

Jumping Run Creek Stream Restoration

2003 Annual Monitoring Report



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NC STATE UNIVERSITY

2003 Jumping Run at Payne Dairy Monitoring Abstract

Jumping Run was restored through the North Carolina Wetlands Restoration Program (NCWRP). The goals and objectives of this project are as follows:

- 1.) Restore 5,177-linear feet of Jumping Run Creek through dimension, pattern and profile adjustments.
- 2.) Restore 470-linear feet of Jumping Run Creek through dimension and profile adjustments and cattle exclusion.
- 3.) Establish a riparian zone surrounding restored sections of Jumping Run Creek, an additional 1,350-linear feet of Jumping run, and 1,350-linear feet of a tributary.
- 4.) Improve the habitat within the channel and the riparian zone.

This is the 3rd year of the 5-year monitoring plan for Jumping Run.

Table 1A. Background Information

Project Name	Jumping Run Creek
Designer's Name	Kimley-Horn and Associates, Inc. PO Box 33068, Raleigh, NC, 27636 (919)677-2000
Contractor's Name	Shamrock, Inc
Project County	Alexander County
Directions to Project Site	From Statesville, follow Interstate I-64 west to Millersville road. Turn left (south) on Millersville road and follow to Henry Road. Turn right (west) on Henry Road until it dead ends with Paul Payne Store Road. Turn right on Paul Payne Store Road and follow to the top of the hill. At the top of the hill turn right onto a field road. The beginning of the project is located at the bottom of the hill. Please note that this is a private residence and permission is suggested prior to entering the site.
Drainage Area	1.2 sq. mi. (End of Area 3 - Upstream of SR-1614) 2.2 sq. mi. (End of Area 4 at the end of the project)
USGS Hydro Unit	3050101
NCDWQ Subbasin	05-07-04
Project Length	5,755 Linear feet (Restoration) 2,640 Linear feet (Preservation)
Restoration Approach	5,177-feet of dimension, pattern, and profile 470-feet of dimension and profile modifications 1,350-feet of cattle exclusion and riparian enhancement 1,400-feet of cattle exclusion and riparian enhancement (one side)
Date of Completion	2001
Monitoring Dates	June, 2001; December, 2001; December, 2002; October, 2003

Table 2A. Summary of Channel Conditions

DIMENSION	Jumping Run Area #1				Jumping Run Area #2				Jumping Run Area #1				Jumping Run Area #1			
	Riffle		Pool		Riffle		Pool		Riffle		Pool		Riffle		Pool	
	As-built	2003	As-built	2003	As-built	2003	As-built	2003	As-built	2003	As-built	2003	As-built	2003	As-built	2003
Bankfull Cross-sectional Area	9.4	7.1	19.2	11.7	9.0	10.8	12.8	10.9	8.3	9.0	27.1	29.0	13.5	8.6	15.9	13.1
Bankfull Width	14.0	11.8	16.0	8.8	11.5	12.8	13.7	12.3	9.0	9.7	15.0	28.8	17.0	8.6	14.0	11.7
Bankfull Mean Depth	0.7	0.6	1.2	1.3	0.8	0.8	0.9	0.9	0.9	0.9	1.8	1.0	0.8	1.0	1.1	1.1
Bankfull Max Depth	1.6	1.6	2.3	2.3	1.4	1.6	1.5	4.5	1.3	1.3	3.6	7.6	1.2	1.4	2.0	1.8

PATTERN	Jumping Run As-built - 2000				Jumping Run 2003			
	Area 1	Area 2	Area 3	Area 4	Area 1	Area 2	Area 3	Area 4
	Meander Wave Length	130	100	120-165	140	115-123	49-95	145-149
Radius of Curvature	60	33	35-84	60+	27-39	22-30	34-58	30-51
Beltwidth	-	-	-	-	35-39	36-47	43-51	25-49

PROFILE*	Jumping Run 2003 - Area 1			Jumping Run 2003 - Area 2			Jumping Run 2003 - Area 3			Jumping Run 2003 - Area 4		
	Minimum	Maximum	Median	Minimum	Maximum	Median	Minimum	Maximum	Median	Minimum	Maximum	Median
	Riffle Length	19.8	21.9	20.9	6.1	19.3	11.8	9.5	35.1	23.6	14.0	25.0
Riffle Slope	1.34%	5.52%	1.66%	0.23%	7.30%	1.39%	1.62%	3.90%	1.86%	0.62%	3.21%	1.52%
Pool Length	8.6	24.1	16.9	14.5	37.8	30.0	19.5	39.1	29.5	12.7	54.0	35.0
Pool to Pool Spacing	32.6	54.7	44.0	36.4	80.4	43.3	66.6	104.9	89.2	54.9	111.5	89.5

*Data for previous monitoring periods were not reported

SUBSTRATE	Jumping Run Area #1				Jumping Run Area #2				Jumping Run Area #3				Jumping Run Area #4			
	Cross-section #1		Cross-section #2		Cross-section #1		Cross-section #2		Cross-section #1		Cross-section #2		Cross-section #1		Cross-section #2	
	Riffle		Pool		Riffle		Pool		Riffle		Pool		Riffle		Pool	
	As-built	2003	As-built	2003	As-built	2003	As-built	2003	As-built	2003	As-built	2003	As-built	2003	As-built	2003
d50	0.27	0.12	0.08	0.28	7.41	0.17	0.09	0.23	12.65	0.38	0.38	0.14	9.65	3.37	0.14	0.16
d85	8.09	0.73	0.14	0.85	14.03	2.63	0.15	1.5	44.9	34.77	8.87	0.75	27.3	15.43	0.56	1.29

VEGETATION	Jumping Run Area 1		Jumping Run Area 2		Jumping Run Area 3		Jumping Run Area 4	
	Quad #1		Quad #2		Quad #3		Quad #4	
	Observed	Planted	Observed	Planted	Observed	Planted	Observed	Planted
	Tree Stratum (trees/acre)	480	360	1080	240	1040	840	520
Shrub Stratum (%cover)	25	-	2.5	-	10.5	-	12	-
Herb Stratum (%cover)	143	-	115	-	206.5	-	169	-

Results and Discussion

Overall, the Jumping Run Restoration Project is doing excellent. Dimension, pattern, profile, and channel materials are similar to as-built conditions and where deviations are occurring, the trend is in the positive directions pointing that the stream is functioning properly. A headcut previously noted was not evident in the field during the survey. Two structures show signs of stress and should be monitored closely in upcoming monitoring events. Vegetation has established and is thriving in the restored conditions of the channel and riparian zone.

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

- **Head cut area**
 - A previously noted headcut in Area 1 should be monitored in the future.
- **Piping through the structure**
 - A cross vane just upstream of section 2 should be monitored for changes. It is presently partially piping through the structure.
- **Cross vane wing slump**
 - Cross vane below area 3 should be monitored for changes. Presently the arm has slumped into the downstream scour hole but vegetation appears

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. Piping through structure
Station: Just upstream of Area 2.**



**Issue Photo 2. Slumped cross vane arm.
Located just upstream of Paul Payne Road
culvert. A cross vane 20 feet downstream
is holding grade.**

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1.0 BACKGROUND INFORMATION

This project is located within the limits of the Payne Dairy Farm in Alexander County. Drainage area at the outlet is 2.2 sq. mi. at the end of Area 4 (at the end of the project) and 1.2 square miles at SR-1614. The project was completed in 2001 with as-built survey completed in June of 2001. Additional background information for this report was not provided at the time of completion. Please refer to prior documentation for background information.

1.1 Goals and Objective

The goals and objectives of this project are as follows:

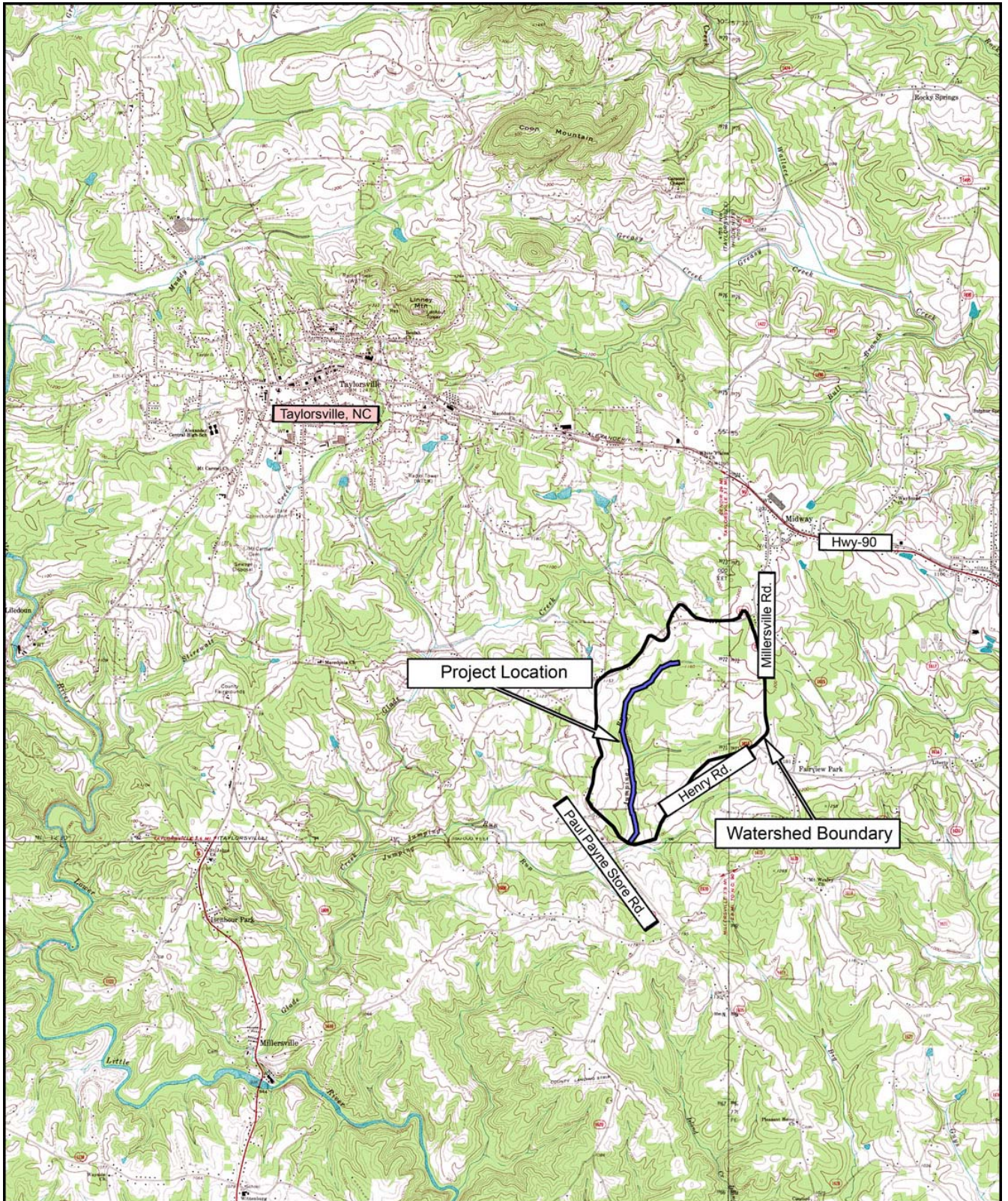
- 5.) Restore 5,177-linear feet of Jumping Run Creek through dimension, pattern and profile adjustments.
- 6.) Restore 470-linear feet of Jumping Run Creek through dimension and profile adjustments and cattle exclusion.
- 7.) Establish a riparian zone surrounding restored sections of Jumping Run Creek, an additional 1,350-linear feet of Jumping run, and 1,350-linear feet of a tributary.
- 8.) Improve the habitat within the channel and the riparian zone.

1.2 Project Location

This project is located southeast of Taylorsville in Alexander County. From Statesville, follow Interstate I-64 west to Millersville road. Turn left (south) on Millersville road and follow to Henry Road. Turn right (west) on Henry Road until it dead ends with Paul Payne Store Road. Turn right on Paul Payne Store Road and follow to the top of the hill. At the top of the hill turn right onto a field road. The beginning of the project is located at the bottom of the hill. Please note that this is a private residence and permission is suggested prior to entering the site.

1.4 Project Description

A previously impaired stream flowing through a cow pasture, Jumping Run 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 root wads and vegetation along the channel banks. Easement boundaries are maintained with fencing.



