1301.27	2.30	8.9	12.99
	38.2	1310.39	10.02	1300.37	3.20	4.9	13.48
	44	1310.39	9.47	1300.92	2.65	5.8	16.97
	46.7	1310.39	9.47	1300.92	2.65	2.7	7.16
	47.5	1310.39	11.26	1299.13	4.44	0.8	2.84
	52	1310.39	9.64	1300.75	2.82	4.5	16.34
	55.4	1310.39	10.37	1300.02	3.55	3.4	10.83
	58	1310.39	10.37	1300.02	3.55	2.6	9.23
	60.5	1310.39	8.73	1301.66	1.91	2.5	6.83
	61	1310.39	9.58	1300.81	2.76	0.5	1.17
	66	1310.39	9.6	1300.79	2.78	5.0	13.85
	68	1310.39	9.21	1301.18	2.39	2.0	5.17
	69.2	1310.39	8.69	1301.70	1.87	1.2	2.56
	71.3	1310.39	8.69	1301.70	1.87	2.1	3.93
RBKF	73.4	1310.39	7.02	1303.37	0.20	2.1	2.17
	81.4	1310.39	5.06	1305.33	0.00	0.0	0.00
	143	1310.39	5.4	1304.99	0.00	0.0	0.00

Oct-01

Survey Data		Bkf Hydraulic Geometry		
STA	ELEV	Depth	Width	Area
20	1303.82	0.00	0.0	0.00
22	1303.09	0.73	2.0	0.73
25	1302.32	1.50	3.0	3.35
28	1301.96	1.86	3.0	5.04
32	1301.55	2.27	4.0	8.26
34.8	1301.04	2.78	2.8	7.07
38	1300.36	3.46	3.2	9.98
47	1300.38	3.44	9.0	31.05
52	1300.56	3.26	5.0	16.75
55	1300.19	3.63	3.0	10.33
59	1300.7	3.12	4.0	13.50
63	1300.66	3.16	4.0	12.56
68.3	1301.07	2.75	5.3	15.66
72	1302.61	1.21	3.7	7.33
74	1303.62	0.20	2.0	1.41
77	1304.45	0.00	0.0	0.00
80	1305.28	0.00	0.0	0.00
81.2	1305.33	0.00	0.0	0.00

R2-XSEC4	Feature	Type	Wfpa	LBKF	RBKF	ELEVbkf	Wbkf	Dbkf	W/D	Abkf	Dmax	ER
Oct-00	RIFFLE	C4	200	22.0	73.4	1303.57	51.4	2.5	20.9	126.2	4.4	3.9
Oct-01	RIFFLE	C4	200	20.0	74.0	1303.82	54.0	2.3	23.1	126.2	3.6	3.7



APPENDIX B

REACH 4:
STREAM GEOMETRY AND SUBSTRATE DATA

Longitudinal Profile - 2000 Survey — STONE MTN RESTORATION — 03/19/2002

Yadkin River Basin, Wilkes County, North Carolina

Dani Wise

	STA (ft)	ELEV (ft)
Head First Riffle	47	95.01
Head Last Riffle	3953	74.47
Valley Length (ft)	2900	
Channel Length (	3906	
Elev Change (ft)	20.54	

1st elev = TBM4 (RG)

Chan Slope (ft/ft) 0.0053

Valley Slope (ft/ft 0.0071

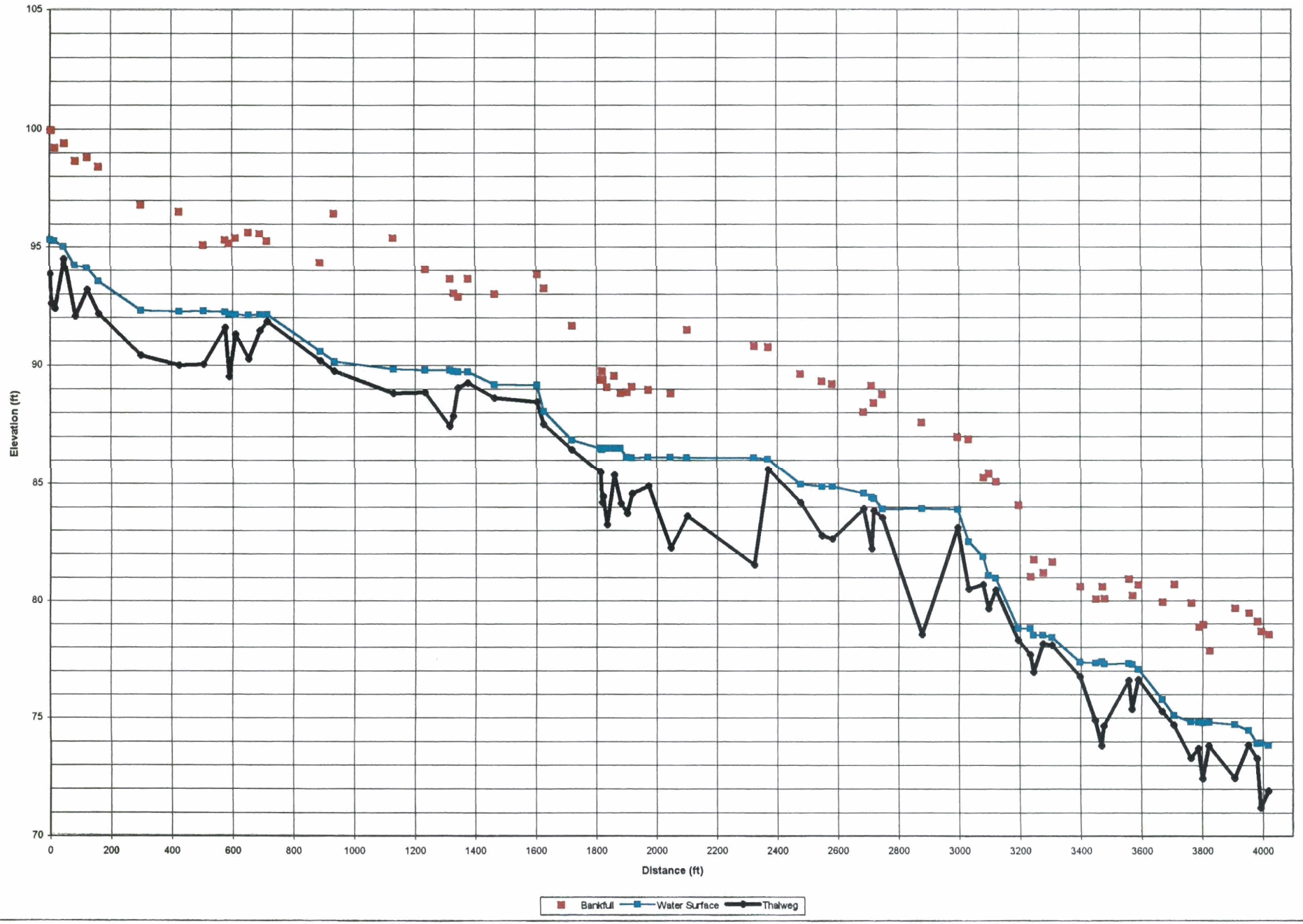
Sinuosity, K 1.35

Turning Points

	BM	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TP13	TP14	TP15	TP16	TP17
FS		3.39	3.52	7.04	5.02	4.27	2.85	11.07	4.32	6.37	6.63	6.72	7.48	6.84	6.13	5.61		
BS	2.62	6.33	4.47	1.94	4.95	5.75	4.78	4.32	4.58	3.83	7.74	5.49	5.47	3.77	1.92	1.54		
ELEV	100.00	99.23	102.04	99.47	96.39	97.07	99.97	93.68	93.68	91.89	89.09	90.11	88.12	87.75	85.39	81.70	83.24	83.24
HI	102.62	105.56	106.51	101.41	101.34	102.82	104.75	98.00	98.26	95.72	96.83	95.60	93.59	91.52	87.31	83.24	83.24	83.24

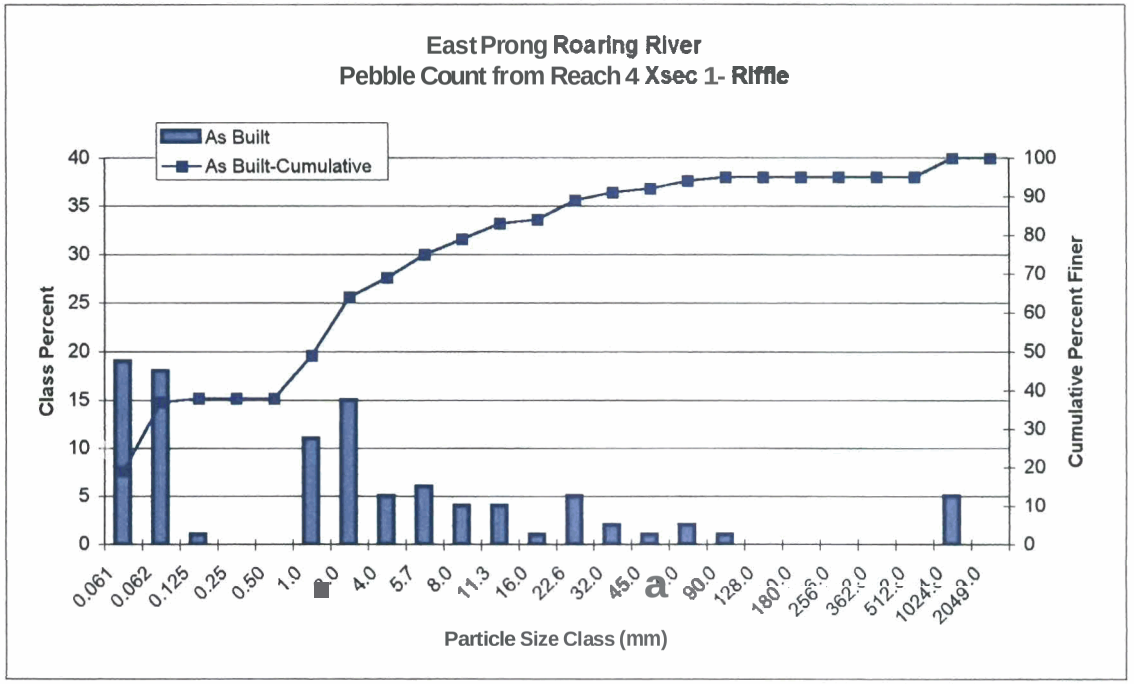
TP	NOTE	STA	HI	FS TW	FS WS	FS IB	FS BKF	FS LTOB	FS RTOB	ELEV TW	ELEV WS	ELEV IB	ELEV BKF	ELEV LTOB	ELEV RTOB
2		0	106.51	12.65	11.2		6.55		4.37	93.86	95.31		99.96		102.14
	jhook	4	106.51	13.92	11.2		6.55		4.37	92.59	95.31		99.96		102.14
	max jhook	17	106.51	14.13	11.25		7.31		4.67	92.38	95.26		99.2		101.84
	HOR	47	106.51	12	11.5		7.11		4.65	94.51	95.01		99.4		101.86
	xvane	83.5	106.51	14.46	12.29		7.85		5.01	92.05	94.22		98.66		101.5
	HOR	123	106.51	13.32	12.41		7.7		6.27	93.19	94.1		98.81		100.24
		160	106.51	14.35	12.97		8.11		4.95	92.16	93.54		98.4		101.56
3		300	101.41	11	9.13		4.61		1.69	90.41	92.28		96.8		99.72
	plug	426	101.41	11.41	9.16		4.89		4.89	90	92.25		96.52		96.52
		506	101.41	11.37	9.15		6.34		6.34	90.04	92.26		95.07		95.07
	xvane	577	101.41	9.82	9.17		6.11		5.35	91.59	92.24		95.3		96.06
	max xvane	590	101.41	11.9	9.28		6.25	5.56		89.51	92.13		95.16	95.85	
4	rock vane	611	101.34	10.04	9.22		5.96	5.96		91.3	92.12		95.38	95.38	
		653	101.34	11.07	9.24		5.71	5.71		90.27	92.1		95.63	95.63	
		691	101.34	9.9	9.22		5.77	5.77		91.44	92.12		95.57	95.57	
	HOR	715	101.34	9.51	9.22		6.09	6.09		91.83	92.12		95.25	95.25	
	log vane	889	101.34	11.15	10.78		7		3.92	90.19	90.56		94.34		97.42
5		936	102.82	13.07	12.67		6.38	6.38		89.75	90.15		96.44	96.44	
6		1130	104.75	15.95	14.92		9.36	9.36		88.8	89.83		95.39	95.39	
		1234	104.75	15.9	14.96		10.71	10.71		88.85	89.79		94.04	94.04	
7	x vane	1315	98	10.57	8.22		4.36		2	87.43	89.78		93.64		96
	max	1326.5	98	10.15	8.28		4.97		2.46	87.85	89.72		93.03		95.54
		1342	98	8.96	8.3		5.11		3.06	89.04	89.7		92.89		94.94
	HOR	1374	98	8.75	8.3		4.36		4.36	89.25	89.7		93.64		93.64
		1462	98	9.38	8.82		5		5	88.62	89.18		93		93
8	x vane	1603	98.26	9.81	9.1		4.43		4.43	88.45	89.16		93.83		93.83
	HOR	1625	98.26	10.75	10.21		5.01	5.01		87.51	88.05		93.25	93.25	
		1718	98.26	11.82	11.41		6.61		6.61	86.44	86.85		91.65		91.65
9		1812	95.72	10.23	9.23		6.34			85.49	86.49		89.38		
		1818	95.72	11.53	9.29		5.97			84.19	86.43		89.75		
		1820	95.72	11.26	9.25		6.32			84.46	86.47		89.4		
		1834	95.72	12.48	9.22		6.64	3.34		83.24	86.5		89.08	92.38	
		1858	95.72	10.35	9.23		6.17			85.37	86.49		89.55		
		1880	95.72	11.58	9.22		6.9		5.9	84.14	86.6		88.82		89.82
		1900	95.72	12	9.61		6.86	5.59		83.72	86.11		88.86	90.13	
		1917	95.72	11.15	9.62		6.62		5.56	84.57	86.1		89.1		90.16
		1971	95.72	10.82	9.6		6.76		6.13	84.9	86.12		88.96		89.59
		2045	96.83	14.58	10.72		8.02			82.25	86.11		88.81		
		2100	96.83	13.22	10.74		5.34		4.3	83.61	86.09		91.49		92.53
		2323	95.6	14.07	9.51		4.81			81.53	86.09		90.79		
		2368	95.6	10	9.56		4.85			85.6	86.04		90.75		
		2476	95.6	11.41	10.65		5.96			84.19	84.95		89.64		
		2547	95.6	12.83	10.74		6.27			82.77	84.86		89.33		
		2580	95.6	12.96	10.75		6.38			82.64	84.85		89.22		
		2684	93.59	9.68	9.02		5.56			83.91	84.57		88.03		
		2711	93.59	11.38	9.2		4.46			82.21	84.39		89.13		
		2719	93.59	9.76	9.25		5.18			83.83	84.34		88.41		
		2746	93.59	10.06	9.69		4.82			83.53	83.9		88.77		
		2877	93.59	15.04	9.67		6.01			78.55	83.92		87.58		
		2996	91.52	8.41	7.65		4.54			83.11	83.87		86.98		
		3032	91.52	11.03	9.01		4.65			80.49	82.51		86.87		
		3078	91.52	10.84	9.65		6.28			80.68	81.87		85.24		
		3096	91.52	11.86	10.45		6.11			79.66	81.07		85.41		
		3120	91.52	11.07	10.57		6.46			80.45	80.95		85.06		
		3195	91.52	13.22	12.73		7.45			78.3	78.79		84.07		
		3235	87.31	9.62	8.52		6.28		2.96	77.69	78.79		81.03		84.35
		3244	87.31	10.38	8.8		5.56		3.02	76.93	78.51		81.75		84.29
		3276	87.31	9.16	8.8		6.1		0.22	78.15	78.51		81.21		87.09
		3305	87.31	9.23	8.9		5.65		0.68	78.08	78.41		81.66		86.63
		3398	87.31	10.56	9.95		6.71	5.27		76.75	77.36		80.6	82.04	
		3450	87.31	12.41	9.98		7.23	5.08		74.9	77.33		80.08	82.23	
		3470	87.31	13.48	9.94		6.7	5.14		73.83	77.31		80.61	82.17	
		3478	87.31	12.65	10.03		7.21	4.89		74.66	77.28		80.1	82.42	
		3558	87.31	10.71	10		6.37			76.6	77.31		80.94		
		3570	87.31	11.94	10.05		7.08			75.37	77.26		80.23		
		3588	87.31	10.68	10.26		6.63			76.63	77.05		80.68		
		3668	83.24	7.97	7.46		3.3			75.27	75.78		79.94		
		3707	83.24	8.53	8.13		2.54			74.71	75.11		80.7		
		3763	83.24	9.93	8.41		3.33			73.31	74.83		79.91		
		3788	83.24	9.54	8.42		4.37			73.7	74.82		78.87		
		3802	83.24	10.79	8.45		4.27			72.45	74.79		78.97		
		3823	83.24	9.41	8.43		5.39		4.31	73.83	74.81		77.85		78.93
		3908	83.24	10.78	8.52		3.56			72.46	74.72		79.68		
		3953	83.24	9.38	8.77		3.78		1.03	73.86	74.47		79.46		82.21
		3981	83.24	9.96	9.32		4.15			73.28	73.92		79.09		
		3993	83.24	12.04	9.31		4.57			71.2	73.93		78.67		
		4019	83.24	11.31	9.4		4.7			71.93	73.84		78.54		