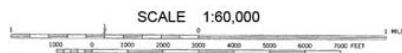
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Campus Box 7625
Raleigh, NC 27606

Project Location: Jumping Run
Axelander County, North Carolina

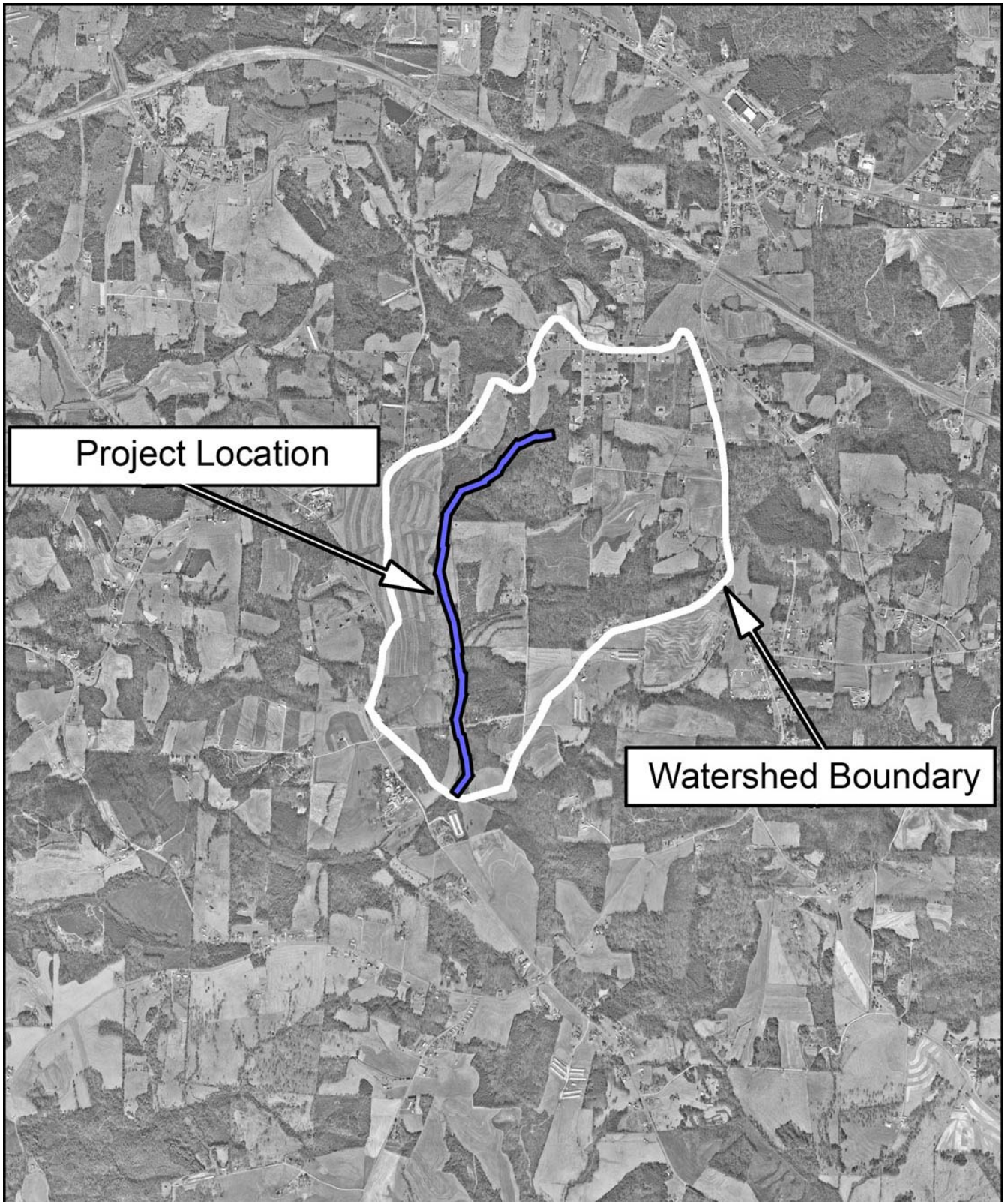
EEP Monitoring
Report



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

FIGURE

1



<p>NC STATE UNIVERSITY Department of Biological & Agricultural Engineering Campus Box 7625 Raleigh, NC 27606</p>	<p style="text-align: center;">Aerial Watershed Photo: Jumping Run Alexander County, North Carolina</p> <p>EEP Monitoring Report</p> <p style="text-align: center;">SCALE 1:30,000</p> <p style="text-align: center;">0 1000 2000 3000 4000 5000 FEET 1 MILE</p> <p style="text-align: right;">N</p>	<p>Dwn. By: MVH Ckd By: DAB Date: March 2004</p>	<p style="text-align: center;">FIGURE 2</p>
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2.0 YEAR 2003 RESULTS AND DISCUSSION

Year 2003 monitoring results are shown for Jumping Run monitoring.

2.1 Vegetation

The following describes the results of 2003 vegetation monitoring conducted at the Jumping Run Restoration Site. Sampling and analysis methods used can be found in the appendix. Modifications to those methods are described below. 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 Jumping Run Creek is overall considered successful. The herbaceous layer was well established and diverse. *Panicum virgatum* (switchgrass), *Juncus* spp. (rushes) and *Carex* spp. (sedges) were most notably dominant throughout. Streambanks and floodplain areas were well covered with herbaceous plants. Shrub species, particularly those sprouting from livestakes are performing well. In the majority of areas where livestakes were planted, they are alive and growing. *Salix nigra* (black willow) is performing exceptionally well throughout the entire project area. There is also a large number of naturally regeneration shrub species throughout the project area. Several clumps of shrubs appear to be transplanted during construction. These appear to be healthy and vigorous.

Overall number of planted trees was average and above mitigation requirements. Extrapolation from the four plots resulted in an overall average of approximately 490 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 780 trees per acre. Both of these estimates are based on a diverse mix of species as well. Natural regeneration obviously plays an important role in the restoration of this site.

Microstegium vimineum was the only major invasive exotic plant located within these areas. *Festuca* sp. (Fescue) was prevalent in the adjacent fields surrounding the buffer; however, the native herbaceous vegetation seemed to be well established in the majority of the project site. Only a few areas contained the fescue.

Recommendations include planting more live stakes in areas where erosion is problematic, particularly on outside meander bends. The invasive vegetation should also be monitored over time to determine if it will be a limiting factor in native plant growth in the future. No treatment is recommended at this time.

2.2 Morphology

Restored channel dimension, pattern, profile and substrate were examined during the 2003 monitoring. Methodology used for data collection can be found in the appendix. Deviations from those methods are detailed below. The entire data set can be found in the appendix.

2.2.1 Results and Discussion

Area 1

Channel profile along area 1 of Jumping Run remained similar to 2002 survey. The headcut previously discussed in prior reports has worked upstream 10 feet from 2002 but appears to have stabilized. This area will be closely examined in upcoming monitoring events. Vegetation dominating the channel banks is maintaining stability through the head cut region.

Channel cross sections remain very stable. Cross-sectional area has decreased in both, the riffle and the pool. Decrease in area is likely due to dense vegetation lining the channel banks. Maximum depth is consistent to as-built conditions and the entire reach appears to be functioning properly.

Riffle channel materials, although finer than as-built conditions, are similar to 2002 conditions. Pool channel materials are coarser than as-built conditions but are considerably less coarse than 2002 indicating that the fines may have flushed out of the system. Future monitoring will indicate if this is accurate.

Channel pattern appears to have been maintained since construction. Dense vegetation has established along the channel banks. This vegetation is providing an excellent root mass to stabilize the banks.

Area 2

Channel profile along area 2 of Jumping Run has remained similar to as-built conditions. Riffles appear to be maintaining grade and pools are maintaining their max depth. No downcutting or headcuts are evident in this section.

Channel cross sections remain very stable. Cross-sectional area has been maintained from both sections. The pool is narrowing by building the point bar and is increasing its maximum depth. Vegetation is stabilizing the banks in both sections.

Similar to area 1, riffle channel materials are finer than as-built conditions but are in a more uniform distribution than previous years. Pool channel materials are coarser than as-built conditions and are similar to 2002 conditions.

Channel pattern appears to have been maintained since construction. Dense vegetation has established along the channel banks. This vegetation is providing an excellent root mass to stabilize the banks.

Area 3

Channel profile along area 3 of Jumping Run has remained similar to as-built conditions. Riffles appear to be maintaining grade and pools are maintaining their max depth. No downcutting or headcuts are evident in this section.

Channel cross sections remain very stable. Area has remained consistent with as-built conditions. Maximum depth is consistent to as-built conditions and the entire reach appears to be functioning properly. Vegetation is stabilizing the banks in both sections.

Riffle channel materials at cross section #1 decreased in d50 but are similar with d84. Pool cross-section materials decreased for both the d50 and d84.

Channel pattern appears to have been maintained since construction. Dense vegetation has established along the channel banks. This vegetation is providing an excellent root mass to stabilize the banks.

Below area #3, a cross vane had previously been cut through and the left arm had slumped. Although water was still cutting around the structure to the left, vegetation has established and the near bank area is aggrading slightly. A structure 20 feet downstream is doing an excellent job of holding grade so there is little risk of head cutting. This area will be monitored closely in future monitoring periods.

Area 4

Channel profile along area 4 of Jumping Run remained similar to as-built conditions. A downcut is seen between stations 3+50 and 4+00 but it was not noticeable in the field. Profile appeared to be properly formed. Upcoming monitoring will determine if this area is a problem. Vegetation dominating the channel banks is maintaining stability.

Channel cross-sectional areas have decreased for both sections. These areas remain very stable. Decrease in area is likely due to dense vegetation lining the channel banks. Maximum depth is consistent to as-built conditions and the entire reach appears to be functioning properly.

Channel materials follow the trend of areas 1 and 3 with decreasing coarseness but not a severe. Excellent gravel is found in the riffle sections throughout this reach. Pool conditions are similar to as-built conditions.

Channel pattern appears to have been maintained since construction. Dense vegetation has established along the channel banks. This vegetation is providing an excellent root mass to stabilize the banks.

Table 1. Summary of Channel Conditions

DIMENSION	Jumping Run Area #1				Jumping Run Area #2				Jumping Run Area #1				Jumping Run Area #1			
	Riffle		Pool		Riffle		Pool		Riffle		Pool		Riffle		Pool	
	As-built	2003	As-built	2003	As-built	2003	As-built	2003	As-built	2003	As-built	2003	As-built	2003	As-built	2003
	Bankfull Cross-sectional Area	9.4	7.1	19.2	11.7	9.0	10.8	12.8	10.9	8.3	9.0	27.1	29.0	13.5	8.6	15.9
Bankfull Width	14.0	11.8	16.0	8.8	11.5	12.8	13.7	12.3	9.0	9.7	15.0	28.8	17.0	8.6	14.0	11.7
Bankfull Mean Depth	0.7	0.6	1.2	1.3	0.8	0.8	0.9	0.9	0.9	0.9	1.8	1.0	0.8	1.0	1.1	1.1
Bankfull Max Depth	1.6	1.6	2.3	2.3	1.4	1.6	1.5	1.7	1.3	1.3	3.6	3.1	1.2	1.4	2.0	1.8

PATTERN	Jumping Run As-built - 2000				Jumping Run 2003			
	Area 1	Area 2	Area 3	Area 4	Area 1	Area 2	Area 3	Area 4
	Meander Wave Length	130	100	120-165	140	115-123	49-95	145-149
Radius of Curvature	60	33	35-84	60+	27-39	22-30	34-58	30-51
Beltwidth	-	-	-	-	35-39	36-47	43-51	25-49

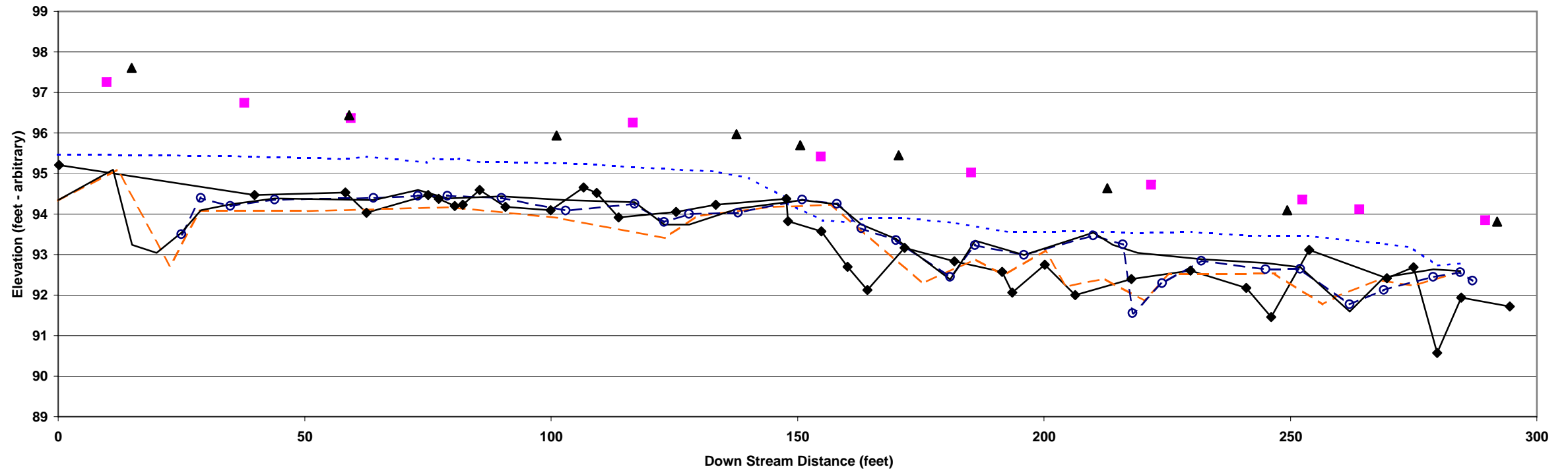
PROFILE*	Jumping Run 2003 - Area 1			Jumping Run 2003 - Area 2			Jumping Run 2003 - Area 3			Jumping Run 2003 - Area 4		
	Minimum	Maximum	Median	Minimum	Maximum	Median	Minimum	Maximum	Median	Minimum	Maximum	Median
Riffle Length	19.8	21.9	20.9	6.1	19.3	11.8	9.5	35.1	23.6	14.0	25.0	17.9
Riffle Slope	1.34%	5.52%	1.66%	0.23%	7.30%	1.39%	1.62%	3.90%	1.86%	0.62%	3.21%	1.52%
Pool Length	8.6	24.1	16.9	14.5	37.8	30.0	19.5	39.1	29.5	12.7	54.0	35.0
Pool to Pool Spacing	32.6	54.7	44.0	36.4	80.4	43.3	66.6	104.9	89.2	54.9	111.5	89.5