Longitudinal Profile - 2000 Survey



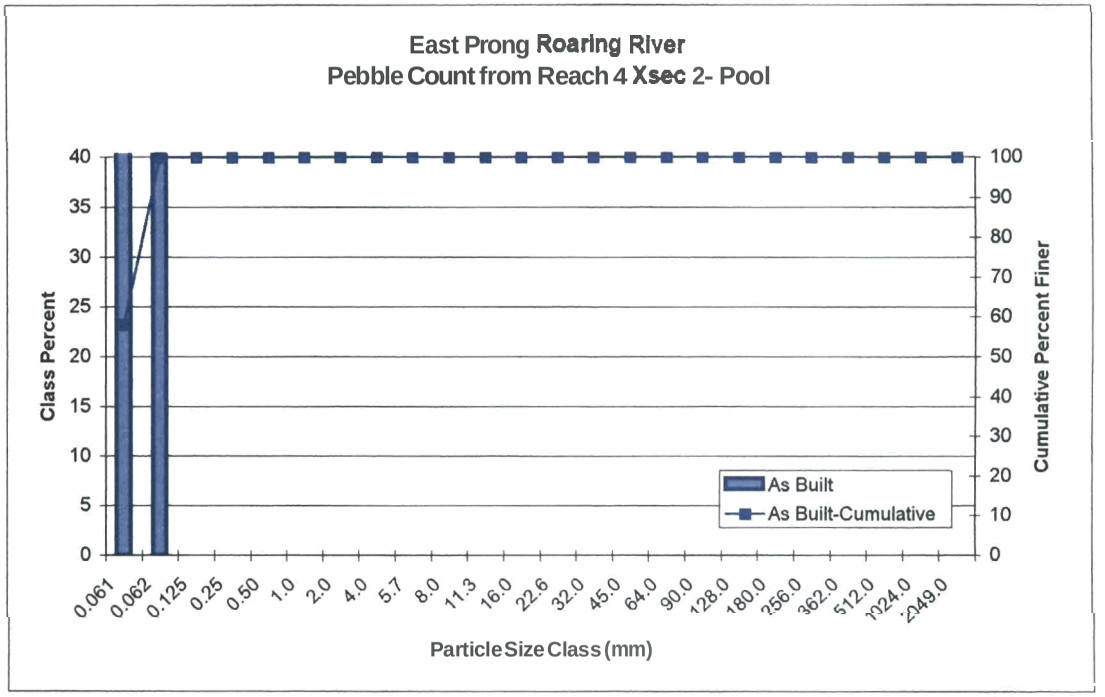
Reach 4 Perm. X SEC 1	Approx. STA # 8+56	Survey Date 2000	
Particle Size (mm)	**Particle Size**	**Total**	**%Cumulative**
0.061	**Silt/Clay**	19	19
0.062	**Sand**	18	37
0.125		1	38
0.25		0	38
0.50		0	38
1.0	**G r a v e l**	11	49
2.0		15	64
4.0		5	69
5.7		6	75
8.0		4	79
11.3		4	83
16.0		1	84
22.6		5	89
32.0		2	91
45.0		1	92
64.0	**Cobble**	2	94
90.0		1	95
128.0		0	95
180.0		0	95
256.0	**Boulder**	0	95
362.0		0	95
512.0		0	95
1024.0		5	100
2049.0	**Bedrock**	0	100

Particle Sizes (mm):	
D16	0.061
D35	0.062
D50	1.4
D84	18
D95	112



Reach 4 Perm X Sec 2	Approx. STA # 11+86	Survey Date 2000	
Particle Size (mm)	**Particle Size**	**Total**	**%Cumulative**
0.061	**Silt/Clay**	58	58
0.062	**Sand**	42	100
0.125			100
0.25			100
0.50			100
1.0	**G r a v e l**		100
2.0			100
4.0			100
5.7			100
8.0			100
11.3			100
16.0			100
22.6			100
32.0			100
45.0			100
64.0	**Cobble**		100
90.0			100
128.0			100
180.0			100
256.0	**Boulder**		100
362.0			100
512.0			100
1024.0			100
2049.0	**Bedrock**		100

Particle Sizes (mm):	
D16	0.061
D35	0.061
D50	0.061
D84	0.062
D95	0.062



Cross Section R4-XSEC1 RIFFLE

STONE MTN RESTORATION
Yadkin River Basin, Wilkes County, North Carolina
Dani Wise

Oct-00

	Survey Data				Bkf Hydraulic Geometry		
NOTES	STA	HI	FS	ELEV	Depth	Width	Area
	0	101.34	5.74	95.60	0.00	0.0	0.00
	27	101.34	4.66	96.68	0.00	0.0	0.00
	32	101.34	5.37	95.97	0.00	0.0	0.00
LBKF	33	101.34	6.07	95.27	0.00	0.0	0.00
	35	101.34	7.98	93.36	1.91	2.0	1.91
	38.5	101.34	8.51	92.83	2.44	3.5	7.61
	42	101.34	9.96	91.38	3.89	3.5	11.08
	49	101.34	10.52	90.82	4.45	7.0	29.19
	60.2	101.34	11.18	90.16	5.11	11.2	53.54
	63.2	101.34	10.53	90.81	4.46	3.0	14.36
	65.4	101.34	10.12	91.22	4.05	2.2	9.36
	65.7	101.34	9.35	91.99	3.28	0.3	1.10
	68.5	101.34	9.42	91.92	3.35	2.8	9.28
	69	101.34	10.51	90.83	4.44	0.5	1.95
	78.3	101.34	10.3	91.04	4.23	9.3	40.32
	83.4	101.34	8.76	92.58	2.69	5.1	17.65
RBKF	90	101.34	6.24	95.10	0.17	6.6	9.44
	105	101.34	5.44	95.90	0.00	0.0	0.00
	107	101.34	7.32	94.02	0.00	0.0	0.00

R4-XSEC 1	Feature	Type	Wfpa	LBKF	RBKF	ELEVbkf	Wbkf	Dbkf	W/D	Abkf	Dmax	ER
Oct-00	RIFFLE	C	200	33.0	90.0	95.27	57.0	3.6	15.7	206.8	5.1	3.5

Cross Section R4-XSEC2 POOL

STONE MTN RESTORATION
Yadkin River Basin, Wilkes County, North Carolina
Dani Wise

Oct-00

	Survey Data				Bkf Hydraulic Geometry		
NOTES	**STA**	**HI**	**FS**	**ELEV**	**Depth**	**Width**	**Area**
	0	104.75	9.84	94.91	0.00	0.0	0.00
LBKF	19	104.75	9.69	95.06	0.00	0.0	0.00
	22.1	104.75	10.38	94.37	0.69	3.1	1.07
	23	104.75	11.87	92.88	2.18	0.9	1.29
	25.5	104.75	12.84	91.91	3.15	2.5	6.66
	31	104.75	14.88	89.87	5.19	5.5	22.94
	41	104.75	15.29	89.46	5.60	10.0	53.95
	48	104.75	15.85	88.90	6.16	7.0	41.16
	52	104.75	15.51	89.24	5.82	4.0	23.96
	52	104.75	14.92	89.83	5.23	0.0	0.00
	52.6	104.75	13.02	91.73	3.33	0.6	2.57
	56.8	104.75	12.08	92.67	2.39	4.2	12.01
RBKF	62.7	104.75	9.2	95.55	0.00	0.0	0.00
	67	104.75	5.17	99.58	0.00	0.0	0.00
	68.6	104.75	4.9	99.85	0.00	0.0	0.00
	80	104.75	4.97	99.78	0.00	0.0	0.00
	100	104.75	4.92	99.83	0.00	0.0	0.00

R4-XSEC2	Feature	Type	Wfpa	LBKF	RBKF	ELEVbkf	Wbkf	Dbkf	W/D	Abkf	Dmax	ER
Oct-00	POOL	C	200	19.0	62.7	95.06	43.7	3.8	11.5	165.6	6.2	4.6

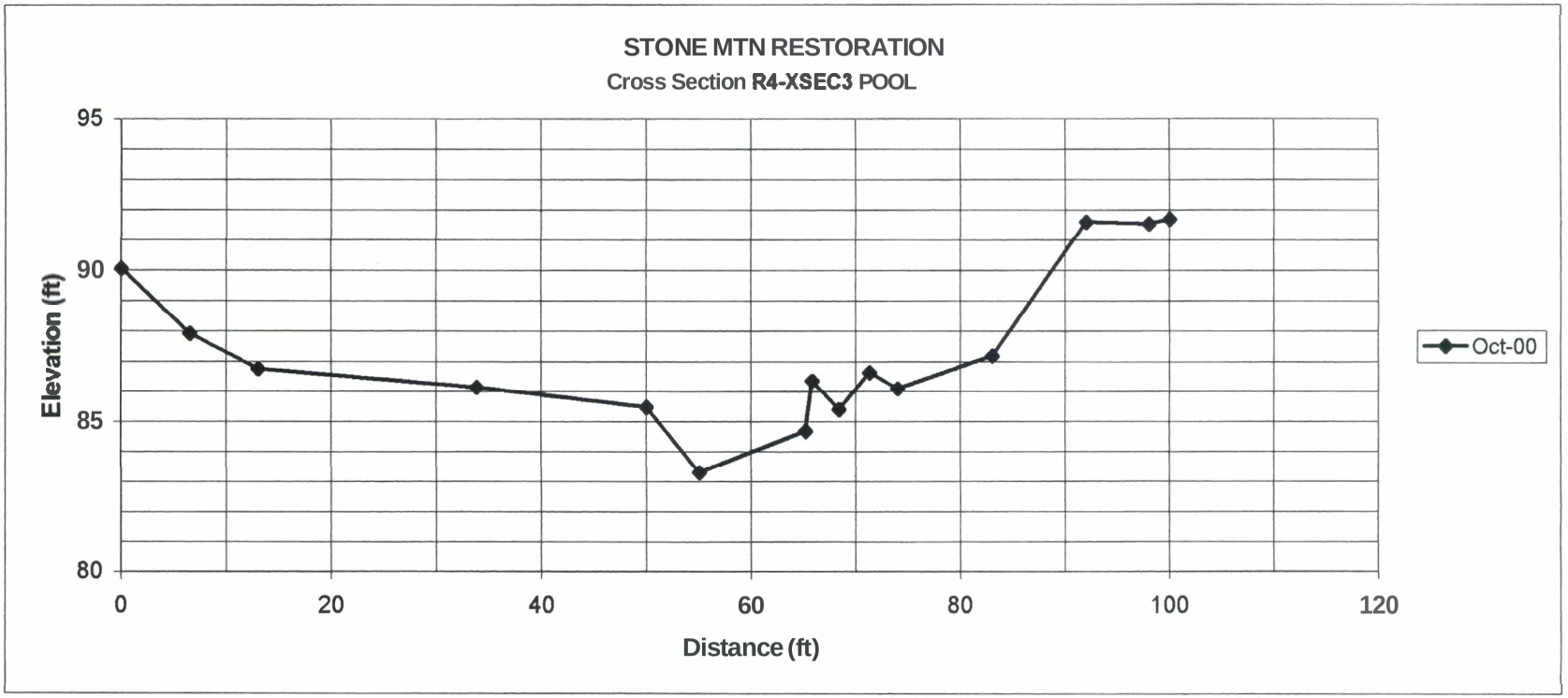
Cross Section R4-XSEC3 POOL

STONE MTN RESTORATION
Yadkin River Basin, Wilkes County, North Carolina
Dani Wise

Oct-00

	Survey Data				Bkf Hydraulic Geometry		
NOTES	STA	HI	FS	ELEV	Depth	Width	Area
	0	96.86	6.8	90.06	0.00	0.0	0.00
LBKF	6.5	96.86	8.94	87.92	0.00	0.0	0.00
	13	96.86	10.1	86.76	1.16	6.5	3.77
	33.8	96.86	10.73	86.13	1.79	20.8	30.68
	50	96.86	11.39	85.47	2.45	16.2	34.34
	55	96.86	13.57	83.29	4.63	5.0	17.70
	65.2	96.86	12.18	84.68	3.24	10.2	40.14
	65.8	96.86	10.51	86.35	1.57	0.6	1.44
	68.4	96.86	11.47	85.39	2.53	2.6	5.33
	71.3	96.86	10.23	86.63	1.29	2.9	5.54
	74	96.86	10.76	86.10	1.82	2.7	4.20
	83	96.86	9.66	87.20	0.72	9.0	11.43
RBKF	92	96.86	5.26	91.60	0.00	0.0	0.00
	98	96.86	5.32	91.54	0.00	0.0	0.00
	100	96.86	5.16	91.70	0.00	0.0	0.00

R4-XSEC 3	Feature	Type	Wfpa	LBKF	RBKF	ELEVbkf	Wbkf	Dbkf	W/D	Abkf	Dmax	ER
Oct-00	POOL	C	200	6.5	92.0	87.92	85.5	1.8	47.3	154.6	4.6	2.3



Longitudinal Profile - 2000 Survey — STONE MTN RESTORATION — 03/19/2002

Yadkin River Basin, Wilkes County, North Carolina

Dani Wise

	STA (ft)	ELEV (ft)
Head First Riffle	47	95.01
Head Last Riffle	3953	74.47
Valley Length (ft)	2900	
Channel Length (	3906	
Elev Change (ft)	20.54	

1st elev = TBM4 (RG)

Chan Slope (ft/ft) 0.0053

Valley Slope (ft/ft 0.0071

Sinuosity, K 1.35

Turning Points

	BM	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TP13	TP14	TP15	TP16	TP17
FS		3.39	3.52	7.04	5.02	4.27	2.85	11.07	4.32	6.37	6.63	6.72	7.48	5.84	6.13	5.61		
BS	2.62	6.33	4.47	1.94	4.95	5.75	4.78	4.32	4.58	3.83	7.74	5.49	5.47	3.77	1.92	1.54		
ELEV	100.00	99.23	102.04	99.47	96.39	97.07	99.97	93.68	93.68	91.89	89.09	90.11	88.12	87.75	85.39	81.70	83.24	83.24
HI	102.62	105.56	106.51	101.41	101.34	102.82	104.75	98.00	98.26	95.72	96.83	95.60	93.59	91.52	87.31	83.24	83.24	83.24

TP	NOTE	STA	HI	FS TW	FS WS	FS IB	FS BKF	FS LTOB	FS RTOB	ELEV TW	ELEV WS	ELEV IB	ELEV BKF	ELEV LTOB	ELEV RTOB
2		0	106.51	12.65	11.2		6.55		4.37	93.86	95.31		99.96		102.14
	jhook	4	106.51	13.92	11.2		6.55		4.37	92.59	95.31		99.96		102.14
	max jhook	17	106.51	14.13	11.25		7.31		4.67	92.38	95.26		99.2		101.84
	HOR	47	106.51	12	11.5		7.11		4.65	94.51	95.01		99.4		101.86
	xvane	83.5	106.51	14.46	12.29		7.85		5.01	92.05	94.22		98.66		101.5
	HOR	123	106.51	13.32	12.41		7.7		6.27	93.19	94.1		98.81		100.24
		160	106.51	14.35	12.97		8.11		4.95	92.16	93.54		98.4		101.56
3		300	101.41	11	9.13		4.61		1.69	90.41	92.28		96.8		99.72
	plug	426	101.41	11.41	9.16		4.89		4.89	90	92.25		96.52		96.52
		506	101.41	11.37	9.15		6.34		6.34	90.04	92.26		95.07		95.07
	xvane	577	101.41	9.82	9.17		6.11		5.35	91.59	92.24		95.3		96.06
	max xvane	590	101.41	11.9	9.28		6.25	5.56		89.51	92.13		95.16	95.85	
4	rock vane	611	101.34	10.04	9.22		5.96	5.96		91.3	92.12		95.38	95.38	
		653	101.34	11.07	9.24		5.71	5.71		90.27	92.1		95.63	95.63	
		691	101.34	9.9	9.22		5.77	5.77		91.44	92.12		95.57	95.57	
	HOR	715	101.34	9.51	9.22		6.09	6.09		91.83	92.12		95.25	95.25	
	log vane	889	101.34	11.15	10.78		7		3.92	90.19	90.56		94.34		97.42
5		936	102.82	13.07	12.67		6.38	6.38		89.75	90.15		96.44	96.44	
6		1130	104.75	15.95	14.92		9.36	9.36		88.8	89.83		95.39	95.39	
		1234	104.75	15.9	14.96		10.71	10.71		88.85	89.79		94.04	94.04	
7	x vane	1315	98	10.57	8.22		4.36		2	87.43	89.78		93.64		96
	max	1326.5	98	10.15	8.28		4.97		2.46	87.85	89.72		93.03		95.54
		1342	98	8.96	8.3		5.11		3.06	89.04	89.7		92.89		94.94
	HOR	1374	98	8.75	8.3		4.36		4.36	89.25	89.7		93.64		93.64
		1462	98	9.38	8.82		5		5	88.62	89.18		93		93
8	x vane	1603	98.26	9.81	9.1		4.43		4.43	88.45	89.16		93.83		93.83
	HOR	1625	98.26	10.75	10.21		5.01	5.01		87.51	88.05		93.25	93.25	
		1718	98.26	11.82	11.41		6.61		6.61	86.44	86.85		91.65		91.65
9		1812	95.72	10.23	9.23		6.34			85.49	86.49		89.38		
		1818	95.72	11.53	9.29		5.97			84.19	86.43		89.75		
		1820	95.72	11.26	9.25		6.32			84.46	86.47		89.4		
		1834	95.72	12.48	9.22		6.64	3.34		83.24	86.5		89.08	92.38	
		1858	95.72	10.35	9.23		6.17			85.37	86.49		89.55		
		1880	95.72	11.58	9.22		6.9		5.9	84.14	86.5		88.82		89.82
		1900	95.72	12	9.61		6.86	5.59		83.72	86.11		88.86	90.13	
		1917	95.72	11.15	9.62		6.62		5.56	84.57	86.1		89.1		90.16
		1971	95.72	10.82	9.6		6.76		6.13	84.9	86.12		88.96		89.59
		2045	96.83	14.58	10.72		8.02			82.25	86.11		88.81		
		2100	96.83	13.22	10.74		5.34		4.3	83.61	86.09		91.49		92.53
		2323	95.6	14.07	9.51		4.81			81.53	86.09		90.79		
		2368	95.6	10	9.56		4.85			85.6	86.04		90.75		
		2476	95.6	11.41	10.65		5.96			84.19	84.95		89.64		
		2547	95.6	12.83	10.74		6.27			82.77	84.86		89.33		
		2580	95.6	12.96	10.75		6.38			82.64	84.85		89.22		
		2684	93.59	9.68	9.02		5.56			83.91	84.57		88.03		
		2711	93.59	11.38	9.2		4.46			82.21	84.39		89.13		
		2719	93.59	9.76	9.25		5.18			83.83	84.34		88.41		
		2746	93.59	10.06	9.69		4.82			83.53	83.9		88.77		
		2877	93.59	15.04	9.67		6.01			78.55	83.92		87.58		
		2996	91.52	8.41	7.65		4.54			83.11	83.87		86.98		
		3032	91.52	11.03	9.01		4.65			80.49	82.51		86.87		
		3078	91.52	10.84	9.65		6.28			80.68	81.87		85.24		
		3096	91.52	11.86	10.45		6.11			79.66	81.07		85.41		
		3120	91.52	11.07	10.57		6.46			80.45	80.95		85.06		
		3195	91.52	13.22	12.73		7.45			78.3	78.79		84.07		
		3235	87.31	9.62	8.52		6.28		2.96	77.69	78.79		81.03		84.35
		3244	87.31	10.38	8.8		5.56		3.02	76.93	78.51		81.75		84.29
		3276	87.31	9.16	8.8		6.1		0.22	78.15	78.51		81.21		87.09
		3305	87.31	9.23	8.9		5.65		0.68	78.08	78.41		81.66		86.63
		3398	87.31	10.56	9.95		6.71	5.27		76.75	77.36		80.6	82.04	
		3450	87.31	12.41	9.98		7.23	5.08		74.9	77.33		80.08	82.23	
		3470	87.31	13.48	9.94		6.7	5.14		73.83	77.37		80.61	82.17	
		3478	87.31	12.65	10.03		7.21	4.89		74.66	77.28		80.1	82.42	
		3558	87.31	10.71	10		6.37			76.6	77.31		80.94		
		3570	87.31	11.94	10.05		7.08			75.37	77.26		80.23		
		3588	87.31	10.68	10.26		6.63			76.63	77.05		80.68		
		3668	83.24	7.97	7.46		3.3			75.27	75.78		79.94		
		3707	83.24	8.53	8.13		2.54			74.71	75.11		80.7		
		3763	83.24	9.93	8.41		3.33			73.31	74.83		79.91		
		3788	83.24	9.54	8.42		4.37			73.7	74.82		78.87		
		3802	83.24	10.79	8.45		4.27			72.45	74.79		78.97		
		3823	83.24	9.41	8.43		5.39		4.31	73.83	74.81		77.85		78.93
		3908	83.24	10.78	8.52		3.56			72.46	74.72		79.68		
		3953	83.24	9.38	8.77		3.78		1.03	73.86	74.47		79.46		82.21
		3981	83.24	9.96	9.32		4.15			73.28	73.92		79.09		
		3993	83.24	12.04	9.31		4.57			71.2	73.93		78.67		
		4019	83.24	11.31	9.4		4.7			71.93	73.84		78.54		

Longitudinal Profile - 2001 Survey **STONE MTN RESTORATION**

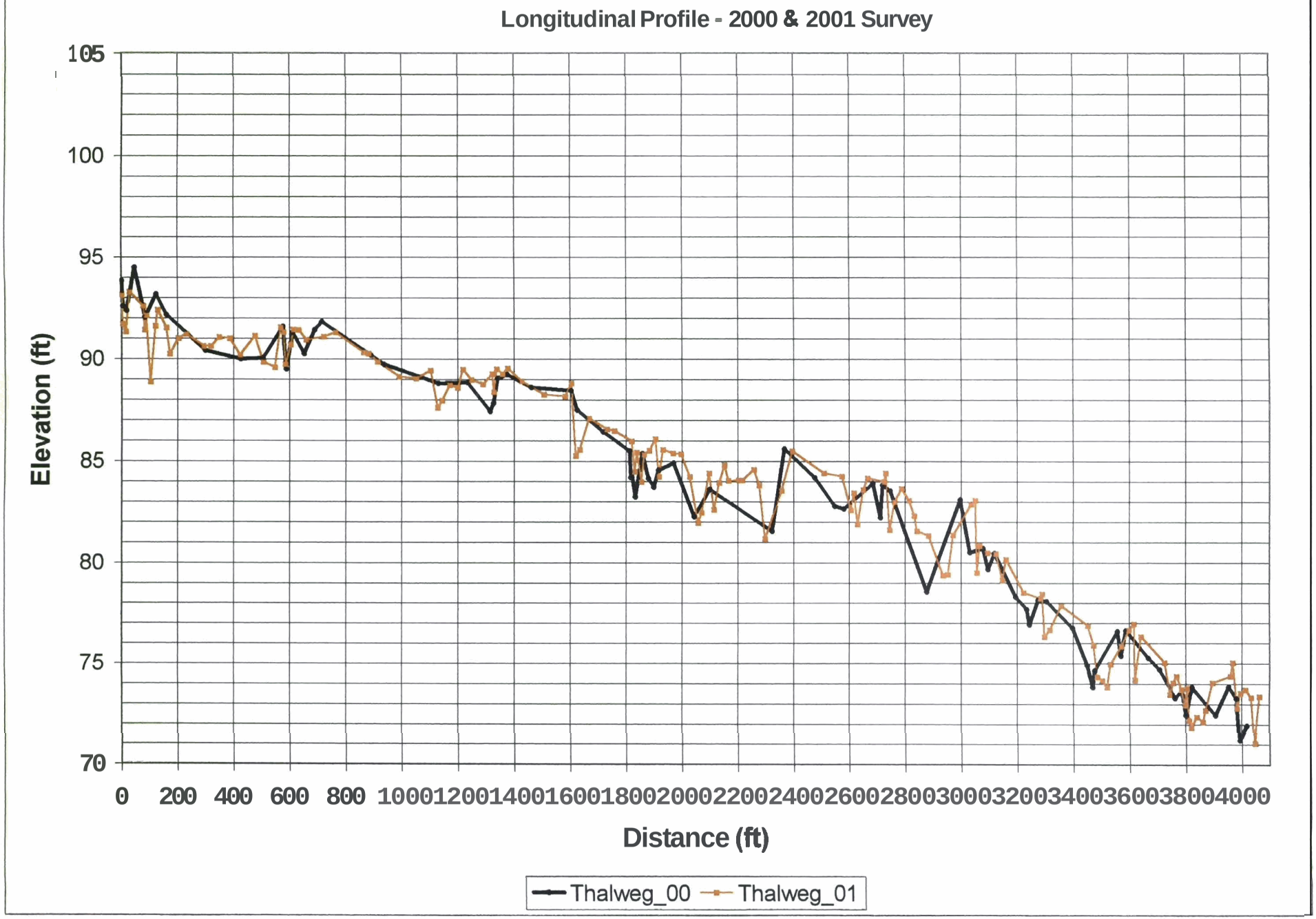
Yadkin River Basin, Wilkes County, North Carolina

Dani Wise

			STA (ft)	ELEV (ft)
		Head First Riffle	47	95.01
		Head Last Riffle	3953	74.47
Chan Slope (ft/ft)	0.0053	Valley Length (ft)	2900	
Valley Slope (ft/ft)	0.0071	Channel Length (ft)	3906	
Sinuosity, K	1.3469	Elev Change (ft)	20.54	