*Data for previous monitoring periods were not reported

SUBSTRATE	Jumping Run Area #1				Jumping Run Area #2				Jumping Run Area #3				Jumping Run Area #4			
	Cross-section #1		Cross-section #2		Cross-section #1		Cross-section #2		Cross-section #1		Cross-section #2		Cross-section #1		Cross-section #2	
	Riffle		Pool		Riffle		Pool		Riffle		Pool		Riffle		Pool	
	As-built	2003	As-built	2003	As-built	2003	As-built	2003	As-built	2003	2001	2003	As-built	2003	As-built	2003
d50	0.27	0.12	0.08	0.28	7.41	0.17	0.09	0.23	12.65	0.38	0.38	0.14	9.65	3.37	0.14	0.16
d85	8.09	0.73	0.14	0.85	14.03	2.63	0.15	1.5	44.9	34.77	8.87	0.75	27.3	15.43	0.56	1.29

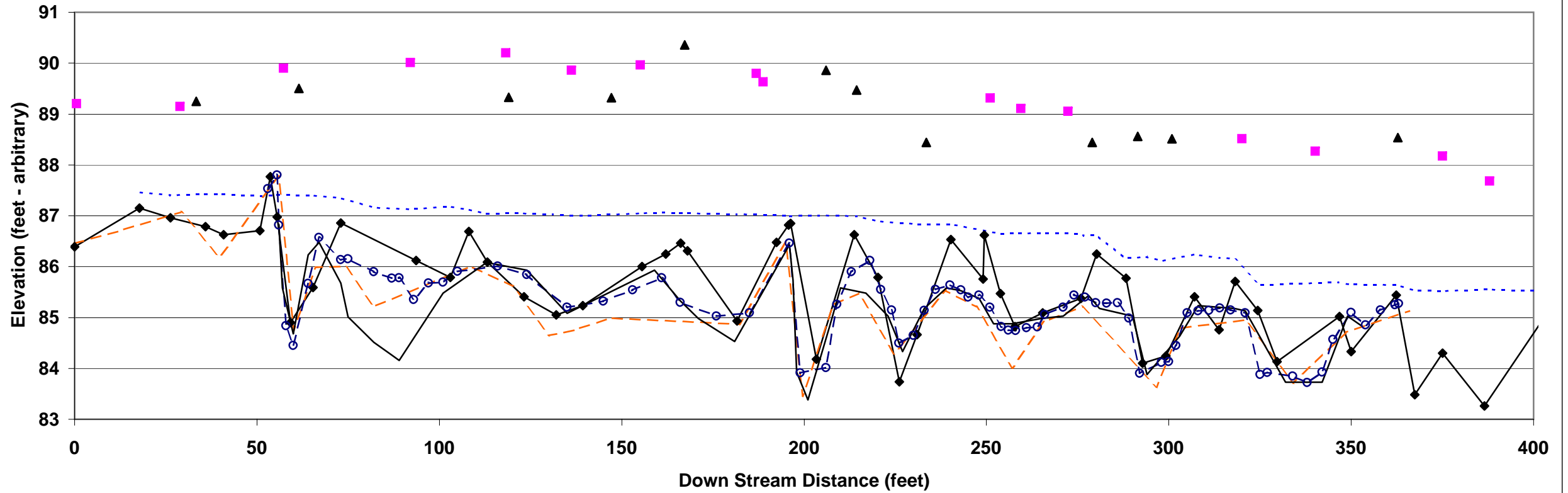
VEGETATION	Jumping Run Area 1		Jumping Run Area 2		Jumping Run Area 3		Jumping Run Area 4	
	Quad #1		Quad #2		Quad #3		Quad #4	
	Observed	Planted	Observed	Planted	Observed	Planted	Observed	Planted
Tree Stratum (trees/acre)	480	360	1080	240	1040	840	520	520
Shrub Stratum (%cover)	25	-	2.5	-	10.5	-	12	-
Herb Stratum (%cover)	143	-	115	-	206.5	-	169	-

**Jumping Run Creek
Longitudinal Profile
Area #1**



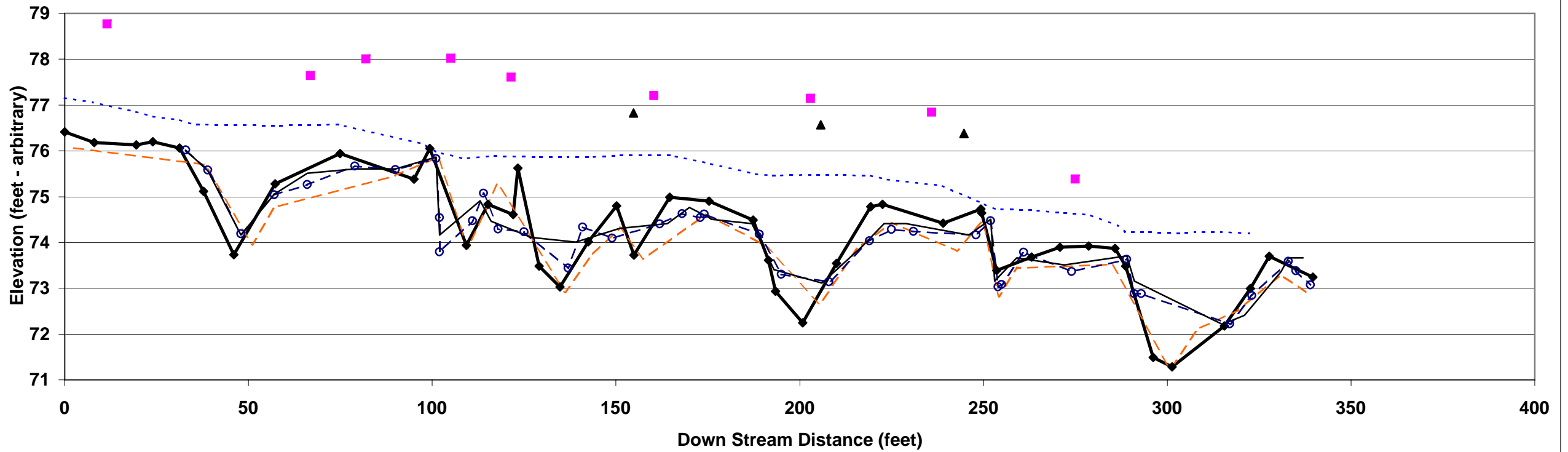
■ Left Bankfull
 ▲ Right Bankfull
 - - - - Water Surface
 —◆— Long Pro 2003
 - - - Long Pro 2002
 -○- Long Pro 2001
 — As-built 2000

**Jumping Run Creek
Longitudinal Profile
Area #2**



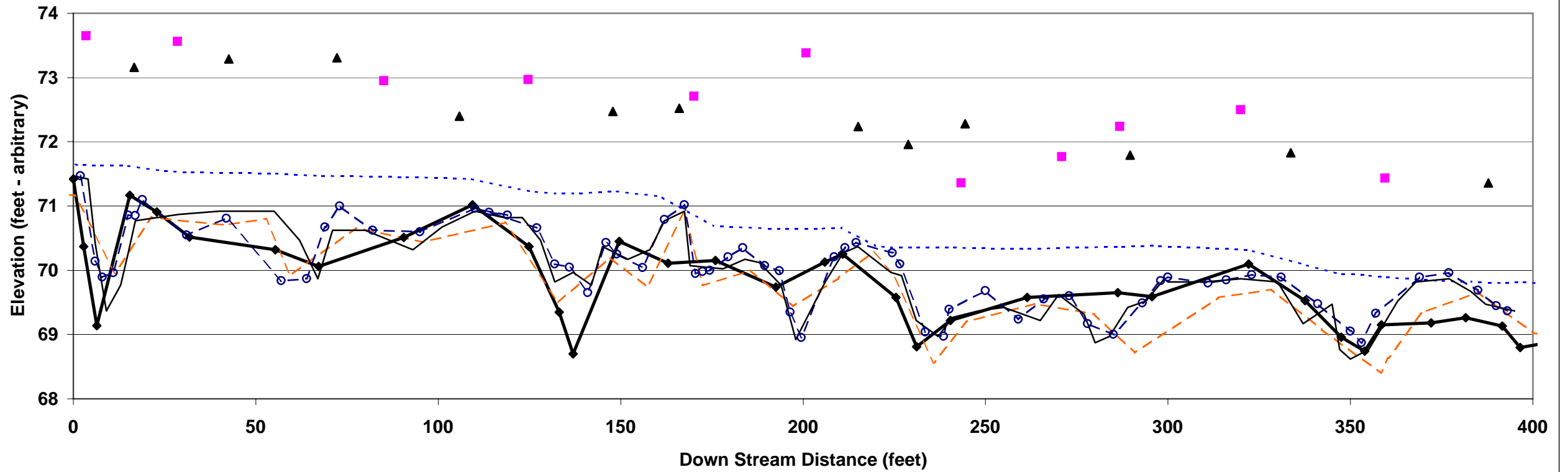
■ Left Bankfull ▲ Right Bankfull ····· Water Surface —◆— Long Pro 2003 - - - Long Pro 2002 -○- Long Pro 2001 — As-built 2000

**Jumping Run Creek
Longitudinal Profile
Area #3**



■ Left Bankfull ▲ Right Bankfull -.-.- Water Surface —◆— Long Pro 2003 -.-.- Long Pro 2002 -○- Long Pro 2001 — As-built 2000

**Jumping Run Creek
Longitudinal Profile
Area #4**



2.3 Areas of Concern

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

- **Head cut area**
 - A previously noted headcut in Area 1 should be monitored in the future.
- **Piping through the structure**
 - A cross vane just upstream of section 2 should be monitored for changes. It is presently partially piping through the structure.
- **Cross vane wing slump**
 - Cross vane below area 3 should be monitored for changes. Presently the arm has slumped into the downstream scour hole but vegetation appears

2.4. Jumping Run Photo Document

2000 – As built – Year 0



2003 – Year 3



Photo Point 1: Standing at riffle cross-section looking downstream (begin project)



Photo Point 2: Standing at riffle cross-section looking upstream (begin project)



Photo Point 3: Standing at pool cross-section looking upstream

2000 – As built – Year 0



2003 – Year 3



Photo Point 4: Standing at pool cross-section looking downstream



Photo Point 15: Standing at riffle cross-section looking downstream



Photo Point 16: Standing at riffle cross-section looking upstream

2000 – As built – Year 0



2003 – Year 3



Photo Point 19: Standing at pool cross-section looking upstream



Photo Point 20: Standing at pool cross-section looking downstream



Photo Point 39: Standing at riffle cross-section looking upstream

2000 – As built – Year 0



2003 – Year 3



Photo Point 40: Standing at riffle cross-section looking downstream near Henry Road

2002 – Year 2



Photo Point 41: Standing at pool cross-section looking upstream

2002 – Year 2



Photo Point 42: Standing at pool cross-section looking downstream

2000 – As built – Year 0



2003 – Year 3



Photo Point 46: Standing at pool cross-section looking upstream



Photo Point 47: Standing at pool cross-section looking downstream



Photo Point 48: Standing at riffle cross-section looking upstream

2000 – As built – Year 0



2003 – Year 3



Photo Point 49: Standing at riffle cross-section looking downstream



Photo Point 50: Looking upstream towards Paul Payne Store Road

Quad 1

Tree Stratum

<u>Species</u>	<u>Height (cm)</u>	<u>Diameter (mm)</u>	<u>Radius (mm)</u>	<u>Σ X-sec. (mm²)</u>	<u>Rel. x-sec (%)</u>	<u>Density</u>	<u>Rel. Density (%)</u>	<u>Rank (Importance)</u>	<u>Average</u>
<i>Betula nigra</i>	117	10	5	78.5	1.2	2	16.7	3	8.93403
Total	161	16	8	201.1					
			13	279.6					
<i>Liriodendron tulipifera</i>	300	45	22.5	1590.4	96.3	3	25.0	1	60.63168
	600	110	55	9503.3					
Total	600	120	60	11309.7					
			137.5	22403.5					
<i>Acer rubrum</i>	69	3	1.5	7.1	0.3	3	25.0	2	12.66241
	65	2.5	1.25	4.9					
Total	97	9	4.5	63.6					
		3	7.25	75.6					
<i>Fraxinus sp.</i>	164	18	9	254.5	1.1	1	8.3	5	4.713368
Total			9	254.5					
<i>Quercus alba</i>	84	5	2.5	19.6	0.4	2	16.7	4	8.512193
	80	9	4.5	63.6					
Total		14	7	83.3					
<i>Liquidambar styraciflua</i>	129	15	7.5	176.7	0.8	1	8.3	6	4.546321
Total			7.5	176.7					
Overall Total			181.3	23273.1	100.0	12	100		
Total Trees per acre									480
Planted trees per acre									360
Natural regen. trees per acre									120

Shrub Stratum

<u>Species</u>	<u>Cover (%)</u>	<u>Rel. cover (%)</u>	<u>Density</u>	<u>Rel. Density (%)</u>	<u>Rank (Importance)</u>
<i>Alnus serrulata</i>	5	0.32	12	0.35	1
<i>Salix nigra</i>	20	1.29	9	0.26	2

Herb Stratum

<u>Species</u>	<u>Cover (%)</u>	<u>Rel. cover (%)</u>	<u>Rank (Importance)</u>
<i>Panicum virgatum</i>	10	7.0	3
<i>Polygonum sp.</i>	30	21.0	2
<i>Carex sp.</i>	10	7.0	3
<i>Unknown grass</i>	90	62.9	1
<i>Juncus sp.</i>	3	2.1	4
Total	143	100.0	