TP	NOTE	STA	HI	FS TW	FS WS	FS IB	FS BKF	FS LTOB	FS RTOB	ELEV TW	ELEV WS	ELEV IB	ELEV BKF	ELEV LTOB	ELEV RTOB
		0	106.18	13.05	12.23					93.13	93.95				
		5	106.18	14.48	12.26					91.7	93.92				
		15	106.18	14.84	12.24				5.44	91.34	93.94				100.74
		29	106.18	12.9	12.32					93.28	93.86				
		78	106.18	13.59	12.98					92.59	93.2				
		83.5	106.18	14.78	13					91.42	93.18				
		87.5	106.18	14.04	13.06					92.14	93.12				
		104	106.18	17.31	13.32					88.87	92.86				
		122	106.18	14.56	13.31					91.62	92.87				
		130	106.18	13.78	13.32				7	92.4	92.86				99.18
		160	106.18	14.66	14.09					91.52	92.09				
		174	106.18	15.93	14.05					90.25	92.13				
		203	106.18	15.17	14.05					91.01	92.13				
		231	106.18	14.95	14.04					91.23	92.14				
		293	106.18	15.54	14.05					90.64	92.13				
		320	101.95	11.31	9.8					90.64	92.15				
		350	101.95	10.89	9.79					91.06	92.16				
		387	101.95	10.94	9.8					91.01	92.15				
		424	101.95	11.76	9.85					90.19	92.1				
		478	101.95	10.81	9.81				6.19	91.14	92.14				95.76
		508	101.95	12.11	9.81					89.84	92.14				
		549	101.95	12.35	9.82					89.6	92.13				
		569	101.95	10.4	9.85					91.55	92.1				
		580	101.95	10.62	9.94					91.33	92.01				
		586	101.95	12.2	9.99					89.75	91.96				
		605	101.95	11.25	10.02					90.7	91.93				
		615	101.95	10.51	10.01					91.44	91.94				
		633	101.95	10.54	10					91.41	91.95				
		661	101.95	11.01	10			6.72		90.94	91.95			95.23	
		724	101.95	10.85	10					91.1	91.95				
		765	101.95	10.64	10.02					91.31	91.93				
		865	102.57	12.25	11.86					90.32	90.71				
		882	102.57	12.31	11.96					90.26	90.61				
		915	102.57	12.7	12.17				5.39	89.87	90.4				97.18
		991	102.57	13.44	12.72					89.13	89.85				
		1052	102.57	13.52	12.74					89.05	89.83				
		1104	105.5	16.07	15.27					89.43	90.23				
		1129	105.5	17.9	15.26					87.6	90.24				
		1145	105.5	17.54	15.25					87.96	90.25				
		1171	105.5	16.79	15.25					88.71	90.25				
		1199	105.5	16.91	15.26			10.55		88.59	90.24			94.95	
		1219	105.5	16.02	15.25					89.48	90.25				
		1248	105.5	16.52	15.26					88.98	90.24				
		1290	105.5	16.73	15.28					88.77	90.22				
		1323	105.5	16.24	15.34					89.26	90.16				
		1329	105.5	17.12	15.32					88.38	90.18				
		1339	105.5	15.99	15.32					89.51	90.18				
		1358	105.5	16.24	15.35					89.26	90.15				
		1378	105.5	15.95	15.35					89.55	90.15				
		1427	98.5	9.59	9.08			5.86		88.91	89.42			92.64	
		1507	98.5	10.23	9.59					88.27	88.91				
		1582	98.5	10.32	9.63					88.18	88.87				
		1604	98.5	9.69	9.69					88.81	88.81				
		1620	98.5	13.25	10.75					85.25	87.75				
		1634	98.5	12.94	10.74					85.56	87.76				
		1667	98.5	11.42	10.75					87.08	87.75				
		1733	98.5	11.93	11.45			6.32		86.57	87.05			92.18	
		1759	98.5	12.03	11.57					86.47	86.93				
		1820	98.5	12.53	11.59					85.97	86.91				
		1832	98.5	14.02	11.59					84.48	86.91				
		1840	98.5	13.06	11.59					85.44	86.91				
		1855	98.5	14.53	11.59					83.97	86.91				
		1864	98.5	13.18	11.6					85.32	86.9				
		1883	98.5	12.99	11.59					85.51	86.91				
		1906	98.5	12.42	12.07					86.08	86.43				
		1918	96.92	12.68	10.99					84.24	85.93				
		1933	96.92	11.35	10.89					85.57	86.03				
		1969	96.92	11.54	10.92					85.38	86				
		1997	96.92	11.57	10.9					85.35	86.02				
		2028	96.92	12.69	10.92					84.23	86				
		2058	96.92	14.98	10.94					81.94	85.98				
		2072	96.92	14.48	10.94					82.44	85.98				
		2098	96.92	12.5	10.94					84.42	85.98				
		2115	96.92	14.32	10.94					82.6	85.98				
		2135	96.92	13	10.93					83.92	85.99				
		2154	96.92	12.12	10.92					84.8	86				
		2168	96.92	12.89	10.94					84.03	85.98				
		2204	96.92	12.85	10.91					84.07	86.01				
		2217	96.92	12.85	10.91					84.07	86.01				

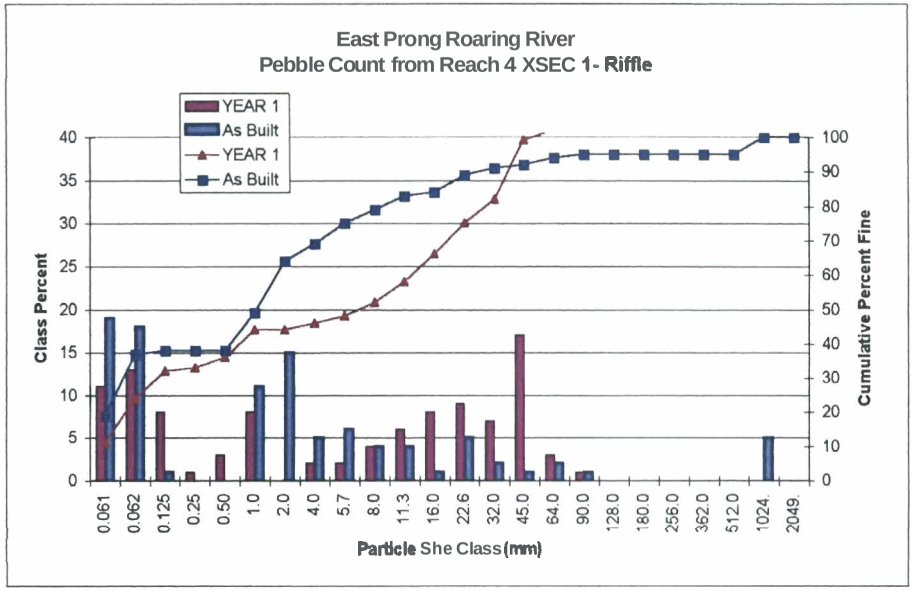
2259	96.92	12.34	10.92			84.58	86		
2277	96.92	13.11	10.92			83.81	86		
2299	96.92	15.75	11			81.17	85.92		
2358	96.92	13.38	10.94			83.54	85.98		
2396	96.92	11.42	10.97		6.01	85.5	85.95		90.91
2509	94.61	10.2	9.7			84.41	84.91		
2574	94.61	10.35	9.84			84.26	84.77		
2606	94.61	12.02	9.88			82.59	84.73		
2617	94.61	11.19	9.88			83.42	84.73		
2630	94.61	12.72	9.88		5.33	81.89	84.73		89.28
2650	94.61	11.02	9.88			83.59	84.73		
2666	94.61	10.44	9.88			84.17	84.73		
2726	94.61	10.62	9.95			83.99	84.66		
2730.4	94.61	10.21	9.96			84.4	84.65		
2744	94.61	13.01	10.44			81.6	84.17		
2761	94.61	11.61	10.47			83	84.14		
2787	94.61	10.96	10.57			83.65	84.04		
2814	94.61	11.56	11.02			83.05	83.59		
2833	94.61	12.31	11.02			82.3	83.59		
2842	94.61	13.08	11.03			81.53	83.58		
2883	94.61	13.3	11.03			81.31	83.58		
2935	92.41	13.06	8.84			79.35	83.57		
2953	92.41	13	8.85			79.41	83.56		
2971	92.41	11.07	8.85			81.34	83.56		
3036	92.41	9.55	8.85			82.86	83.56		
3050	92.41	9.35	8.89			83.06	83.52		
3057	92.41	12.91	10.86			79.5	81.55		
3066.5	92.41	11.59	10.98			80.82	81.43		
3094	92.41	11.94	11.31			80.47	81.1		
3125	92.41	11.99	11.46			80.42	80.95		
3148	92.41	13.29	11.59			79.12	80.82		
3160	92.41	12.27	11.65		7.34	80.14	80.76		85.07
3223	92.41	13.9	13.24			78.51	79.17		
3284	92.41	14.19	13.54			78.22	78.87		
3290	92.41	13.97	13.55			78.44	78.86		
3297	87.84	11.52	9.55			76.32	78.29		
3316	87.84	11.19	9.54			76.65	78.3		
3357.5	87.84	9.99	9.55			77.85	78.29		
3451.5	87.84	10.97	10.55		7.34	76.87	77.29		80.5
3472	87.84	11.94	10.64			75.9	77.2		
3485	87.84	13.51	10.69			74.33	77.15		
3502	87.84	13.68	10.66			74.16	77.18		
3520	87.84	14.01	10.65			73.83	77.19		
3532	87.84	12.88	10.64			74.96	77.2		
3572	87.84	11.98	10.64			75.86	77.2		
3599	87.84	11.17	10.64			76.67	77.2		
3615.5	87.84	10.87	10.66			76.97	77.18		
3620	87.84	13.63	10.95			74.21	76.89		
3642	83.67	7.33	6.81			76.34	76.86		
3725	83.67	8.62	8.07			75.05	75.6		
3743	83.67	10.19	8.64			73.48	75.03		
3754	83.67	9.62	8.66			74.05	75.01		
3767	83.67	9.3	8.72			74.37	74.95		
3784.5	83.67	9.95	8.86			73.72	74.81		
3798.5	83.67	10.71	8.85			72.96	74.82		
3805	83.67	9.88	8.87			73.79	74.8		
3812.5	83.67	11.48	8.86			72.19	74.81		
3821	83.67	11.82	8.86			71.85	74.81		
3840	83.67	11.3	8.86			72.37	74.81		
3861.5	83.67	11.53	8.87			72.14	74.8		
3871.5	83.67	10.98	8.86			72.69	74.81		
3895	83.67	9.63	8.87		4.84	74.04	74.8		78.83
3960	83.67	9.29	8.88			74.38	74.79		
3968	83.67	8.62	8.88			75.05	74.79		
3983	83.67	10.86	9.33			72.81	74.34		
3996.5	83.67	10.12	9.33			73.55	74.34		
4013	83.67	9.96	9.35			73.71	74.32		
4034	83.67	10.34	9.75			73.33	73.92		
4047	83.67	12.63	9.81			71.04	73.86		
4063.5	83.67	10.3	9.86		5.19	73.37	73.81		78.48


Longitudinal Profile - 2000 & 2001 Survey
Elevation (ft)
105
100
95
90
85
80
75
70
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
Distance (ft)
Thalweg_00
Thalweg_01

Reach 4 Perm. X Sec 1	Approx. STA # 8+56	Survey Date 2000		Survey Date 2001	
Particle Size (mm)	**Particle Size**	**Total**	**%Cumulative**	**Total**	**%Cumulative**
0.061	**Silt/Clay**	19	19	11	11
0.062	**Sand**	18	37	13	24
0.125		1	38	8	32
0.25		0	38	1	33
0.50		0	38	3	36
1.0	**G r a v e l**	11	49	8	44
2.0		15	64	0	44
4.0		5	69	2	46
5.7		6	75	2	48
8.0		4	79	4	52
11.3		4	83	6	58
16.0		1	84	8	66
22.6		5	89	9	75
32.0		2	91	7	82
45.0		1	92	17	99
64.0	**Cobble**	2	94	3	102
90.0		1	95	1	103
128.0		0	95	0	103
180.0		0	95	0	103
256.0	**Boulder**	0	95	0	103
362.0		0	95	0	103
512.0		0	95	0	103
1024.0		5	100	0	103
2049.0	**Bedrock**	0	100	0	103

Particle Sizes (mm):	
D16	0.061
D35	0.062
D50	1.4
D84	18
D95	112

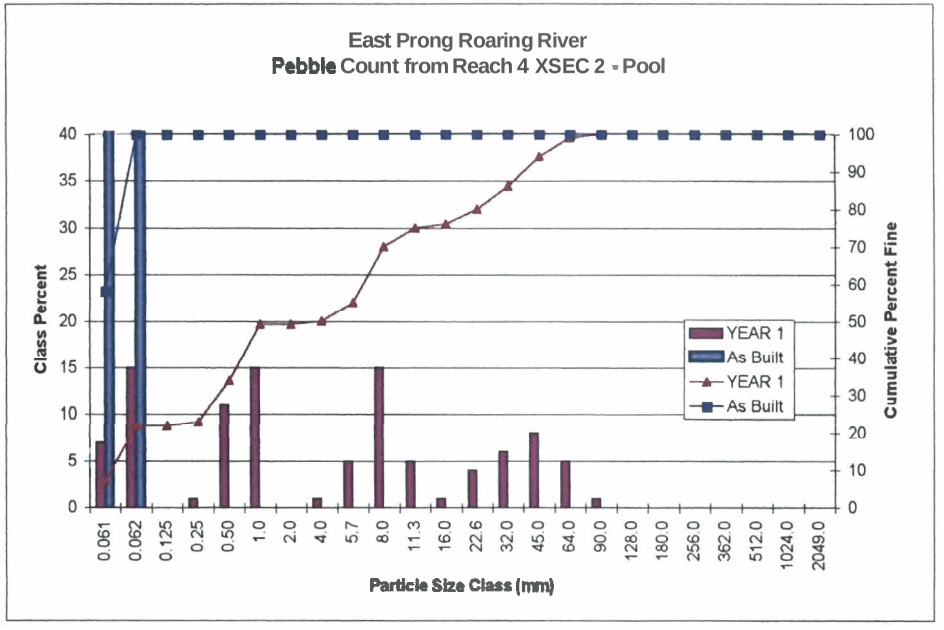
Particle Sizes (mm):	
D16	0.061
D35	0.4
D50	7
D84	36
D95	40



Reach 4 Perm X Sec 2	Approx. STA # 11+86	Survey Date 2000		Survey Date 2001	
Particle Size (mm)	**Particle Size**	**Total**	**%Cumulative**	**Total**	**%Cumulative**
0.061	**Silt/Clay**	58	58	7	7
0.062	**Sand**	42	100	15	22
0.125			100	0	22
0.25			100	1	23
0.50			100	11	34
1.0	**G r a v e l**		100	15	49
2.0			100	0	49
4.0			100	1	50
5.7			100	5	55
8.0			100	15	70
11.3			100	5	75
16.0			100	1	76
22.6			100	4	80
32.0			100	6	86
45.0			100	8	94
64.0	Cobble		100	5	99
90.0			100	1	100
128.0			100		100
180.0			100		100
256.0	Boulder		100		100
362.0			100		100
512.0			100		100
1024.0			100		100
2049.0	**Bedrock**		100		100

Particle Sizes (mm):	
D16	0.061
D35	0.061
D50	0.061
D84	0.062
D95	0.062

Particle Sizes (mm):	
D16	0.1
D35	1
D50	5
D84	40
D95	50



Cross Section R4-XSEC1 RIFFLE

STONE MTN RESTORATION
Yadkin River Basin, Wilkes County, North Carolina
Dani Wise