Payne Dairy Stream Restoration
Alexander County, NC

Quad 2

Tree Stratum

Species	Height (cm)	Diameter (mm)	Radius (mm)	Σ X-sec. (mm ²)	Rel. x-sec (%)	Density	Rel. Density (%)	Rank (Importance)	Average
<i>Platanus occidentalis</i>	133	15	7.5	176.7	2.7	2	7.4	4	5.056054
	152	18	9	254.5					
Total			16.5	431.2					
<i>Betula nigra</i>	142	13	6.5	132.7	2.5	4	14.8	3	8.663689
	127	14	7	153.9					
	104	9	4.5	63.6					
	135	8	4	50.3					
Total			22	400.6					
<i>Salix nigra</i>	360	45	22.5	1590.4	83.7	13	48.1	1	65.90824
	360	55	27.5	2375.8					
	300	18	9	254.5					
	360	25	12.5	490.9					
	360	51	25.5	2042.8					
	360	16	8	201.1					
	360	16	8	201.1					
	360	31	15.5	754.8					
	360	40	20	1256.6					
	450	68	34	3631.7					
	360	25	12.5	490.9					
	180	5	2.5	19.6					
	120	6	3	28.3					
Total		45	200.5	13338.4					
<i>Liquidambar styraciflua</i>	142	15	7.5	176.7	1.1	1	3.7	5	2.406094
Total			7.5	176.7					
<i>Acer rubrum</i>	300	27	13.5	572.6	10.0	7	25.9	2	17.96592
	240	22	11	380.1					
	150	3	1.5	7.1					
	360	18	9	254.5					
	300	14	7	153.9					
	300	15	7.5	176.7					
	300	8	4	50.3					
Total		107	53.5	1595.1					
Overall Total				15942.0	100.0		27.0	100.0	
Total Trees per acre							1080		
Planted trees per acre							240		
Natural regen. trees per acre							840		

Shrub Stratum

Species	Cover (%)	Rel. cover (%)	Density	Rel. Density (%)	Rank (Importance)
<i>Alnus serrulata</i>	0.5	0.03	2	0.06	2
<i>Sambucus canadensis</i>	2	0.13	2	0.06	1

Herb Stratum

Species	Cover (%)	Rel. cover (%)	Rank (Importance)
<i>Panicum clandestinum</i>	0.5	0.4	4
<i>Polygonum sp.</i>	5	4.3	2
<i>Carex sp.</i>	0.5	0.4	3
<i>Lonicera japonica</i>	1	0.9	4
<i>Leersia sp.</i>	100	87.0	1
<i>Vernonia sp.</i>	3	2.6	3
<i>Microstegium vimineum</i>	5	4.3	2
Total	115	100.0	

Payne Dairy Stream Restoration
Alexander County, NC

Quad 3

Tree Stratum

<u>Species</u>	<u>Height (cm)</u>	<u>Diameter (mm)</u>	<u>Radius (mm)</u>	<u>E X-sec. (mm²)</u>	<u>Rel. x-sec (%)</u>	<u>Density</u>	<u>Rel. Density (%)</u>	<u>Rank (Importance)</u>	<u>Average</u>
<i>Salix nigra</i>	240	24	12	452.4	95.2	23	88.5	1	91.83997
	240	21	10.5	346.4					
	240	19	9.5	283.5					
	360	36	18	1017.9					
	240	21	10.5	346.4					
	180	15	7.5	176.7					
	180	8	4	50.3					
	180	13	6.5	132.7					
	240	14	7	153.9					
	180	4	2	12.6					
	180	4	2	12.6					
	180	4	2	12.6					
	150	3	1.5	7.1					
	90	5	2.5	19.6					
	90	5	2.5	19.6					
	90	5	2.5	19.6					
	90	5	2.5	19.6					
	210	17	8.5	227.0					
	180	5	2.5	19.6					
	300	20	10	314.2					
	150	3	1.5	7.1					
	240	18	9	254.5					
	240	18	9	254.5					
Total			4160.3						
<i>Fraxinus sp.</i>	111	4	2	12.6	0.3	1	3.8	3	2.066884
Total				12.6					
<i>Quercus phellos</i>	203	15	7.5	176.7	4.5	2	7.7	2	6.093143
	116	5	2.5	19.6					
Total				196.3					
Overall Total				4369.2	100.0		26.0	100.0	100

Total Trees per acre

1040

Planted trees per acre

840

Natural regen. trees per acre

200

Shrub Stratum

<u>Species</u>	<u>Cover (%)</u>	<u>Rel. cover (%)</u>	<u>Density</u>	<u>Rel. Density (%)</u>	<u>Rank (Importance)</u>
<i>Cornus sp.</i>	10	95.2	2	28.6	1
<i>Alnus serrulata</i>	0.5	4.8	5	71.4	2

Herb Stratum

<u>Species</u>	<u>Cover (%)</u>	<u>Rel. cover (%)</u>	<u>Rank (Importance)</u>
<i>Polygonum sp.</i>	80	38.7	1
<i>Eupatorium sp.</i>	8	3.9	5
<i>Panicum clandestinum</i>	25	12.1	3
<i>Carex sp.</i>	3	1.5	7
<i>Juncus. Sp</i>	70	33.9	2
<i>Rubus sp.</i>	3	1.5	7
<i>Aster sp.</i>	5	2.4	6
<i>Vernonia sp.</i>	0.5	0.2	8
<i>Microstegium</i>	12	5.8	4
Total	206.5	100.0	

Payne Dairy Stream Restoration
Alexander County, NC

Quad 4

Tree Stratum

<u>Species</u>	<u>Height (cm)</u>	<u>Diameter (mm)</u>	<u>Radius (mm)</u>	<u>Σ X-sec. (mm²)</u>	<u>Rel. x-sec (%)</u>	<u>Density</u>	<u>Rel. Density (%)</u>	<u>Rank (Importance)</u>	<u>Average</u>
<i>Salix nigra</i>	360	24	12	452.4	91.6	10	76.9	1	84.26267
	180	6	3	28.3					
	120	6	3	28.3					
	360	37	18.5	1075.2					
	240	19	9.5	283.5					
	180	15	7.5	176.7					
	360	25	12.5	490.9					
	180	6	3	28.3					
	120	6	3	28.3					
	240	16	8	201.1					
	Total			2792.9					
<i>Pinus sp.</i>	22	3	1.5	7.1	0.2	1	7.7	3	3.962073
Total				7.1					
<i>Platanus occidentalis</i>	140	14	7	153.9	8.2	2	15.4	2	11.77525
	118	11	5.5	95.0					
Total				249.0					
Overall Total				3048.9	100.0	13.0	100.0		100

Total Trees per acre
Planted trees per acre

520
520

Shrub Stratum

<u>Species</u>	<u>Cover (%)</u>	<u>Rel. cover (%)</u>	<u>Density</u>	<u>Rel. Density (%)</u>	<u>Rank (Importance)</u>
<i>Cornus sp.</i>	12	120.0	3	42.9	1
					81.4

Herb Stratum

<u>Species</u>	<u>Cover (%)</u>	<u>Rel. cover (%)</u>	<u>Rank (Importance)</u>
<i>Polygonum sp.</i>	25	14.8	4
<i>Panicum virgatum</i>	10	5.9	5
<i>Panicum clandestinum</i>	3	1.8	6
<i>Carex sp.</i>	40	23.7	2
<i>Juncus. Sp</i>	60	35.5	1
<i>Aster sp.</i>	1	0.6	7
<i>Microstegium</i>	30	17.8	3
Total	169	100.0	

Project Name Jumping Run Area 1
Cross Section #1 (pins A-B)
Feature Riffle
Date 10/7/2003
Crew Shaffer, Bidelspach, Clinton

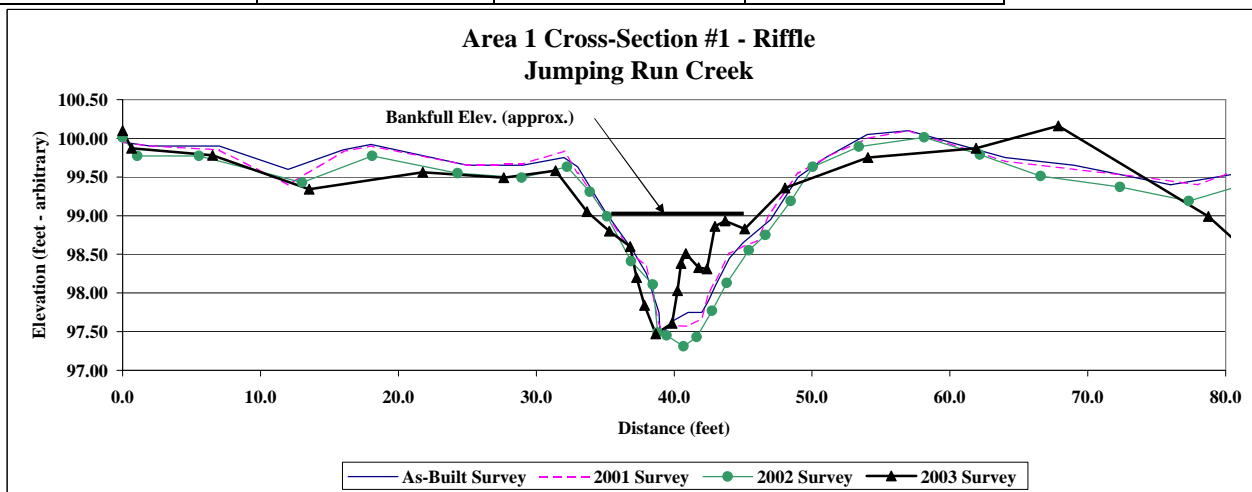
*2003 Elevation Adjusted +3.01

2000 As-Built Survey			2001 Survey			2002 Survey			2003 Survey		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation *	Notes
0.0	99.95	Grnd	0	99.95	Grnd	0.0	100.01	PIN-A	0.0	100.1	PIN-A
2.0	99.90		2	99.9		1.1	99.77	G	0.6	99.87	
7.0	99.90		7	99.85		5.5	99.77	G	6.5	99.78	
12.0	99.60		12	99.4		13.0	99.43	G	13.5	99.34	
16.0	99.85		16	99.83		18.1	99.77	G	21.8	99.56	
18.0	99.92		18	99.9		24.3	99.55	G	27.7	99.49	
25.0	99.65		25	99.65		28.9	99.49	G	31.4	99.58	
29.0	99.65		29	99.67		32.2	99.63	G	33.7	99.05	LBF (est)
32.0	99.75		32	99.83		33.9	99.31	G	35.3	98.8	
33.0	99.63		33	99.55		35.1	98.99	LBF	36.8	98.6	
35.0	99.05	LBF (est)	35	99.03	LBF (est)	36.9	98.41	G	37.3	98.2	
37.0	98.55		37	98.5		38.5	98.11	LEOW	37.9	97.84	
38.0	98.25		38	98.35		38.8	97.49	CHN	38.7	97.47	
38.9	97.75		38.9	97.6		39.4	97.45	CHN	39.9	97.61	
39.0	97.45		39	97.56		40.7	97.31	TW	40.2	98.03	
40.0	97.65		40	97.58		41.6	97.43	CHN	40.5	98.38	
41.0	97.75		41	97.57		42.8	97.77	CHN	40.9	98.51	
42.0	97.75		42	97.67		43.8	98.13	REOW	41.8	98.33	
42.5	97.90		42.5	98		45.4	98.55	G	42.4	98.31	
43.0	98.10		43	98.16		46.6	98.75	RBF	43.0	98.86	
44.0	98.45		44	98.51		48.5	99.19	G	43.7	98.93	
45.0	98.65		45	98.6	Est.	50.1	99.63	G	45.1	98.83	
46.0	98.80		46	98.67		53.4	99.89	G	48.0	99.36	RBF (est)
47.0	98.95	RBF (est)	47	99.05	RBF (est)	58.1	100.01	G	54.1	99.75	
49.0	99.50		49	99.55		62.2	99.79	G	61.9	99.87	
51.0	99.75		51	99.75		66.6	99.51	G	67.9	100.16	
54.0	100.05		54	100		72.4	99.37	G	78.7	98.99	
57.0	100.10		57	100.1		77.3	99.19	G	82.1	98.45	
64.0	99.75		64	99.7		81.5	99.41	G	100.4	99.08	PIN-B1
69.0	99.65		69	99.6		82.7	99.91	PIN-B			
76.0	99.40		74	99.5							
81.0	99.55		78	99.4							
82.3	99.85	Grnd	81	99.6							
82.3	99.93	Pin B?	82.3	99.85	Grnd						
100.00			82.3	99.91	Pin B?						



Photo of Area 1 Cross-Section #1 - Looking Downstream

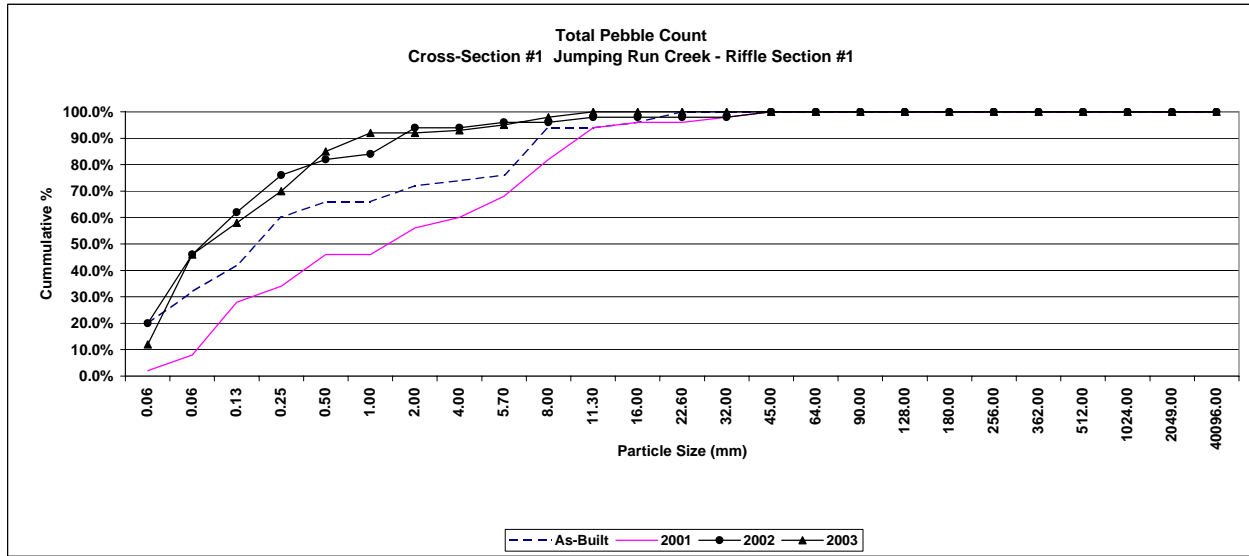
	Bankfull Area			
	As-Built	2001	2002	2003
Area	9.4	9.60	11.52	7.06
Width	14.0	12.0	13.3	11.8
Mean Depth	0.7	0.8	0.9	0.6
Max Depth	1.6	2.0	1.5	1.6



Project Name	Payne Dairy - Jumping Run Creek
Cross Section	#1 Section 1
Feature	Riffle
Date	10/7/03
Crew	Shaffer, Bidelspach, Clinton

Description	Material	2000 As-Built			2001			2002			2003				
		Size (mm)	Riffle - Bed	%	Cum %	Riffle - Bed	%	Cum %	Riffle - Bed	%	Cum %	Riffle - Bed	iffle - Ban	%	Cum %
Silt/Clay	silt/clay	0.061	10	20.0%	20.0%	1	2.0%	2.0%	10	20.0%	20.0%	0	12	12.0%	12.0%
Sand	very fine sand	0.062	6	12.0%	32.0%	3	6.0%	8.0%	13	26.0%	46.0%	0	34	34.0%	46.0%
	fine sand	0.125	5	10.0%	42.0%	10	20.0%	28.0%	8	16.0%	62.0%	8	4	12.0%	58.0%
	medium sand	0.25	9	18.0%	60.0%	3	6.0%	34.0%	7	14.0%	76.0%	12		12.0%	70.0%
	course sand	0.50	3	6.0%	66.0%	6	12.0%	46.0%	3	6.0%	82.0%	15		15.0%	85.0%
	very course sand	1.0		0.0%	66.0%		0.0%	46.0%	1	2.0%	84.0%	7		7.0%	92.0%
G r a v e l	very fine gravel	2.0	3	6.0%	72.0%	5	10.0%	56.0%	5	10.0%	94.0%	0		0.0%	92.0%
	fine gravel	4.0	1	2.0%	74.0%	2	4.0%	60.0%		0.0%	94.0%	1		1.0%	93.0%
	fine gravel	5.7	1	2.0%	76.0%	4	8.0%	68.0%	1	2.0%	96.0%	2		2.0%	95.0%
	medium gravel	8.0	9	18.0%	94.0%	7	14.0%	82.0%		0.0%	96.0%	3		3.0%	98.0%
	medium gravel	11.3		0.0%	94.0%	6	12.0%	94.0%	1	2.0%	98.0%	2		2.0%	100.0%
	course gravel	16.0	1	2.0%	96.0%	1	2.0%	96.0%		0.0%	98.0%			0.0%	100.0%
	course gravel	22.6	2	4.0%	100.0%		0.0%	96.0%		0.0%	98.0%			0.0%	100.0%
	very course gravel	32		0.0%	100.0%	1	2.0%	98.0%		0.0%	98.0%			0.0%	100.0%
	very course gravel	45		0.0%	100.0%	1	2.0%	100.0%	1	2.0%	100.0%			0.0%	100.0%
Cobble	small cobble	64		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%
	medium cobble	90		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%
	large cobble	128		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%
	very large cobble	180		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%
Boulder	small boulder	256		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%
	small boulder	362		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%
	medium boulder	512		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%
	large boulder	1024		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%
TOTAL / %of whole count			50	100.0%		50	100.0%		50	100.0%		50	50	100.0%	

	d16	d35	d50	d85	d95
As-Built	0.00	0.12	0.27	8.09	16.48
2001	0.13	0.41	2.10	10.32	10.32
2002	0.00	0.08	0.12	1.50	1.50
2003	0.07	0.08	0.12	0.73	6.85



Project Name Jumping Run Area 1
Cross Section #2 (pins C-D)
Feature Pool
Date 10/7/2003
Crew Shaffer, Bidelspach, Clinton

*2003 Stationing adjusted -28 ft
 **2003 Elevations adjusted +5.73 ft

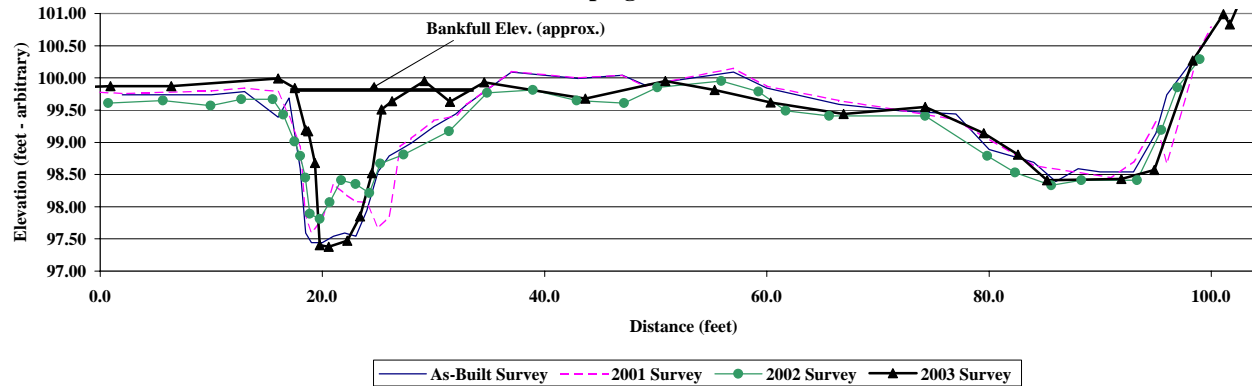
2000 As-Built Survey			2001 2001 Survey			2002 2002 Survey			2003 2003 Survey		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station*	Elevation**	Notes
0.0	100.00	PIN-C	0	99.78		0.0	99.87	PIN-C	-25.18	100.4	
2.0	99.74		2	99.76		0.7	99.61	G	-7.58	99.82	
10.0	99.74		10	99.8		5.7	99.65	G	0.92	99.87	
13.0	99.79		13	99.84		9.9	99.57	G	6.38	99.87	Pin-C
16.0	99.39		16	99.79		12.7	99.67	G	16	99.99	
17.0	99.69	LBF (est)	17	99.41	LBF (est)	15.5	99.67	G	17.52	99.84	
18.0	98.59		18	98.94		16.5	99.43	LBF	18.5	99.19	
18.5	97.59		18.5	97.85		17.5	99.01	G	18.72	99.17	
19.0	97.44		19	97.6		18.0	98.79	LEOW	19.33	98.68	
20.0	97.44		20	97.8		18.5	98.45	CHN	19.76	97.4	
21.0	97.54		21	98.35		18.9	97.89	CHN	20.55	97.38	
22.0	97.59		22	98.2		19.8	97.81	CHN	22.22	97.47	
23.0	97.54		23	98.08		20.6	98.07	CHN	23.39	97.85	
24.0	97.94		24	98.07		21.7	98.41	CHN	24.45	98.52	
25.0	98.54		25	97.67		23.0	98.35	CHN	25.3	99.51	
26.0	98.79		26	97.84		24.2	98.21	CHN	26.27	99.64	
27.0	98.89		27	98.94		25.2	98.67	REOW	29.16	99.95	
28.0	98.99		28	99.06		27.3	98.81	G	31.47	99.63	
30.0	99.24		30	99.34		31.4	99.17	G	34.56	99.93	
32.0	99.44		32	99.41		34.8	99.77	RBF	43.65	99.68	
33.0	99.59	RBF (est)	33	99.59	RBF (est)	38.9	99.81	G	50.86	99.95	
37.0	100.09		37	100.1		42.9	99.65	G	55.29	99.81	
43.0	99.99		43	100		47.2	99.61	G	60.32	99.62	
47.0	100.04		47	100.04		50.2	99.85	G	66.91	99.44	
49.0	99.89		49	99.87		55.9	99.95	G	74.24	99.55	
57.0	100.09		57	100.15		59.3	99.79	G+VP	79.5	99.14	
60.0	99.84		60	99.87		61.7	99.49	G	82.59	98.81	
66.5	99.59		66.5	99.65		65.6	99.41	G	85.21	98.41	
72.0	99.49		72	99.5		74.2	99.41	G	91.91	98.43	
77.0	99.44		77	99.35		79.8	98.79	G	94.87	98.57	
80.0	98.89		84	98.64		82.3	98.53	G	98.32	100.27	
84.0	98.69		91	98.45		85.6	98.33	G	101.07	100.99	Pin-D
86.0	98.39		93	98.7		88.3	98.41	G	101.66	100.83	
88	98.59		95	99.31		93.3	98.41	G	104.6	102	
90	98.54		96	98.67		95.5	99.19	G	108.24	102.84	
93	98.54		99	100.48		96.9	99.85	G+VP	120.38	104.8	
95	99.14		100	100.78		98.9	100.29	G			
96	99.74		100	100.99	PIN-D?	100.1	100.99	PIN-D			
99	100.44										
100	100.69										
100	100.94	PIN-D									



Photo of Area 1 Cross-Section #2 - Looking Upstream

	Bankfull Area			
	As-Built	2001	2002	2003
Area	19.2	17.88	17.25	11.72
Width	16.0	16.0	19.3	8.8
Mean Depth	1.2	1.1	0.9	1.3
Max Depth	2.3	2.1	1.9	2.3

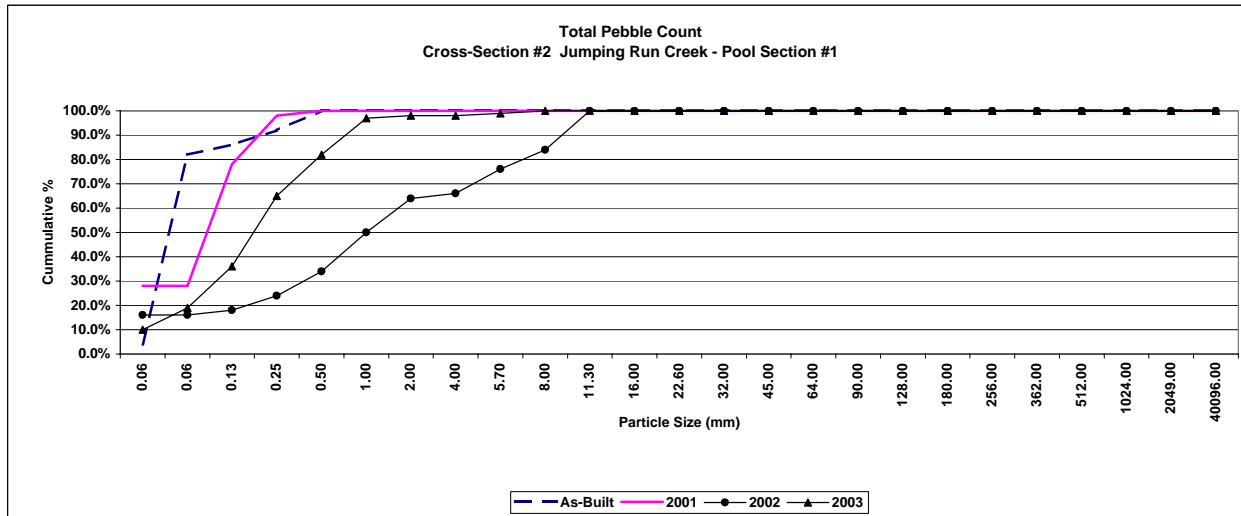
Area 1 Cross-Section #2 - Pool
Jumping Run Creek



Project Name	Payne Dairy - Jumping Run Creek
Cross Section	#2 Section 1
Feature	Pool
Date	10/7/03
Crew	Shaffer, Bidelspach, Clinton