03/19/2002

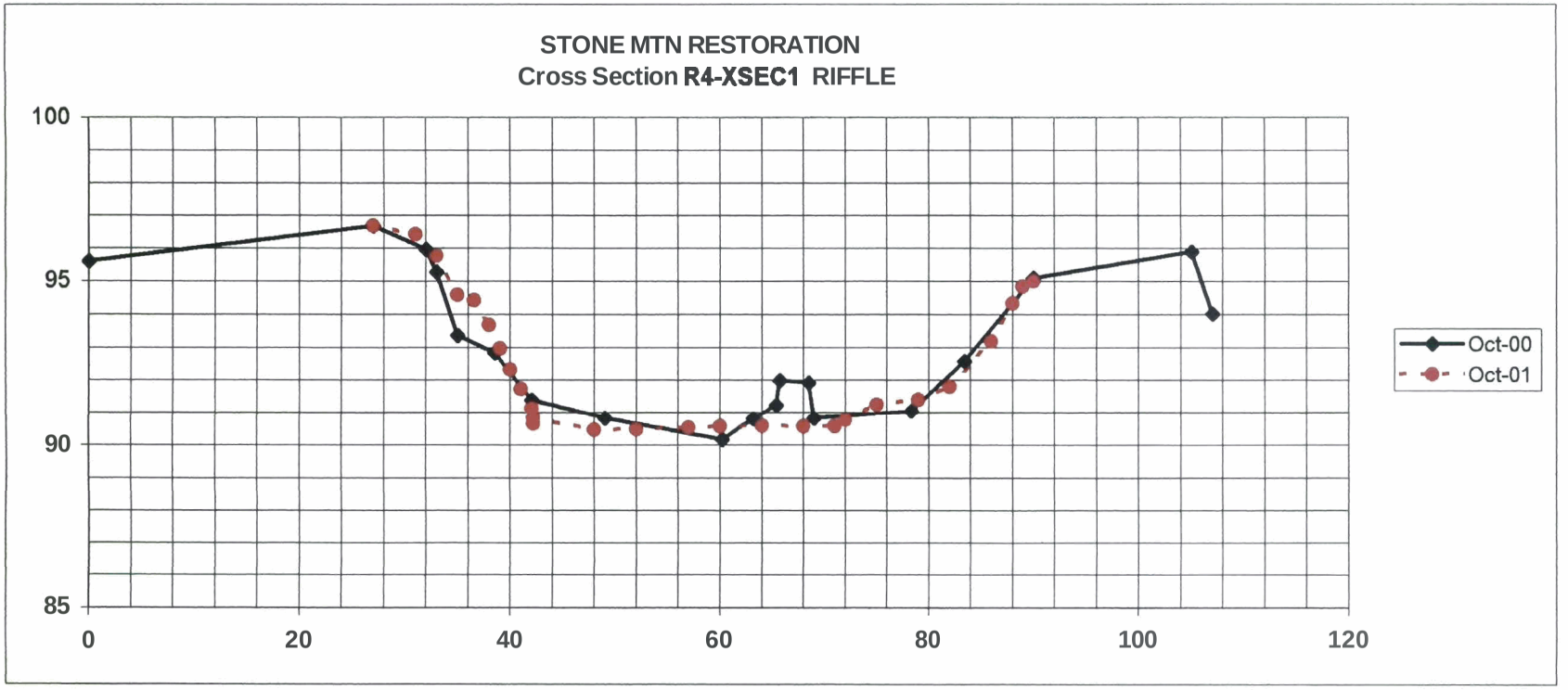
Oct-00

NOTES	Survey Data STA	HI	FS	ELEV	Bkf Hydraulic Geometry Depth	Width	Area
	0	101.34	5.74	95.60	0.00	0.0	0.00
	27	101.34	4.66	96.68	0.00	0.0	0.00
	32	101.34	5.37	95.97	0.00	0.0	0.00
LBKF	33	101.34	6.07	95.27	0.00	0.0	0.00
	35	101.34	7.98	93.36	1.91	2.0	1.91
	38.5	101.34	8.51	92.83	2.44	3.5	7.61
	42	101.34	9.96	91.38	3.89	3.5	11.08
	49	101.34	10.52	90.82	4.45	7.0	29.19
	60.2	101.34	11.18	90.16	5.11	11.2	53.54
	63.2	101.34	10.53	90.81	4.46	3.0	14.36
	65.4	101.34	10.12	91.22	4.05	2.2	9.36
	65.7	101.34	9.35	91.99	3.28	0.3	1.10
	68.5	101.34	9.42	91.92	3.35	2.8	9.28
	69	101.34	10.51	90.83	4.44	0.5	1.95
	78.3	101.34	10.3	91.04	4.23	9.3	40.32
	83.4	101.34	8.76	92.58	2.69	5.1	17.65
RBKF	90	101.34	6.24	95.10	0.17	6.6	9.44
	105	101.34	5.44	95.90	0.00	0.0	0.00
	107	101.34	7.32	94.02	0.00	0.0	0.00

Oct-01 HI = 102.57

NOTES	Survey Data STA	FS	ELEV	Bkf Hydraulic Geometry Depth	Width	Area
	27	5.9	96.67	0.00	0.0	0.00
	31	6.14	96.43	0.00	0.0	0.00
	33	6.8	95.77	0.00	0.0	0.00
	35	7.99	94.58	1.19	2.0	1.19
	36.6	8.15	94.42	1.35	1.6	2.03
	38	8.9	93.67	2.10	1.4	2.42
	39	9.61	92.96	2.81	1.0	2.46
	40	10.26	92.31	3.46	1.0	3.14
	41	10.85	91.72	4.05	1.0	3.76
	42	11.44	91.13	4.64	1.0	4.35
	42.2	11.94	90.63	5.14	0.2	0.98
	42.2	11.74	90.83	4.94	0.0	0.00
	48	12.11	90.46	5.31	5.8	29.73
	52	12.09	90.48	5.29	4.0	21.20
	57	12.04	90.53	5.24	5.0	26.33
	60	12	90.57	5.20	3.0	15.66
	64	11.99	90.58	5.19	4.0	20.78
	68	12.01	90.56	5.21	4.0	20.80
	71	12.01	90.56	5.21	3.0	15.63
	72	11.8	90.77	5.00	1.0	5.11
	75	11.32	91.25	4.52	3.0	14.28
	79	11.19	91.38	4.39	4.0	17.82
	82	10.78	91.79	3.98	3.0	12.56
	86	9.39	93.18	2.59	4.0	13.14
	88	8.24	94.33	1.44	2.0	4.03
	89	7.74	94.83	0.94	1.0	1.19
	90	7.57	95	0.77	1.0	0.85

R4-XSEC 1	Feature	Type	Wfpa	LBKF	RBKF	ELEVbkf	Wbkf	Dbkf	W/D	Abkf	Dmax	ER
Oct-00	RIFFLE	C	200	33.0	90.0	95.27	57.0	3.6	15.7	206.8	5.1	3.5
Oct-01	RIFFLE	C	200	33.0	90.0	95.77	57.0	4.2	13.6	239.4	5.3	3.5



Cross Section R4-XSEC2 POOL | **STONE MTN RESTORATION** | **03/19/2002**

Yadkin River Basin, Wilkes County, North Carolina

Dani Wise

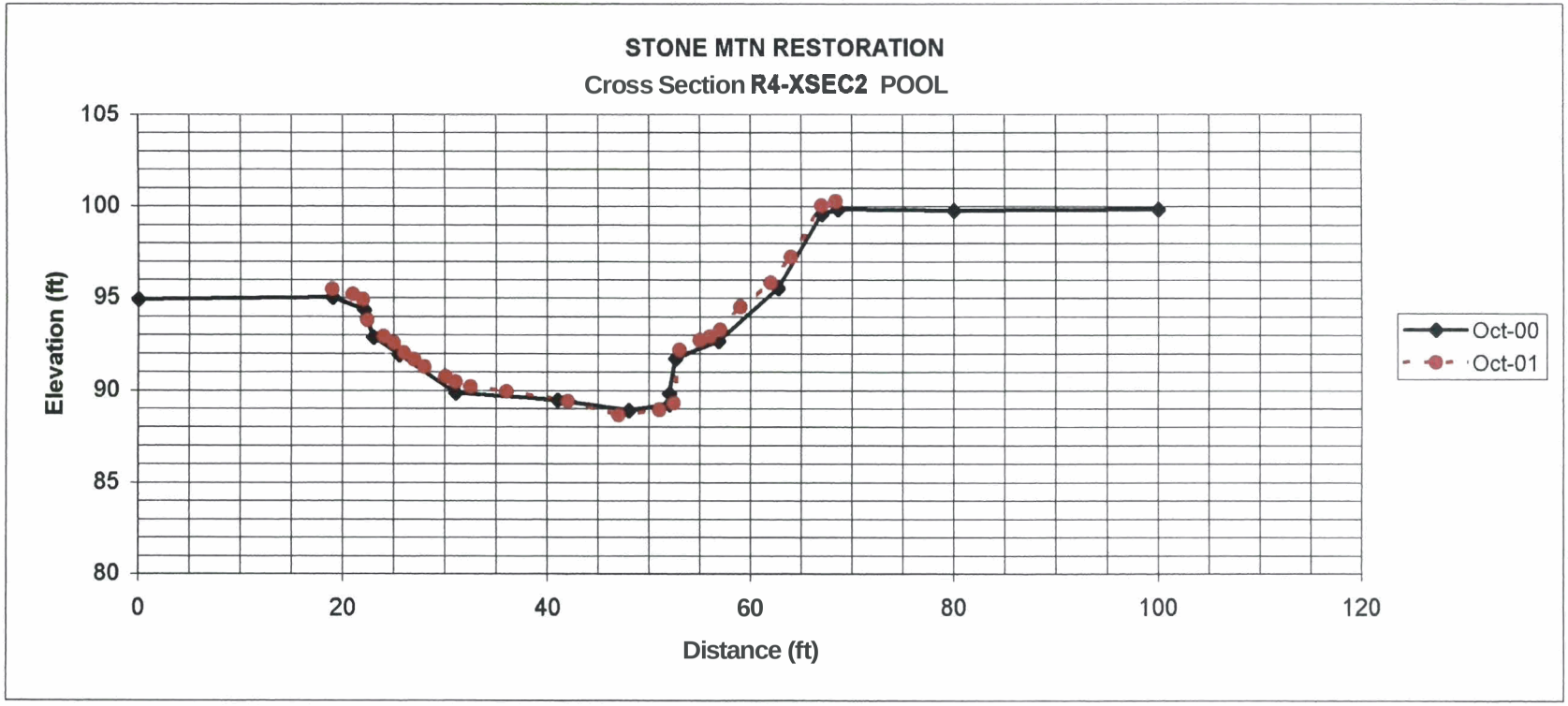
Oct-00

	Survey Data				Bkf Hydraulic Geometry		
NOTES	STA	HI	FS	ELEV	Depth	Width	Area
	0	104.75	9.84	94.91	0.00	0.0	0.00
LBKF	19	104.75	9.69	95.06	0.00	0.0	0.00
	22.1	104.75	10.38	94.37	0.69	3.1	1.07
	23	104.75	11.87	92.88	2.18	0.9	1.29
	25.5	104.75	12.84	91.91	3.15	2.5	6.66
	31	104.75	14.88	89.87	5.19	5.5	22.94
	41	104.75	15.29	89.46	5.60	10.0	53.95
	48	104.75	15.85	88.90	6.16	7.0	41.16
	52	104.75	15.51	89.24	5.82	4.0	23.96
	52	104.75	14.92	89.83	5.23	0.0	0.00
	52.6	104.75	13.02	91.73	3.33	0.6	2.57
	56.8	104.75	12.08	92.67	2.39	4.2	12.01
RBKF	62.7	104.75	9.2	95.55	0.00	0.0	0.00
	67	104.75	5.17	99.58	0.00	0.0	0.00
	68.6	104.75	4.9	99.85	0.00	0.0	0.00
	80	104.75	4.97	99.78	0.00	0.0	0.00
	100	104.75	4.92	99.83	0.00	0.0	0.00

Oct-01 HI = 105.5

	Survey Data			Bkf Hydraulic Geometry		
NOTES	STA	FS	ELEV	Depth	Width	Area
	19	10.02	95.48	0.00	0.0	0.00
	21	10.29	95.21	0.27	2.0	0.27
	22	10.59	94.91	0.57	1.0	0.42
	22.4	11.69	93.81	1.67	0.4	0.45
	24	12.59	92.91	2.57	1.6	3.39
	25	12.94	92.56	2.92	1.0	2.75
	26	13.46	92.04	3.44	1.0	3.18
	27	13.84	91.66	3.82	1.0	3.63
	28	14.22	91.28	4.20	1.0	4.01
	30	14.76	90.74	4.74	2.0	8.94
	31	15.05	90.45	5.03	1.0	4.89
	32.5	15.3	90.2	5.28	1.5	7.73
	36	15.58	89.92	5.56	3.5	18.97
	42	16.09	89.41	6.07	6.0	34.89
	47	16.86	88.64	6.84	5.0	32.28
	51	16.57	88.93	6.55	4.0	26.78
	52.4	16.19	89.31	6.17	1.4	8.90
	53	13.3	92.2	3.28	0.6	2.84
	55	12.8	92.7	2.78	2.0	6.06
	56	12.6	92.9	2.58	1.0	2.68
	57	12.24	93.26	2.22	1.0	2.40
	59	10.99	94.51	0.97	2.0	3.19
	62	9.68	95.82	0.00	0.0	0.00
	64	8.24	97.26	0.00	0.0	0.00
	67	5.47	100.03	0.00	0.0	0.00
	68.4	5.22	100.28	0.00	0.0	0.00
	68.4	5.22	100.28	0.00	0.0	0.00

R4-XSEC2	Feature	Type	Wfpa	LBKF	RBKF	ELEVbkf	Wbkf	Dbkf	W/D	Abkf	Dmax	ER
Oct-00	POOL	C	200	19.0	62.7	95.06	43.7	3.8	11.5	165.6	6.2	4.6
Oct-01	POOL	C	200	19.0	62.0	95.48	43	4.2	10.4	178.6	6.8	4.7



Cross Section R4-XSEC3 POOL — STONE MTN RESTORATION — 03/19/2002

Yadkin River Basin, Wilkes County, North Carolina

Dani Wise

Oct-00

NOTES	Survey Data STA	HI	FS	ELEV	Bkf Hydraulic Geometry Depth	Width	Area
	0	96.86	6.8	90.06	0.00	0.0	0.00
LBKF	6.5	96.86	8.94	87.92	0.00	0.0	0.00
	13	96.86	10.1	86.76	1.16	6.5	3.77
	33.8	96.86	10.73	86.13	1.79	20.8	30.68
	50	96.86	11.39	85.47	2.45	16.2	34.34
	55	96.86	13.57	83.29	4.63	5.0	17.70
	65.2	96.86	12.18	84.68	3.24	10.2	40.14
	65.8	96.86	10.51	86.35	1.57	0.6	1.44
	68.4	96.86	11.47	85.39	2.53	2.6	5.33
	71.3	96.86	10.23	86.63	1.29	2.9	5.54
	74	96.86	10.76	86.10	1.82	2.7	4.20
	83	96.86	9.66	87.20	0.72	9.0	11.43
RBKF	92	96.86	5.26	91.60	0.00	0.0	0.00
	98	96.86	5.32	91.54	0.00	0.0	0.00
	100	96.86	5.16	91.70	0.00	0.0	0.00