Description	Material	2000				2001				2002				2003			
		Size (mm)	As-Built	Pool	%	Cum %	Riffle - Bed	%	Cum %	Riffle - Bed	%	Cum %	Riffle - Bed	iffle - Ban	%	Cum %	
Silt/Clay	silt/clay	0.061	2	4.0%	4.0%	14	28.0%	28.0%	8	16.0%	16.0%	4	6	10.0%	10.0%		
	very fine sand	0.062	39	78.0%	82.0%	0	0.0%	28.0%	0	0.0%	16.0%	6	3	9.0%	19.0%		
Sand	fine sand	0.125	2	4.0%	86.0%	25	50.0%	78.0%	1	2.0%	18.0%	8	9	17.0%	36.0%		
	medium sand	0.25	3	6.0%	92.0%	10	20.0%	98.0%	3	6.0%	24.0%	15	14	29.0%	65.0%		
	course sand	0.50	4	8.0%	100.0%	1	2.0%	100.0%	5	10.0%	34.0%	9	8	17.0%	82.0%		
	very course sand	1.0	0	0.0%	100.0%	0	0.0%	100.0%	8	16.0%	50.0%	15		15.0%	97.0%		
	very fine gravel	2.0	0	0.0%	100.0%	0	0.0%	100.0%	7	14.0%	64.0%	1		1.0%	98.0%		
Gravel	fine gravel	4.0	0	0.0%	100.0%	0	0.0%	100.0%	1	2.0%	66.0%	0		0.0%	98.0%		
	fine gravel	5.7	0	0.0%	100.0%	0	0.0%	100.0%	5	10.0%	76.0%	1		1.0%	99.0%		
	medium gravel	8.0	0	0.0%	100.0%	0	0.0%	100.0%	4	8.0%	84.0%	1		1.0%	100.0%		
	medium gravel	11.3	0	0.0%	100.0%	0	0.0%	100.0%	8	16.0%	100.0%			0.0%	100.0%		
	course gravel	16.0	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		
	course gravel	22.6	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		
	very course gravel	32	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		
	very course gravel	45	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		
Cobble	small cobble	64	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		
	medium cobble	90	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		
	large cobble	128	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		
	very large cobble	180	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		
Boulder	small boulder	256	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		
	small boulder	362	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		
	medium boulder	512	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		
	large boulder	1024	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		
Bedrock	bedrock	2049	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		
	bedrock	40096	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		
TOTAL / %of whole count			50	100.0%		50	100.0%		50	100.0%		60	40	100.0%			

	d16	d35	d50	d85	d95
As-Built	0.07	0.07	0.08	0.14	0.52
2001	0.00	0.11	0.13	0.24	0.24
2002	0.16	0.80	1.50	9.65	9.65
2003	0.08	0.18	0.28	0.85	1.40



Project Name	Jumping Run Area 2
Cross Section	#1 (pins E-F)
Feature	Riffle
Date	10/7/2003
Crew	Shaffer, Bidelspach, Clinton

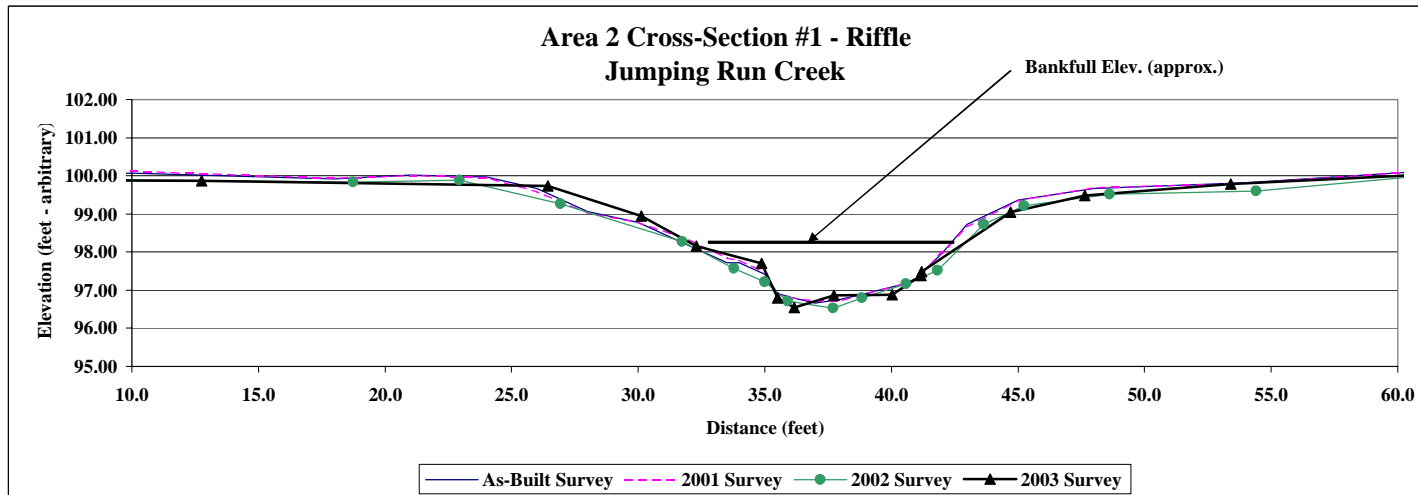
**2003 Elevations adjusted +30.25 ft

2000 As-Built Survey			2001 2001 Survey			2002 2002 Survey			2003 2003 Survey		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station*	Elevation**	Notes
0.0	100.32	PIN-E?	0	99.8		0.0	99.96	PIN-E	0	99.84	Pin-E
0.0	99.77		5	100.03		1.4	99.78	G	2.08	99.79	
5.0	99.97		10	100.12		9.2	99.9	G	6.12	99.88	
10.0	100.07		18	99.94		18.7	99.84	G	12.75	99.87	
18.0	99.92		21	100.01		22.9	99.88	G	26.43	99.73	
21.0	100.02		24	99.95		26.9	99.26	G	30.11	98.94	
24.0	99.97		26	99.58		31.7	98.28	LBF	32.3	98.15	LBF (est)
26.0	99.67		28	99.03		33.8	97.56	G	34.87	97.7	
28.0	99.07		30	98.77		35.0	97.22	LEOW	35.5	96.79	
30.0	98.77		32	98.33		35.9	96.72	CHN	36.17	96.55	
32.0	98.17	LBF (est)	33.5	97.84	LBF (est)	37.7	96.52	TW	37.72	96.86	
33.5	97.72		34	97.78		38.8	96.8	CHN	40.03	96.88	
34.0	97.72		35	97.46		40.6	97.16	REOW	41.16	97.39	
35.0	97.42		35.2	97.11		41.8	97.52	RBF	41.2	97.49	RBF (est)
35.5	96.92		35.5	96.88		43.6	98.72	G	44.7	99.04	
36.0	96.82		36	96.82		45.2	99.22	G	47.64	99.48	
37.0	96.67		37	96.71		48.6	99.52	G	53.39	99.79	
38.0	96.77		38	96.73		54.4	99.6	G	60.2	100	
39.0	96.92		39	96.9		61.1	100	G	65.16	100.17	Pin-F
40.5	97.17		40.5	97.16		64.4	100.06	G			
41.0	97.32	RBF (est)	41	97.29		65.3	100.32	PIN-F			
42.0	97.97		42	97.99	RBF (est)						
43.0	98.72		43	98.66							
45.0	99.37		45	99.35							
48.0	99.67		48	99.69							
54.0	99.82		54	99.8							
61.0	100.12		61	100.12							
63.0	100.12		63	100.15							
63.0	100.32	Pin--F?	63	100.32							



Photo of Area 2 Cross-Section #1 - Looking Downstream

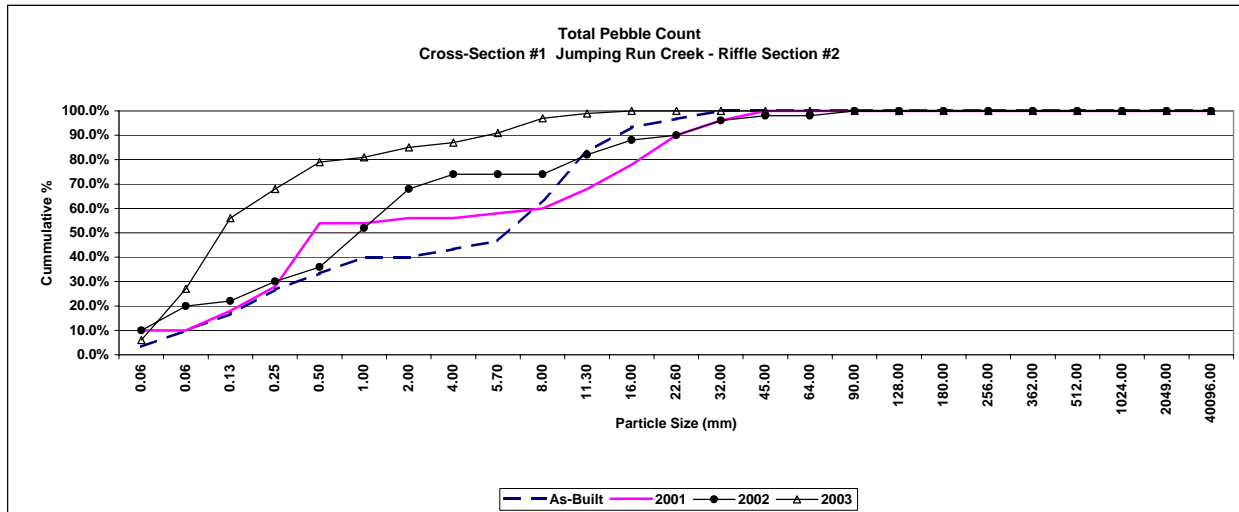
	Bankfull Area			
	As-Built	2001	2002	2003
Area	9.0	8.30	10.17	10.76
Width	11.5	9.5	11.9	12.8
Mean Depth	0.8	0.9	0.9	0.8
Max Depth	1.4	1.4	1.6	1.6



Project Name	Payne Dairy - Jumping Run Creek
Cross Section	#1 Section 2
Feature	Riffle
Date	9/30/03
Crew	Shaffer, Bidelspach, Clinton

Description	Material	2000			2001			2002			2003		
		Size (mm)	Riffle - Bed	%	Riffle - Bed	%	Riffle - Bed	%	Riffle - Bed	%	Riffle - Bed	%	
Silt/Clay	silt/clay	0.061	1	3.3%	5	10.0%	5	10.0%	0	6	6.0%	6.0%	
Sand	very fine sand	0.062	2	6.7%	4	8.0%	1	2.0%	16	13	21.0%	27.0%	
	fine sand	0.125	2	6.7%	5	10.0%	4	8.0%	12	12	20.0%	29.0%	
	medium sand	0.25	3	10.0%	13	26.0%	3	6.0%	11	11	18.0%	28.0%	
	course sand	0.50	2	6.7%	0.0%	54.0%	8	16.0%	2	2	3.0%	8.0%	
	very course sand	1.0	2	6.7%	40.0%	0.0%	54.0%	8	16.0%	52.0%	2	2.0%	81.0%
Gravel	very fine gravel	2.0	0	0.0%	1	2.0%	8	16.0%	4	4	6.0%	85.0%	
	fine gravel	4.0	1	3.3%	0.0%	56.0%	3	6.0%	2	2	3.0%	87.0%	
	fine gravel	5.7	1	3.3%	46.7%	1	2.0%	0.0%	4	4	6.0%	91.0%	
	medium gravel	8.0	5	16.7%	63.3%	1	2.0%	60.0%	6	6	10.0%	97.0%	
	medium gravel	11.3	6	20.0%	83.3%	4	8.0%	68.0%	2	2	3.0%	99.0%	
	course gravel	16.0	3	10.0%	93.3%	5	10.0%	78.0%	3	1	1.0%	100.0%	
	course gravel	22.6	1	3.3%	96.7%	6	12.0%	90.0%	1	0.0%	0.0%	100.0%	
	very course gravel	32	1	3.3%	100.0%	3	6.0%	96.0%	3	6.0%	96.0%	100.0%	
	very course gravel	45	0	0.0%	100.0%	2	4.0%	100.0%	1	2.0%	98.0%	100.0%	
Cobble	small cobble	64	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	98.0%	100.0%	
	medium cobble	90	0	0.0%	100.0%	0	0.0%	100.0%	1	2.0%	100.0%	100.0%	
	large cobble	128	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%	100.0%	
	very large cobble	180	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%	100.0%	
Boulder	small boulder	256	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%	100.0%	
	small boulder	362	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%	100.0%	
	medium boulder	512	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%	100.0%	
	large boulder	1024	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%	100.0%	
	very large boulder	2049	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%	100.0%	
Bedrock	bedrock	40096	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0.0%	100.0%	
TOTAL / %of whole count			30	100.0%	50	100.0%	50	100.0%	60	40	100.0%		

	d16	d35	d50	d85	d95
As-Built	0.18	0.94	7.41	14.03	23.30
2001	0.16	0.48	0.69	23.30	23.30
2002	0.08	0.69	1.41	15.53	15.53
2003	0.08	0.12	0.17	2.63	8.72



Project Name Jumping Run Area 2
Cross Section #2 (pins G-H)
Feature Pool
Date 10/7/2003
Crew Shaffer, Bidelspach, Clinton

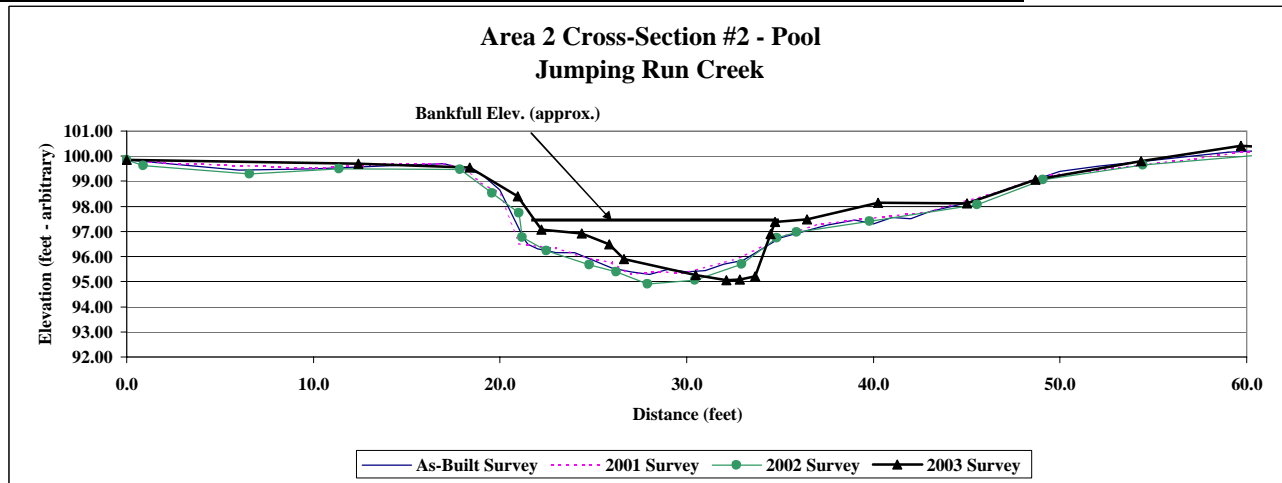
*2003 Elevations adjusted +9.85 ft

2000 As-Built Survey			2001 2001 Survey			2002 2002 Survey			2003 2003 Survey		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station**	Elevation*	Notes
0.0	99.85		0	99.87		0.0	99.85	PIN-G	0	99.86	Pin G
6.0	99.45		2	99.73		0.9	99.62	G	12.4	99.71	
10.0	99.50		10	99.53		6.6	99.3	G	18.4	99.55	
15.0	99.65		13	99.64		11.4	99.5	G	21.0	98.41	
17.0	99.70		16	99.7		17.9	99.48	G	22.2	97.08	
19.0	99.30		17	99.71		19.6	98.52	G	24.4	96.92	LBF (est)
20.0	98.65		18	99.55		21.0	97.74	G	25.8	96.48	
21.3	96.70	LBF (est)	19	98.94		21.2	96.76	LBF	26.6	95.89	
21.5	96.50		20	98.53		22.5	96.24	CHN	30.5	95.27	
22.0	96.30		21	96.51	LBF (est)	24.8	95.66	CHN	32.1	95.07	
23.0	96.15		22	96.4		26.2	95.38	CHN	32.9	95.08	
24.0	96.15		23	96.34		27.9	94.9	TW	33.7	95.21	
26.0	95.55		24	96.1		30.4	95.06	TW	34.5	96.9	RBF (est)
27.0	95.40		25	95.87		32.9	95.7	CHN	34.7	97.38	
28.0	95.30		26	95.77		34.8	96.74	RBF	36.4	97.48	
29.0	95.50		27	95.3		35.9	96.96	G	40.3	98.14	
30.0	95.40		28	95.39		39.8	97.4	G	45.0	98.13	
31.0	95.45		30	95.37		45.6	98.08	G	48.7	99.05	
32.0	95.70		32	95.75		49.1	99.06	G	54.3	99.81	
33.0	95.85		33	96.01		54.5	99.64	G	59.7	100.41	Pin H
35.0	96.75	RBF (est)	35	96.78	RBF (est)	60.9	100.06	G	64.4	100.2	
37.5	97.25		37	97.27		69.3	99.92	G			
39.0	97.45		43	97.78		70.4	100.54	PIN-H			
40.0	97.30		47	98.65							
41.0	97.55		49	99.18							
42.0	97.50		57	99.88							
43.0	97.80		60	100.18							
45.0	98.15		66	100.17							
50.0	99.40		70	100.27							
52.0	99.60		70	100.5	Pin H?						
59.0	100.15										
62.0	100.25										
67.0	100.15										
70.5	100.25										
70.5	100.51	Pin H?									



Photo of Area 2 Cross-Section #2 - Looking Downstream

	Bankfull Area			
	As-Built	2001	2002	2003
Area	12.8	12.22	15.53	10.85
Width	13.7	14.0	13.6	12.3
Mean Depth	0.9	0.9	1.1	0.9
Max Depth	1.5	1.5	1.8	1.7

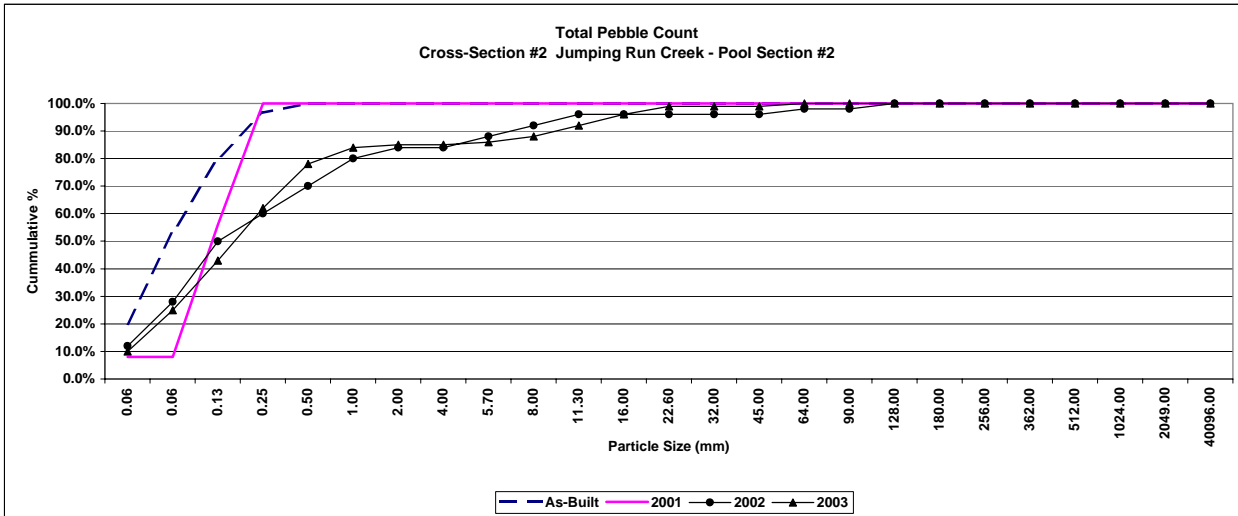


Project Name	Payne Dairy - Jumping Run Creek
Cross Section	#2 Section 2
Feature	Pool
Date	9/30/03
Crew	Shaffer, Bidelspach, Clinton

Cross Section #1

Description	Material	2000			2001			2002			2003		
		Size (mm)	Rifle - Bed	%	Rifle - Bed	%	Rifle - Bed	%	Rifle - Bed	%	Rifle - Bed	%	
Silt/Clay	silt/clay	0.061	6	20.0%	4	8.0%	6	12.0%	0	10	10.0%	10.0%	
Sand	very fine sand	0.062	10	33.3%	0	0.0%	8	16.0%	3	12	15.0%	25.0%	
	fine sand	0.125	8	26.7%	24	48.0%	11	22.0%	10	8	18.0%	43.0%	
	medium sand	0.25	5	16.7%	22	44.0%	5	10.0%	19	0	19.0%	62.0%	
	course sand	0.50	1	3.3%	0	0.0%	5	10.0%	16	0	16.0%	78.0%	
	very course sand	1.0	0	0.0%	0	0.0%	5	10.0%	6	0	6.0%	84.0%	
G r a v e l	very fine gravel	2.0	0	0.0%	0	0.0%	2	4.0%	1	0	1.0%	85.0%	
	fine gravel	4.0	0	0.0%	0	0.0%	0	0.0%	0	0	0.0%	85.0%	
	fine gravel	5.7	0	0.0%	0	0.0%	2	4.0%	1	0	1.0%	86.0%	
	medium gravel	8.0	0	0.0%	0	0.0%	2	4.0%	2	2	2.0%	88.0%	
	medium gravel	11.3	0	0.0%	0	0.0%	2	4.0%	4		4.0%	92.0%	
	course gravel	16.0	0	0.0%	0	0.0%	0	0.0%	4		4.0%	96.0%	
	course gravel	22.6	0	0.0%	0	0.0%	0	0.0%	3		3.0%	99.0%	
	very course gravel	32	0	0.0%	0	0.0%	0	0.0%	0		0.0%	99.0%	
	very course gravel	45	0	0.0%	0	0.0%	0	0.0%	0		0.0%	99.0%	
Cobble	small cobble	64	0	0.0%	0	0.0%	1	2.0%	1	1	1.0%	100.0%	
	medium cobble	90	0	0.0%	0	0.0%	0	0.0%	0		0.0%	100.0%	
	large cobble	128	0	0.0%	0	0.0%	1	2.0%	0		0.0%	100.0%	
	very large cobble	180	0	0.0%	0	0.0%	0	0.0%	0		0.0%	100.0%	
Boulder	small boulder	256	0	0.0%	0	0.0%	0	0.0%	0		0.0%	100.0%	
	small boulder	362	0	0.0%	0	0.0%	0	0.0%	0		0.0%	100.0%	
	medium boulder	512	0	0.0%	0	0.0%	0	0.0%	0		0.0%	100.0%	
	large boulder	1024	0	0.0%	0	0.0%	0	0.0%	0		0.0%	100.0%	
Bedrock	bedrock	2049	0	0.0%	0	0.0%	0	0.0%	0		0.0%	100.0%	
TOTAL / %of whole count			30	100.0%	50	100.0%	50	100.0%	70	30	100.0%		

	d16	d35	d50	d85	d95
As-Built	0.00	0.08	0.09	0.23	0.36
2001	0.11	0.15	0.18	0.31	0.31
2002	0.07	0.12	0.19	7.85	7.85
2003	0.07	0.15	0.26	1.50	17.89



Project Name	Jumping Run Area 3
Cross Section	#1 (pins I-J)
Feature	Riffle
Date	10/7/2003
Crew	Shaffer, Bidelspach, Clinton

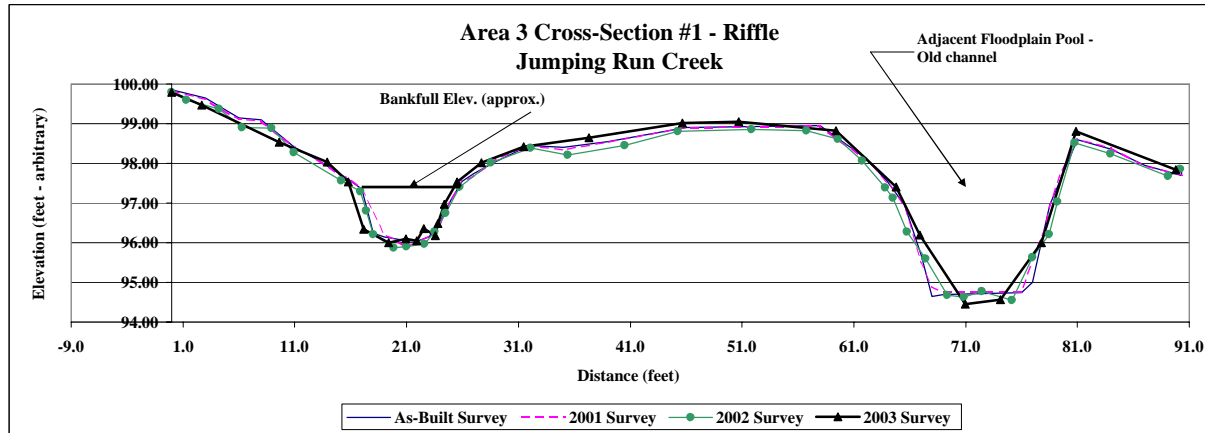
*2003 Survey Elevation Adjusted +21.09 ft

2000 As-Built Survey			2001 Survey			2002 Survey			2003 Survey		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation*	Notes
0.0	99.85		0.0	99.82		0.0	99.79	PIN-I	0.0	99.79	Pin - I
3.0	99.65		2.0	99.7		1.3	99.59	G	2.7	99.46	
6.0	99.15		3.0	99.61		4.2	99.37	G	9.6	98.53	
8.0	99.10		6.0	99.11		6.3	98.91	G	13.9	98.03	
11.0	98.40		8.0	99.07		8.9	98.89	G	15.8	97.54	LBF (est)
13.0	98.10		11.0	98.41		10.9	98.27	G	17.1	96.34	
15.0	97.75		13.0	98.11		15.2	97.57	G	19.4	96	
16.0	97.55		15.0	97.72		16.9	97.29	LBF	20.9	96.09	
17.0	97.35	LBF (est)	16.0	97.59		17.4	96.81	G	21.9	96.05	
18.0	96.25		17.0	97.35	LBF (est)	18.0	96.21	LEOW	22.6	96.36	
19.0	96.15		18.0	96.78		19.9	95.87	CHN	23.6	96.18	
20.0	96.10		19.0	96.2		21.0	95.91	TW	23.8	96.49	
21.0	96.05		20.0	96.08		22.6	95.97	CHN	24.4	96.96	
22.0	96.05		21.0	95.88		23.5	96.27	REOW	25.5	97.54	RBF (est)
23.0	96.15		22.0	96.04		24.5	96.75	G	27.7	98.01	
24.0	96.55		23.0	96.16		25.8	97.41	RBF	31.5	98.42	
25.0	97.10		24.0	96.49		28.5	98.01	G	37.3	98.65	
26.0	97.55	RBF (est)	25.0	97.12		32.1	98.39	G	45.7	99.01	
27.0	97.75		26.0	97.55	RBF (est)	35.4	98.21	G	50.7	99.05	
29.0	98.05		27.0	97.68		40.5	98.45	G	59.4	98.82	
32.0	98.45		29.0	98.12		45.2	98.81	G	64.8	97.4	
35.0	98.40		32.0	98.43		51.8	98.85	G	66.9	96.19	
39.0	98.55		35.0	98.34		56.8	98.83	G	71.0	94.45	
46.0	98.90		39.0	98.53		59.5	98.61	G	74.1	94.57	
58.0	98.95		46.0	98.91		61.8	98.07	G	77.8	96	
62.0	98.15		58.0	98.93		63.8	97.39	G	80.9	98.8	
64.0	97.55		62.0	98.13		64.5	97.13	G+VP	89.8	97.84	Pin - J
65.5	96.95		64.0	97.51		65.8	96.27	G			
67.0	95.70		65.5	96.92		67.4	95.59	G			
68.0	94.65		67.0	95.48		69.4	94.67	G			
69.0	94.70		68.0	94.88		70.9	94.63	G			
76.0	94.75		69.0	94.76		72.5	94.77	G			
77.0	95.00		76.0	94.76		75.2	94.55	G			
78	96.30		77.0	95.55		77.0	95.63	G			
78.5	96.95		78.0	96.27		78.5	96.21	G			
79.5	97.6		78.5	96.92		79.2	97.03	G+VP			
81	98.6		79.5	97.75		80.7	98.51	G			
84	98.35		81.0	98.62		83.9	98.25	G			
87	97.95		84.0	98.38		89.1	97.67	G			
90.3	97.7		87.0	97.93		90.2	97.85	PIN-J			
90.3	97.85	Pin J?	90.3	97.71							
			90.3	97.83	Pin J?						