Oct-01 HI= 95.67

NOTES	Survey Data STA	FS	ELEV	Bkf Hydraulic Geometry Depth	Width	Area
	2	6.35	89.32	0.00	0.0	0.00
	6	6.99	88.68	0.00	0.0	0.00
	8	7.78	87.89	0.00	0.0	0.00
	12	8.81	86.86	1.03	4.0	2.06
	16	8.98	86.69	1.20	4.0	4.46
	28	8.79	86.88	1.01	12.0	13.26
	41	8.71	86.96	0.93	13.0	12.61
	46	9.06	86.61	1.28	5.0	5.52
	51	9.58	86.09	1.80	5.0	7.70
	51.6	9.86	85.81	2.08	0.6	1.16
	58	10.32	85.35	2.54	6.4	14.78
	60	10.92	84.75	3.14	2.0	5.68
	62	11.32	84.35	3.54	2.0	6.68
	64	12.5	83.17	4.72	2.0	8.26
	66	13.28	82.39	5.50	2.0	10.22
	70	13.08	82.59	5.30	4.0	21.60
	72	12.68	82.99	4.90	2.0	10.20
	75	11.6	84.07	3.82	3.0	13.08
	75.5	11.3	84.37	3.52	0.5	1.84
	76	10.18	85.49	2.40	0.5	1.48
	81.5	9.98	85.69	2.20	5.5	12.65
	83	9.89	85.78	2.11	1.5	3.23
	85	9.74	85.93	1.96	2.0	4.07
	86.5	9.38	.29	1.60	1.5	2.67
	90	8.84	86.83	1.06	3.5	4.65
	94	8.36	87.31	0.58	4.0	3.28
	96.5	8.15	87.52	0.37	2.5	1.19
	102	4.67	91	0.00	0.0	0.00
	105	4.1	91.57	0.00	0.0	0.00
	105.5	4.24	91.43	0.00	0.0	0.00
	108.7	4.23	91.44	0.00	0.0	0.00
	108.7	4.09	91.58	0.00	0.0	0.00
	108.7	4.21	91.46	0.00	0.0	0.00

R4-XSEC 3	Feature	Type	Wfpa	LBKF	RBKF	ELEVbkf	Wbkf	Dbkf	W/D	Abkf	Dmax	ER
Oct-00	POOL	C	200	6.5	92.0	87.92	85.5	1.8	47.3	154.6	4.6	2.3
Oct-01	POOL	C	200	8.0	96.5	87.89	88.5	1.9	45.4	172.3	5.5	2.3

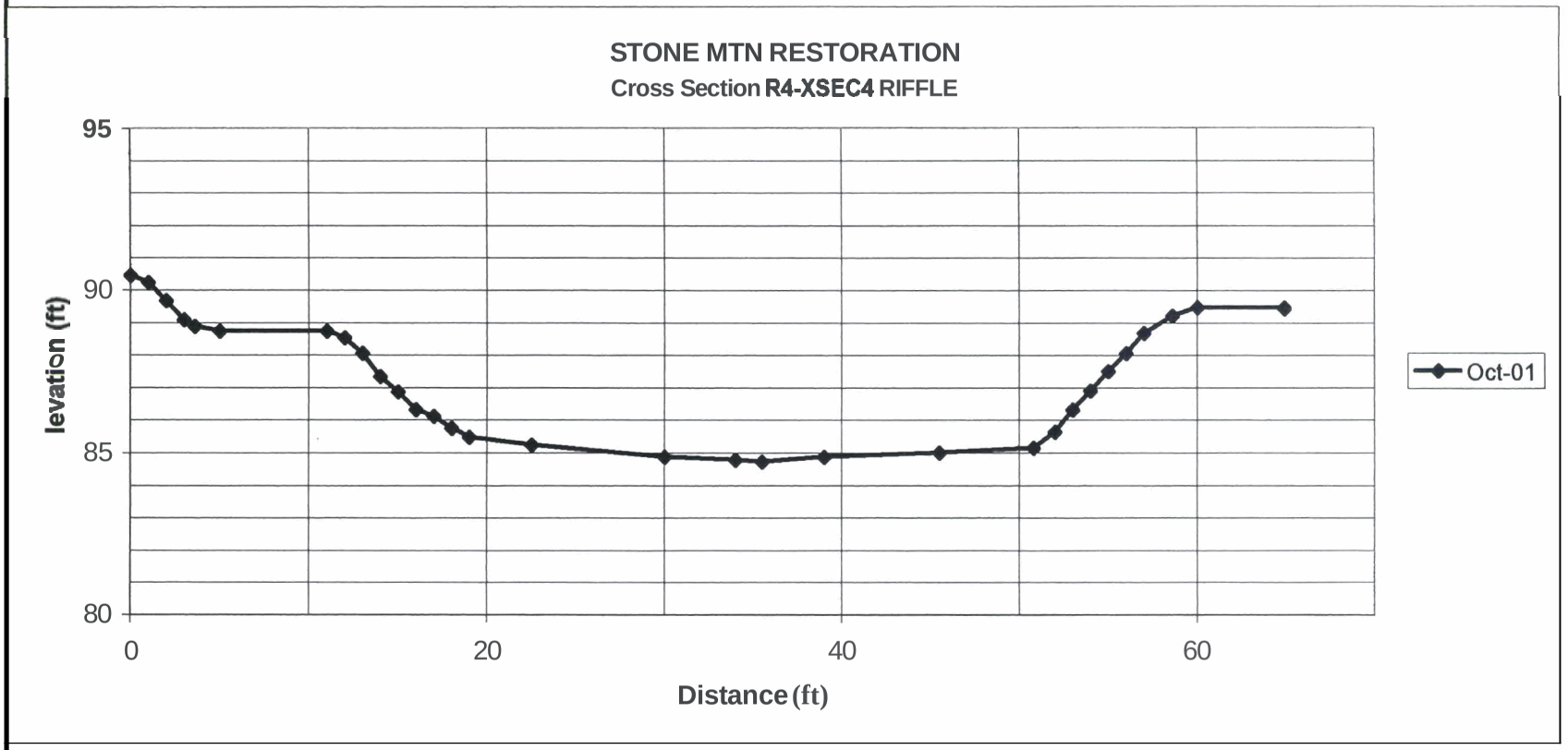
Cross Section R4-XSEC4 RIFFLE

STONE MTN RESTORATION
Yadkin River Basin, Wilkes County, North Carolina
Dani Wise

Oct-01

	Survey Data				Bkf Hydraulic Geometry		
NOTES	STA	HI	FS	ELEV	Depth	Width	Area
	0	94.61	4.15	90.46	0.00	0.0	0.00
	1	94.61	4.37	90.24	0.00	0.0	0.00
	2	94.61	4.94	89.67	0.00	0.0	0.00
	3	94.61	5.53	89.08	0.00	0.0	0.00
	3.6	94.61	5.72	88.89	0.00	0.0	0.00
	5	94.61	5.88	88.73	0.00	0.0	0.00
LBKF	11	94.61	5.88	88.73	0.00	0.0	0.00
	12	94.61	6.08	88.53	0.20	1.0	0.10
	13	94.61	6.55	88.06	0.67	1.0	0.44
	14	94.61	7.26	87.35	1.38	1.0	1.03
	15	94.61	7.75	86.86	1.87	1.0	1.63
	16	94.61	8.3	86.31	2.42	1.0	2.15
	17	94.61	8.49	86.12	2.61	1.0	2.52
	18	94.61	8.86	85.75	2.98	1.0	2.80
	19	94.61	9.14	85.47	3.26	1.0	3.12
	22.5	94.61	9.37	85.24	3.49	3.5	11.81
	30	94.61	9.73	84.88	3.85	7.5	27.53
	34	94.61	9.83	84.78	3.95	4.0	15.60
	35.5	94.61	9.89	84.72	4.01	1.5	5.97
	39	94.61	9.74	84.87	3.86	3.5	13.77
	45.5	94.61	9.61	85.00	3.73	6.5	24.67
	50.8	94.61	9.47	85.14	3.59	5.3	19.40
	52	94.61	8.96	85.65	3.08	1.2	4.00
	53	94.61	8.29	86.32	2.41	1.0	2.75
	54	94.61	7.7	86.91	1.82	1.0	2.12
	55	94.61	7.1	87.51	1.22	1.0	1.52
	56	94.61	6.55	88.06	0.67	1.0	0.95
RBKF	57	94.61	5.92	88.69	0.04	1.0	0.36
	58.6	94.61	5.4	89.21	0.00	0.0	0.00
	60	94.61	5.14	89.47	0.00	0.0	0.00
	64.9	94.61	5.15	89.46	0.00	0.0	0.00
	64.9	94.61	5.18	89.43	0.00	0.0	0.00

R4-XSEC4	Feature	Type	Wfpa	LBKF	RBKF	ELEVbkf	Wbkf	Dbkf	W/D	Abkf	Dmax	ER
Oct-01	POOL	C	200	11.0	57.0	88.73	46.0	3.1	14.7	144.2	4.0	4.3



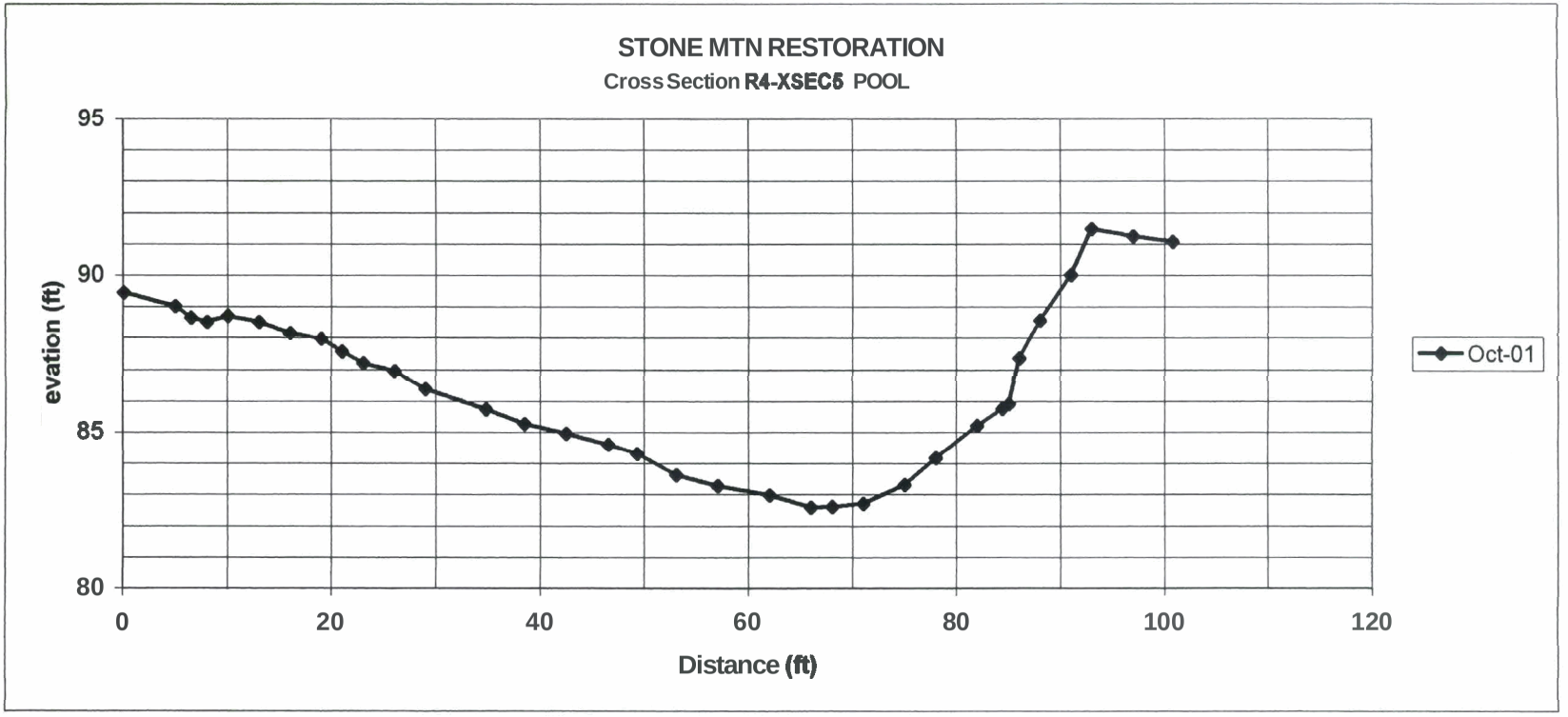
Cross Section R4-XSEC5 POOL

STONE MTN RESTORATION
Yadkin River **Basin**, **Wilkes** County, **North** Carolina
Dani Wise

01-Oct

	Survey Data				Bkf Hydraulic Geometry		
NOTES	STA	HI	FS	ELEV	Depth	Width	Area
	0.04	94.61	5.16	89.45	0.00	0.0	0.00
	5	94.61	5.59	89.02	0.00	0.0	0.00
	6.5	94.61	5.93	88.66	0.00	0.0	0.00
	8	94.61	6.09	88.52	0.00	0.0	0.00
	10	94.61	5.9	88.71	0.00	0.0	0.00
	13	94.61	6.1	88.51	0.00	0.0	0.00
	16	94.61	6.44	88.17	0.00	0.0	0.00
	19	94.61	6.63	87.98	0.00	0.0	0.00
LBKF	21	94.61	7.04	87.57	0.00	0.0	0.00
	23	94.61	7.4	87.21	0.36	2.0	0.36
	26	94.61	7.65	86.96	0.61	3.0	1.46
	29	94.61	8.22	86.39	1.18	3.0	2.68
	34.8	94.61	8.86	85.75	1.82	5.8	8.70
	38.5	94.61	9.34	85.27	2.30	3.7	7.62
	42.5	94.61	9.65	84.96	2.61	4.0	9.82
	'46.5	94.61	10	84.61	2.96	4.0	11.14
	49.3	94.61	10.3	84.31	3.26	2.8	8.71
	a	94.61	10.98	83.63	3.94	3.7	13.32
	57	94.61	11.32	83.29	4.28	4.0	16.44
	62	94.61	11.62	82.99	4.58	5.0	22.15
	66	94.61	12.011	82.60	4.97	4.0	19.10
	68	94.61	11.99	82.62	4.95	2.0	9.92
	71	94.61	11.9	82.71	4.86	3.0	14.72
	75	94.61	11.28	83.33	4.24	4.0	18.20
	78	94.61	10.43	84.18	3.39	3.0	11.45
	82	94.61	9.4	85.21	2.36	4.0	11.50
	84.4	94.61	8.85	85.76	1.81	2.4	5.00
	85	94.61	8.7	85.91	1.66	0.6	1.04
RBKF	86	94.61	7.25	87.36	0.21	1.0	0.93
	88	94.61	6.04	88.57	0.00	0.0	0.00
	91	94.61	4 8	90.01	0.00	0.0	0.00
	93	94.61	3.12	91.49	0.00	0.0	0.00
	97	94.61	3.36	91.25	0.00	0.0	0.00
	100.8	94.61	3.53	91.08	0.00	0.0	0.00

R4-XSEC5	Feature	Type	Wfpa	LBKF	RBKF	ELEVbkf	Wbkf	Dbkf	W/D	Abkf	Dmax	ER
Oct-01	POOL	C	200	21.0	86.0	87.57	65.0	3.0	21.7	194.3	5.0	3.1



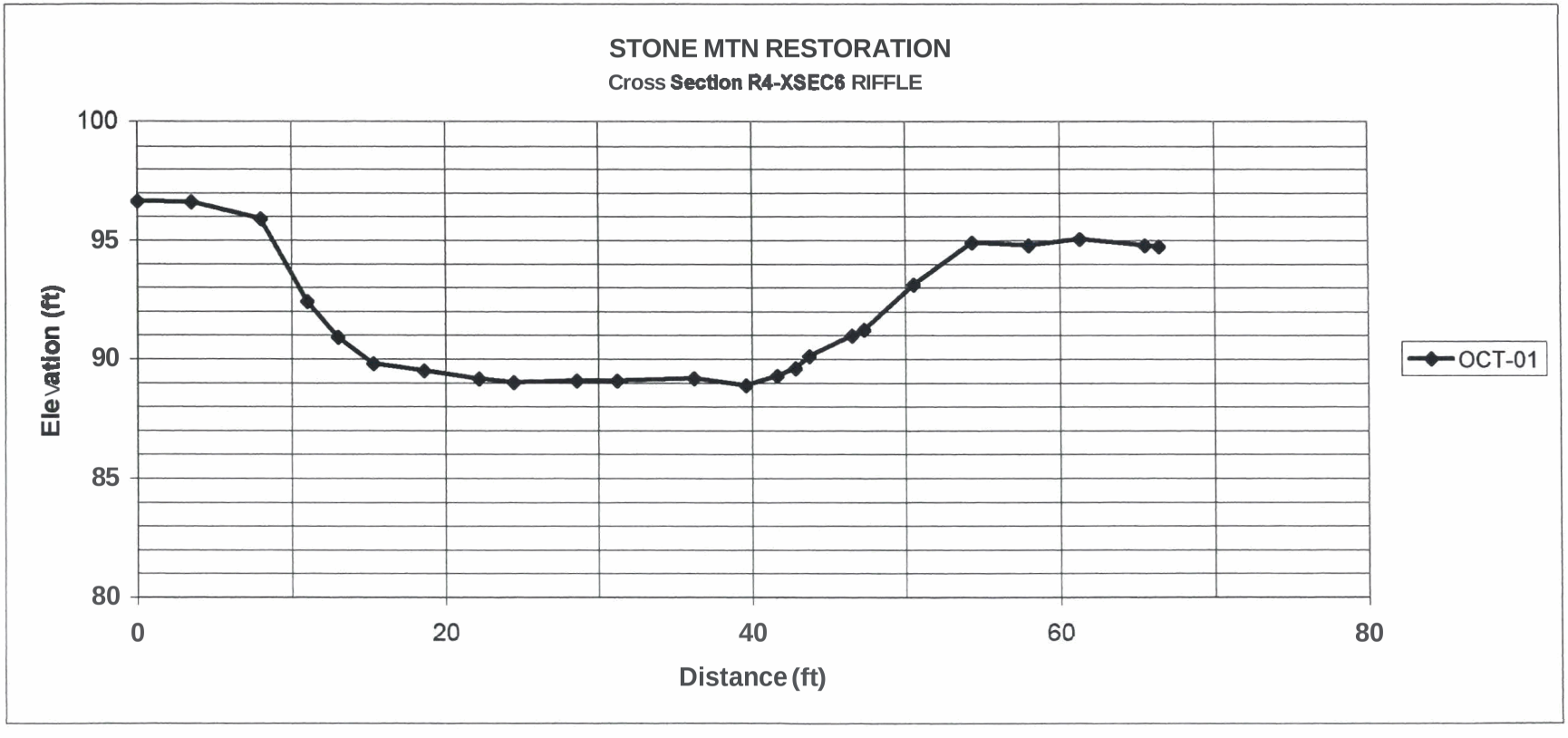
Cross Section R4-XSEC 6 RIFFLE

STONE MTN RESTORATION
Yadkin River Basin, Wilkes County, North Carolina
Dani Wise

Oct-01

	Survey Data				Bkf Hydraulic Geometry		
NOTES	STA	HI	FS	ELEV	Depth	Width	Area
	0	100	3.36	96.64	0.00	0.0	0.00
	3.5	100	3.37	96.63	0.00	0.0	0.00
LBKF	8	100	4.1	95.90	0.00	0.0	0.00
	11	100	7.59	92.41	3.49	3.0	5.24
	13	100	9.1	90.90	5.00	2.0	8.49
	15.3	100	10.2	89.80	6.10	2.3	12.77
	18.6	100	10.5	89.50	6.40	3.3	20.63
	22.2	100	10.84	89.16	6.74	3.6	23.65
	24.5	100	10.98	89.02	6.88	2.3	15.66
	28.6	100	10.92	89.08	6.82	4.1	28.09
	31.2	100	10.92	89.08	6.82	2.6	17.73
	36.2	100	10.81	89.19	6.71	5.0	33.83
	39.6	100	11.1	88.90	7.00	3.4	23.31
	41.6	100	10.71	89.29	6.61	2.0	13.61
	42.8	100	10.39	89.61	6.29	1.2	7.74
	43.7	100	9.87	90.13	5.77	0.9	5.43
	46.5	100	9.01	90.99	4.91	2.8	14.95
	47.3	100	8.78	91.22	4.68	0.8	3.84
	50.5	100	6.87	93.13	2.77	3.2	11.92
RBKF	54.3	100	5.09	94.91	0.99	3.8	7.14
	58	100	5.21	94.79	0.00	0.0	0.00
	61.3	100	4.96	95.04	0.00	0.0	0.00
	65.5	100	5.22	94.78	0.00	0.0	0.00
	66.4	100	5.26	94.74	0.00	0.0	0.00

R4-XSEC6	Feature	Type	Wfpa	LBKF	RBKF	ELEVbkf	Wbkf	Dbkf	W/D	Abkf	Dmax	ER
Oct-01	RIFFLE	C	200	8.0	54.3	95.90	46.3	5.5	8.4	254.0	7.0	4.3



Cross Section R4-XSEC7 POOL

STONE MTN RESTORATION
Yadkin River Basin, Wilkes County, North Carolina
Dani Wise

Oct-01

	Survey Data				Bkf Hydraulic Geometry		
NOTES	STA	HI	FS	ELEV	Depth	Width	Area
LBKF	0	100	4.25	95.75	0.00	0.0	0.00
	8	100	4.71	95.29	0.46	8.0	1.84
	17	100	5.09	94.91	0.84	9.0	5.85
	23.7	100	5.99	94.01	1.74	6.7	8.64
	28.4	100	6.45	93.55	2.20	4.7	9.26
	31	100	6.82	93.18	2.57	2.6	6.20
	37.7	100	7.72	92.28	3.47	6.7	20.23
	40.6	100	7.99	92.01	3.74	2.9	10.45
	42.7	100	8.27	91.73	4.02	2.1	8.15
	45.9	100	9.25	90.75	5.00	3.2	14.43
	48.5	100	10.42	89.58	6.17	2.6	14.52
	51.6	100	10.99	89.01	6.74	3.1	20.01
	53.5	100	11.62	88.38	7.37	1.9	13.40
	54.7	100	11.5	88.50	7.25	1.2	8.77
	55.8	100	11.42	88.58	7.17	1.1	7.93
	56.7	100	11.2	88.80	6.95	0.9	6.35
	57.8	100	10.39	89.61	6.14	1.1	7.20
	59.8	100	7.79	92.21	3.54	2.0	9.68
	62	100	6.83	93.17	2.58	2.2	6.73
	63	100	5.65	94.35	1.40	1.0	1.99
	64.5	100	4.93	95.07	0.68	1.5	1.56
RBKF	67.6	100	3.61	96.39	0.00	0.0	0.00
	69.3	100	3.53	96.47	0.00	0.0	0.00
	71.4	100	3.38	96.62	0.00	0.0	0.00

R4-XSEC7	Feature	Type	Wfpa	LBKF	RBKF	ELEVbkf	Wbkf	Dbkf	W/D	Abkf	Dmax	ER
Oct-01	POOL	C	200	0.0	67.6	95.75	67.6	2.7	24.9	183.2	7.4	3.0

APPENDIX C

VEGETATION MONITORING DATA

Appendix C
Stone Mountain Vegetation Survey: Year 1
Survey Dates: 6-28-01; 8-14-01

BARE ROOT PLOTS				
Reach	**Plot #**	**Live/Total Stems**	**% survivability**	**% Herbaceous Cover**
2	1	26/28	93	>90
4	2	63/77	82	>90
4	3	8/8	100	>90
4	4	11/13	85	>90

LIVE STAKE PLOTS			
Reach	**Plot #**	**Live/Total Stems**	**% Survivability**
2	1	13/17	76
2	2	22/70	31
2	3	2/24	8
4	1	30/56	54
4	2	63/141	45
4	3	3/38	8
4	4	16/44	36
4	5	14/59	24

APPENDIX D

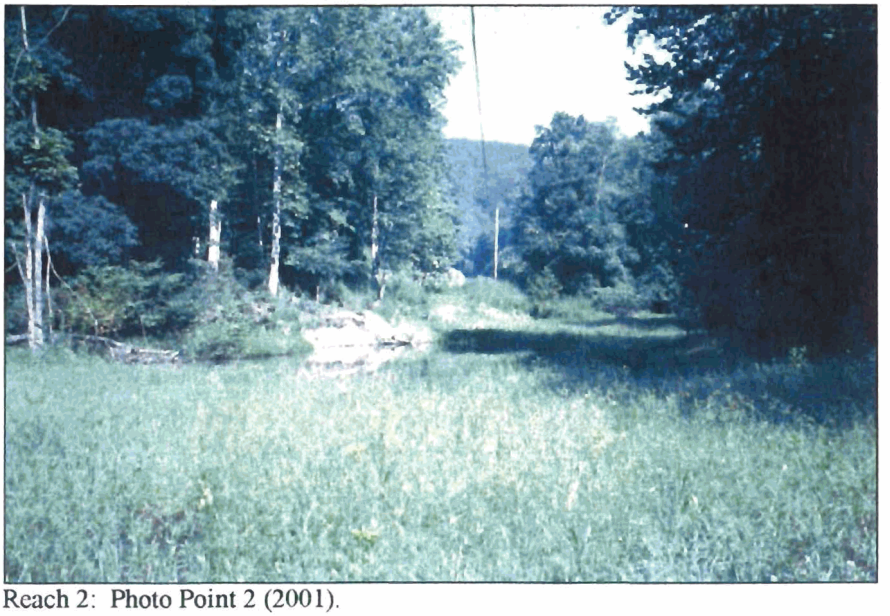
PHOTO REFERENCE POINTS

Reach 2: Photo Point 1 (2000).

Reach 2: Photo Point 2 (2000).

Reach 2: Photo Point 3 (2000).

Reach 2: Photo Point 1(2001).



Reach 2: Photo Point 2 (2001).

Reach 2: Photo Point 3 (2001).

Reach 2: Photo Point 4 (2001).

Reach 2: Photo Point 5 (2001).

Reach 4: Photo Point 1 (2000).

Reach 4: Photo Point 2 (2000).

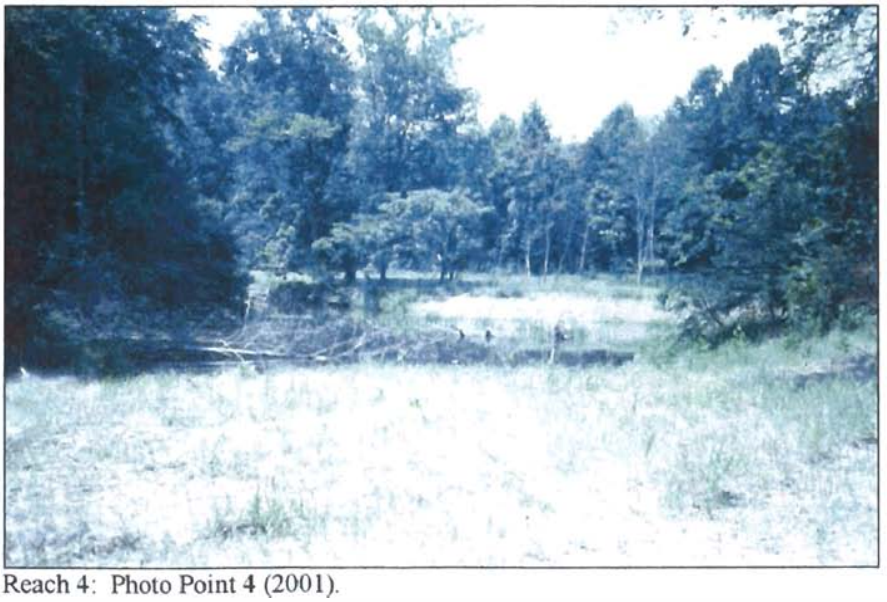
Reach 4: Photo Point 5 (2000).

Reach 4: Photo Point 6 (2000).

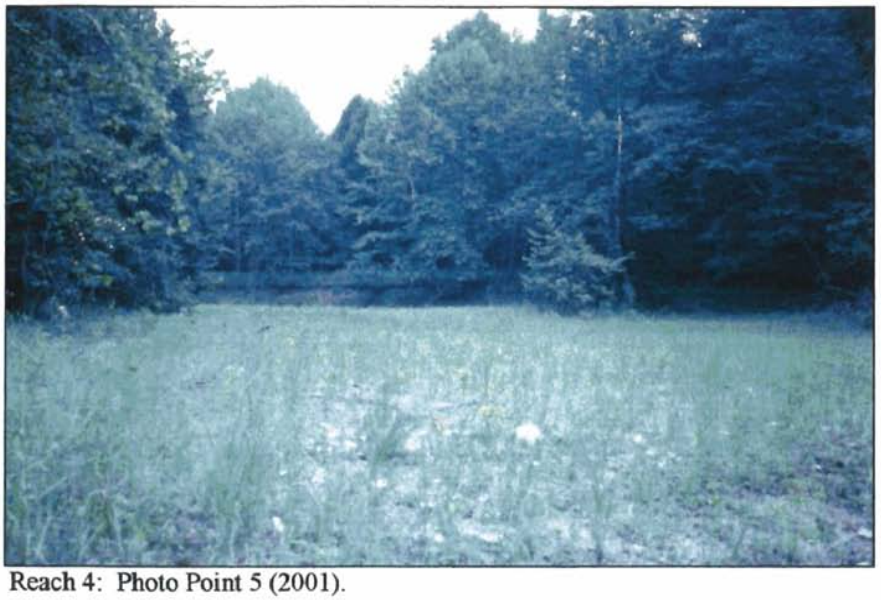
Reach 4: Photo Point 1(2001).

Reach 4: Photo Point 2 (2001).

Reach 4: Photo Point 3 (2001).



Reach 4: Photo Point 4 (2001).



Reach 4: Photo Point 5 (2001).

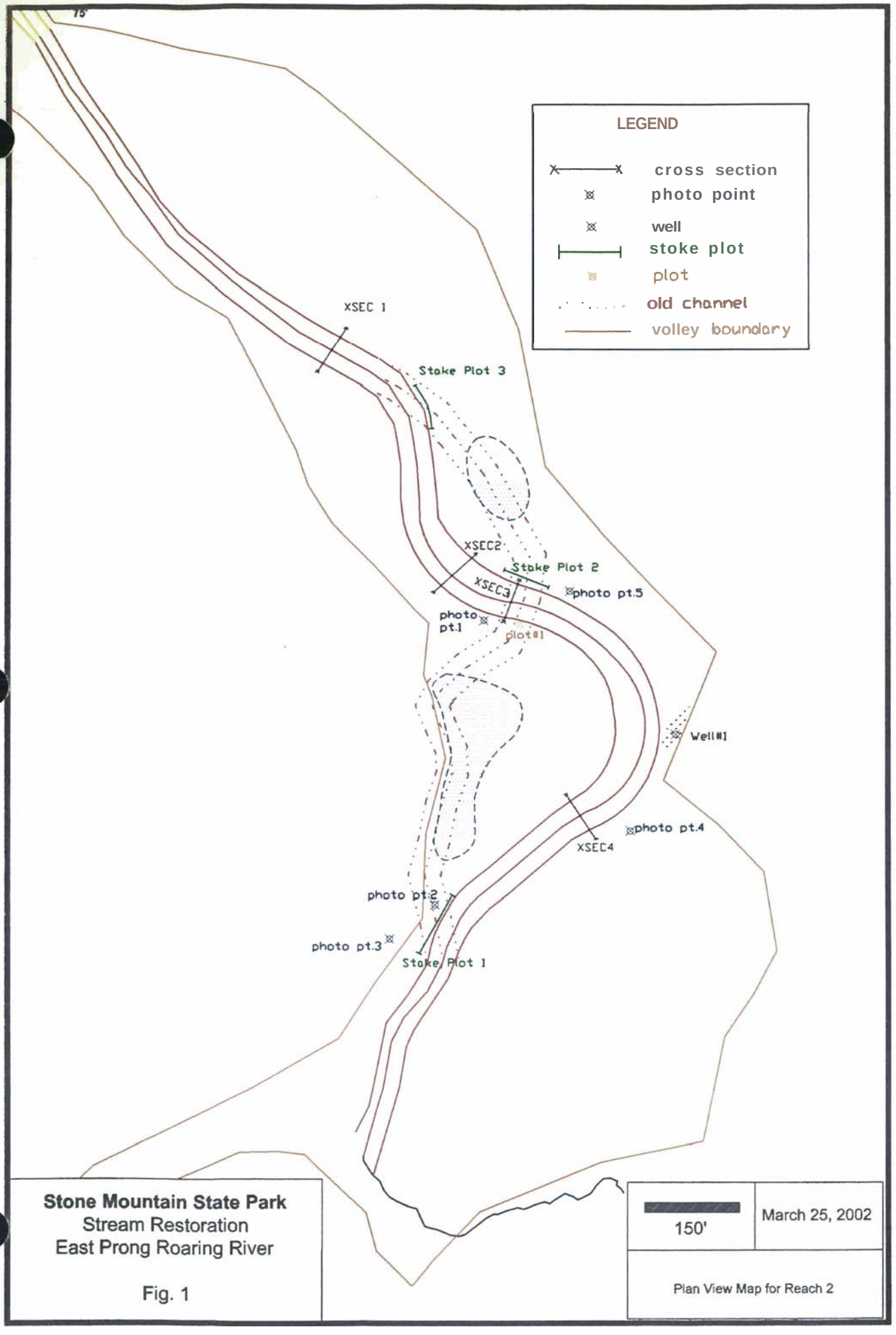
Reach 4: Photo Point 6 (2001).

APPENDIX E

MITIGATION CREDIT INFORMATION

ATTACHMENT A

Plan View Maps for Reaches 2 & 4



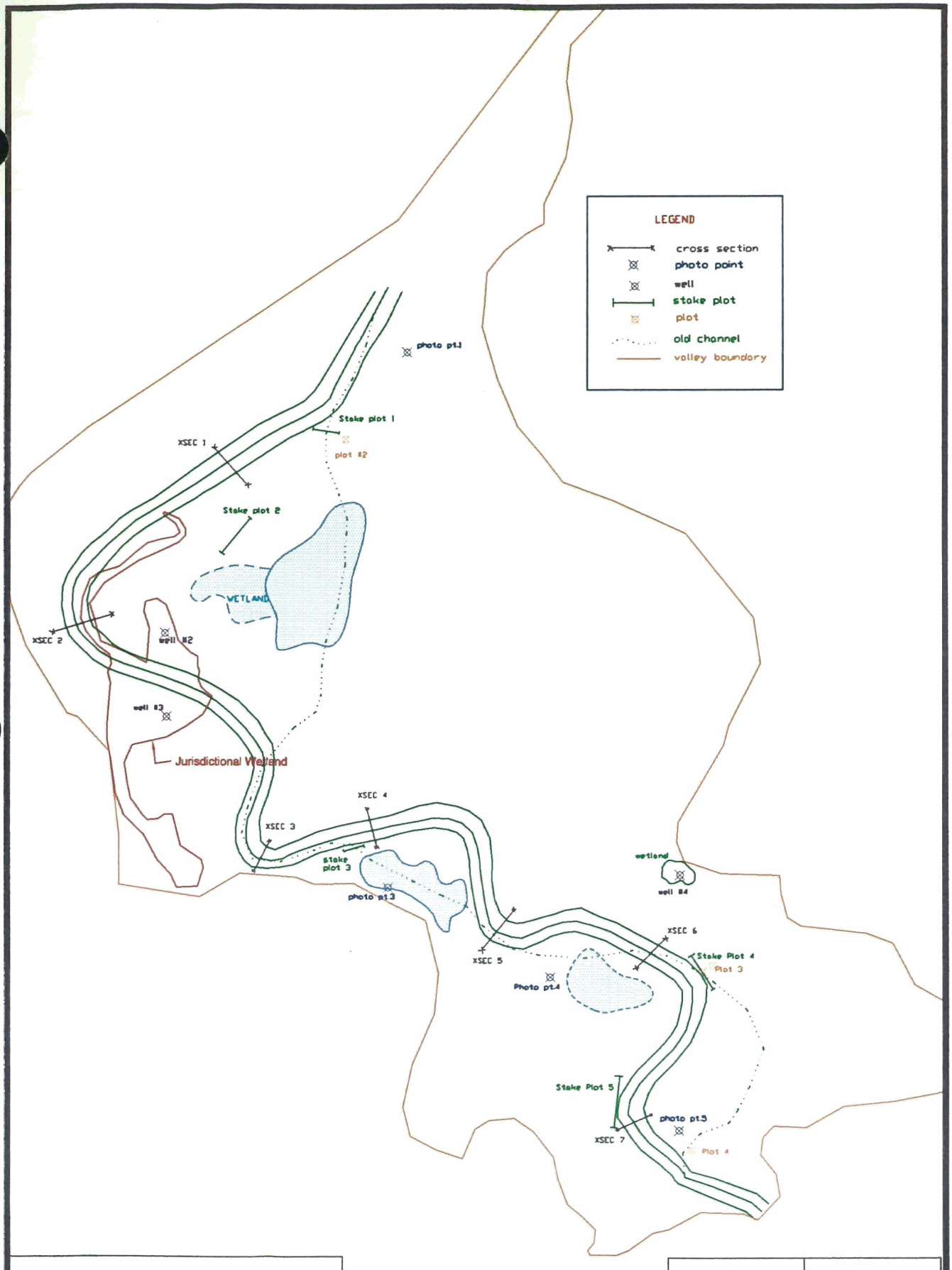
Stone Mountain State Park
Stream Restoration
East Prong Roaring River

Fig. 1

150'

March 25, 2002

Plan View Map for Reach 2



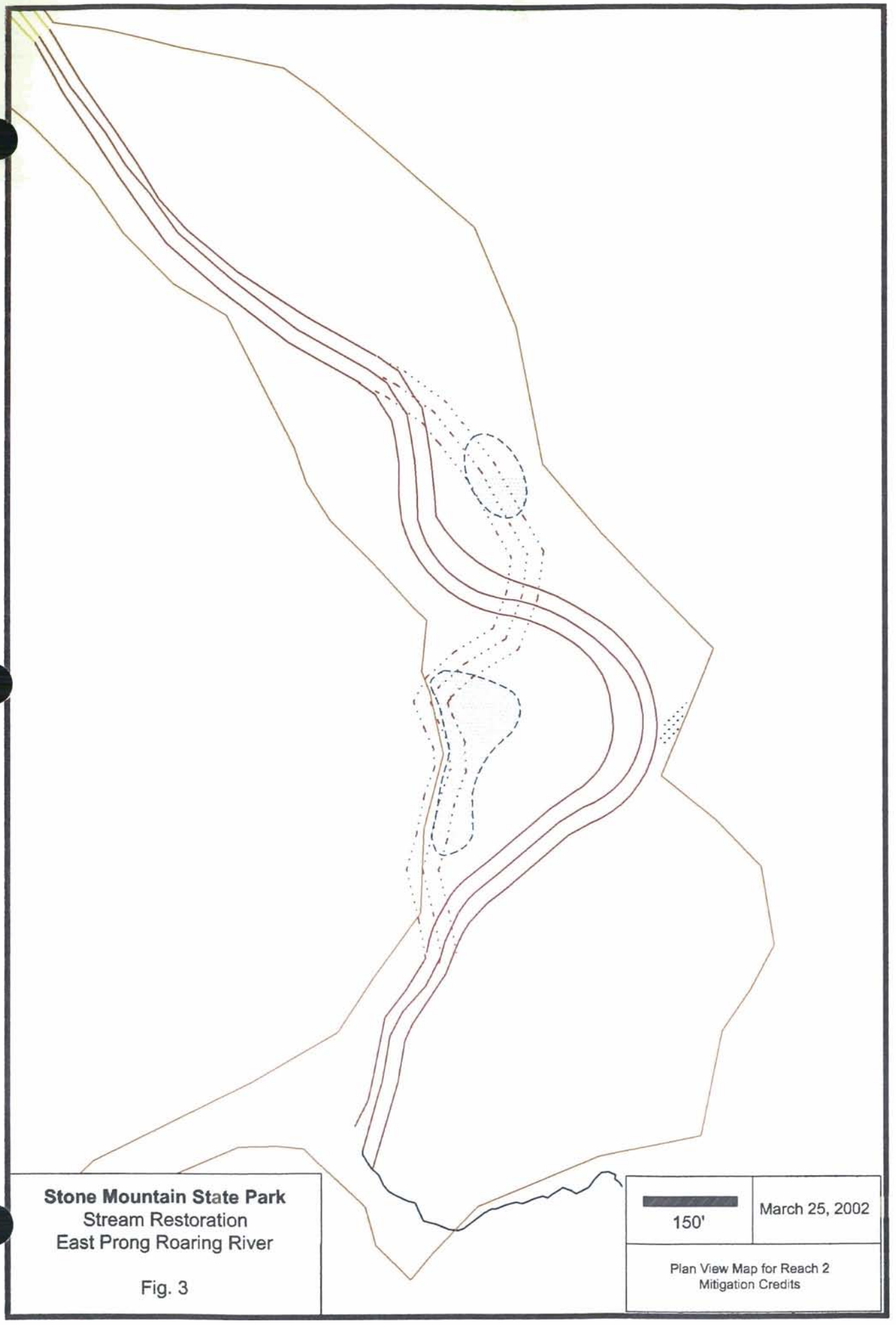
Stone Mountain State Park
Stream Restoration
East Prong Roaring River

Fig. 2

250'

March 25, 2002

Plan View Map for Reach 4



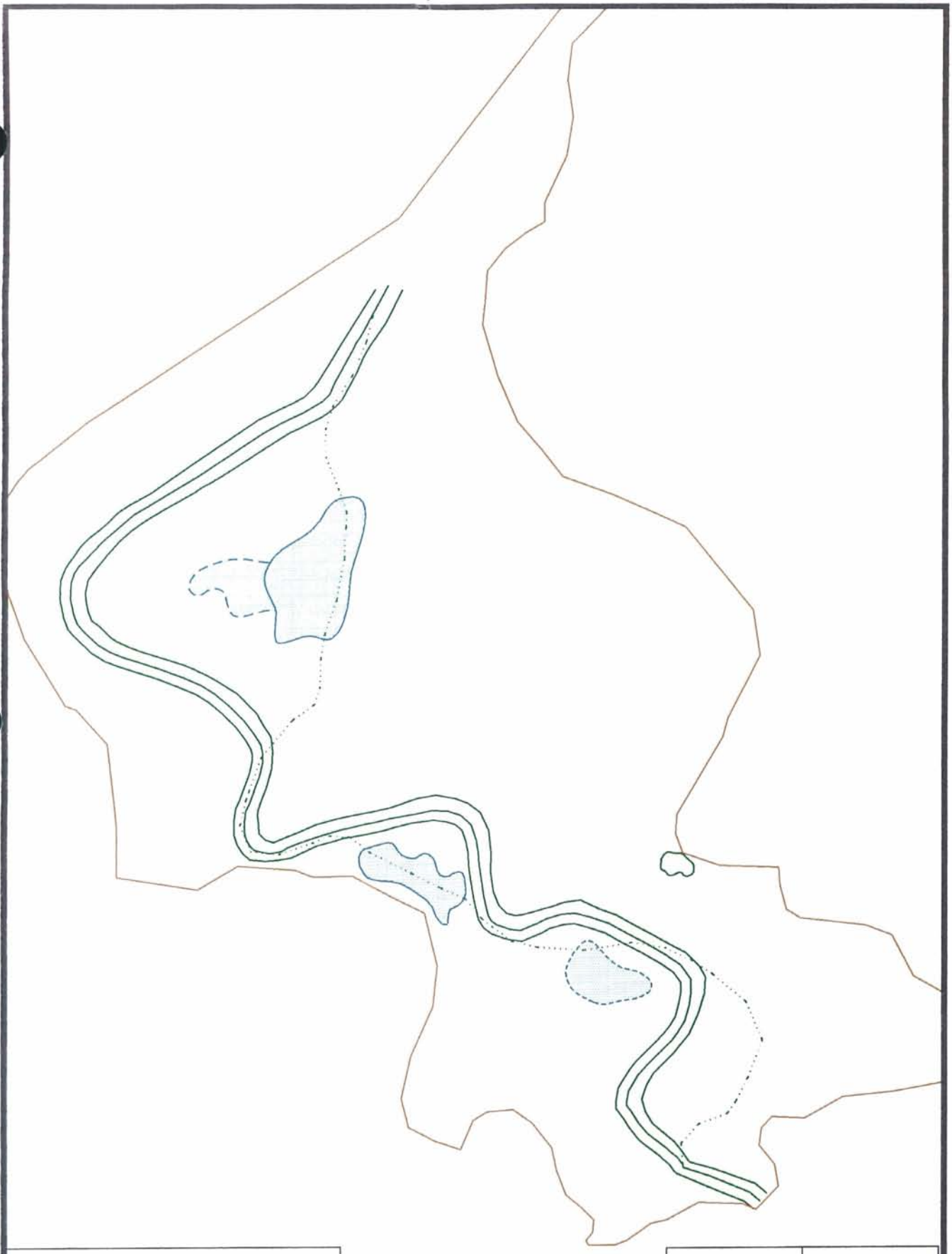
Stone Mountain State Park
Stream Restoration
East Prong Roaring River

Fig. 3

150'

March 25, 2002

Plan View Map for Reach 2
Mitigation Credits



Stone Mountain State Park
Stream Restoration
East Prong Roaring River

Fig. 4

250'

March 25, 2002

Plan View Map for Reach 4
Mitigation Credits