Photo of Area 3 Cross-Section #1 - Looking Downstream

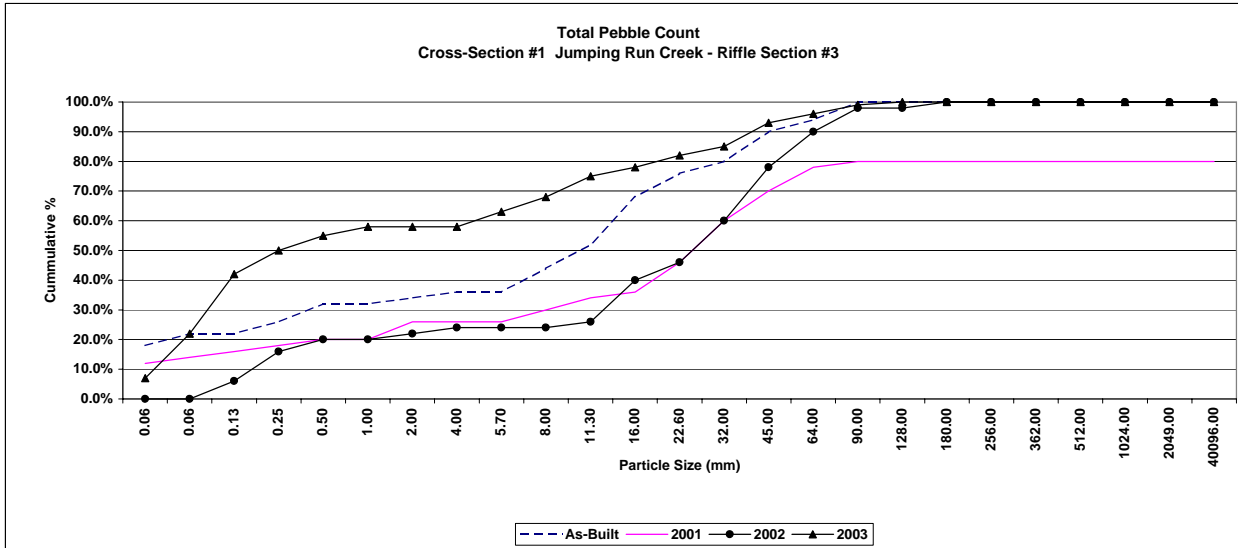
	As-Built	2002	2003	2003
Area	8.3	7.95	9.35	8.99
Width	9.0	9.0	10.6	9.7
Mean Depth	0.9	0.9	0.9	0.9
Max Depth	1.3	1.5	1.5	1.3



Project Name Payne Dairy - Jumping Run Creek
Cross Section #1 Section 3
Feature Riffle
Date 9/30/03
Crew Shaffer, Bidelspach, Clinton

Description	Material	Size (mm)	2000			2001			2002			2003			
			As-Built	Rifle - Bed	%	Rifle - Bed	%	Rifle - Bed	%	Rifle - Bed	%	Rifle - Bed	%		
Silt/Clay	silt/clay	0.061	9	18.0%	18.0%	6	12.0%	12.0%		0.0%	0.0%	2	5	7.0%	7.0%
	very fine sand	0.062	2	4.0%	22.0%	1	2.0%	14.0%		0.0%	0.0%	1	14	15.0%	22.0%
	fine sand	0.125		0.0%	22.0%	1	2.0%	16.0%	3	6.0%	6.0%	10	10	20.0%	42.0%
	medium sand	0.25	2	4.0%	26.0%	1	2.0%	18.0%	5	10.0%	16.0%	8		8.0%	50.0%
	course sand	0.50	3	6.0%	32.0%	1	2.0%	20.0%	2	4.0%	20.0%	5		5.0%	55.0%
Gravel	very course sand	1.0		0.0%	32.0%		0.0%	20.0%		0.0%	20.0%	3		3.0%	58.0%
	very fine gravel	2.0	1	2.0%	34.0%	3	6.0%	26.0%	1	2.0%	22.0%	0		0.0%	58.0%
	fine gravel	4.0	1	2.0%	36.0%		0.0%	26.0%	1	2.0%	24.0%	0		0.0%	58.0%
	fine gravel	5.7		0.0%	36.0%		0.0%	26.0%		0.0%	24.0%	5		5.0%	63.0%
	medium gravel	8.0	4	8.0%	44.0%	2	4.0%	30.0%		0.0%	24.0%	5		5.0%	68.0%
	medium gravel	11.3	4	8.0%	52.0%	2	4.0%	34.0%	1	2.0%	26.0%	7		7.0%	75.0%
	course gravel	16.0	8	16.0%	68.0%	1	2.0%	36.0%	7	14.0%	40.0%	3		3.0%	78.0%
	course gravel	22.6	4	8.0%	76.0%	5	10.0%	46.0%	3	6.0%	46.0%	4		4.0%	82.0%
	very course gravel	32	2	4.0%	80.0%	7	14.0%	60.0%	7	14.0%	60.0%	3		3.0%	85.0%
	very course gravel	45	5	10.0%	90.0%	5	10.0%	70.0%	9	18.0%	78.0%	8		8.0%	93.0%
Cobble	small cobble	64	2	4.0%	94.0%	4	8.0%	78.0%	6	12.0%	90.0%	3		3.0%	96.0%
	medium cobble	90	3	6.0%	100.0%	1	2.0%	80.0%	4	8.0%	98.0%	2	1	3.0%	99.0%
	large cobble	128		0.0%	100.0%		0.0%	80.0%		0.0%	98.0%	1		1.0%	100.0%
	very large cobble	180		0.0%	100.0%		0.0%	80.0%	1	2.0%	100.0%			0.0%	100.0%
Boulder	small boulder	256		0.0%	100.0%		0.0%	80.0%		0.0%	100.0%			0.0%	100.0%
	small boulder	362		0.0%	100.0%		0.0%	80.0%		0.0%	100.0%			0.0%	100.0%
	medium boulder	512		0.0%	100.0%		0.0%	80.0%		0.0%	100.0%			0.0%	100.0%
	large boulder	1024		0.0%	100.0%		0.0%	80.0%		0.0%	100.0%			0.0%	100.0%
	very large boulder	2049		0.0%	100.0%		0.0%	80.0%		0.0%	100.0%			0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0.0%	80.0%	0	0.0%	100.0%			0.0%	100.0%
TOTAL / % of whole count				50	100.0%		40	80.0%		50	100.0%		70	30	100.0%

	d16	d35	d50	d85	d95
As-Built	0.00	3.93	12.65	44.90	82.33
2001	0.19	16.48	30.50	0.00	0.00
2002	0.38	17.28	30.50	65.75	65.75
2003	0.08	0.15	0.38	34.77	69.50



Project Name	Jumping Run Area 3
Cross Section	#2 (pins K-L)
Feature	Pool
Date	10/7/2003
Crew	Shaffer, Bidelspach, Clinton

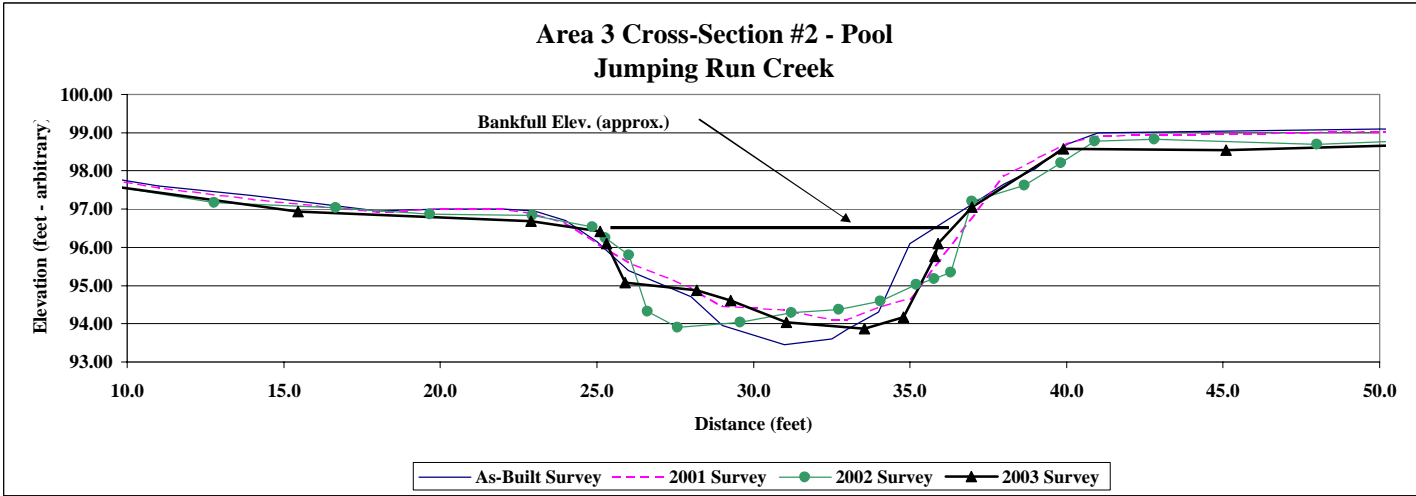
*2003 Survey Elevations Adjusted +21.88 ft

2000 As-Built Survey			2001 2001 Survey			2002 2002 Survey			2003 2003 Survey*		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation*	Notes
0.0	99.75		0.0	99.75		0	Bad shot	Pin-K	0	99.75	Pin - K
2.0	99.35		2.0	99.44		0.77	99.55	G	2.29	99.26	
5.0	98.40		5.0	98.46		2.03	99.35	G	7.06	97.87	
8.0	98.00		8.0	97.97		3.90	98.91	G	15.45	96.94	LBF(est)
11.0	97.60		11.0	97.56		5.89	98.23	G	22.90	96.68	
14.0	97.35		14.0	97.25		8.61	97.73	G	25.11	96.41	
16.0	97.15		16.0	97.09		12.78	97.17	G	25.31	96.10	
18.0	96.95		18.0	96.92		16.65	97.03	LBKF	25.91	95.08	
20.0	97.00		20.0	97.01		19.66	96.87	G	28.19	94.87	
22.0	97.00	LBF (est)	22.0	97.01	LBF (est)	22.94	96.83	G	29.27	94.61	
23.0	96.95		23.0	96.87		24.86	96.53	G	31.05	94.03	
24.0	96.70		24.0	96.63		25.27	96.25	LEOW	33.54	93.87	
25.0	96.15		25.0	96.11		26.03	95.79	CHN	34.79	94.17	
26.0	95.40		26.0	95.61		26.61	94.33	CHN	35.80	95.76	
28.0	94.70		28.0	94.94		27.59	93.91	CHN	35.90	96.10	
29.0	93.95		29.0	94.45		29.58	94.03	CHN	36.97	97.06	RBF(est)
31.0	93.45		31.0	94.35		31.23	94.29	CHN	39.90	98.58	
32.5	93.60		32.5	94.1		32.73	94.37	CHN	45.10	98.54	
33.0	93.85		33.0	94.1		34.05	94.59	CHN	53.11	98.72	
34.0	94.30		34.0	94.43		35.20	95.03	CHN	58.34	98.62	Pin - L
35.0	96.10		35.0	94.65		35.77	95.17	CHN			
38.0	97.65	RBF (est)	38.0	97.85	RBF (est)	36.31	95.35	CHN			
39.0	98.05		39.0	98.29		36.98	97.21	RBF			
40.0	98.70		40.0	98.71		38.65	97.63	G			
41.0	99.00		41.0	98.91		39.81	98.21	G			
50.0	99.10		50.0	99.03		40.91	98.77	G			
58.5	99.05		58.5	99.04		42.81	98.83	G			
58.5	99.25	Pin L?	58.5	99.21	Pin L?	47.99	98.69	G			
						52.62	98.85	G			
						58.27	98.81	G			
						58.87	98.87	Pin L			



Photo of Area 3 Cross-Section #2 - Looking Downstream

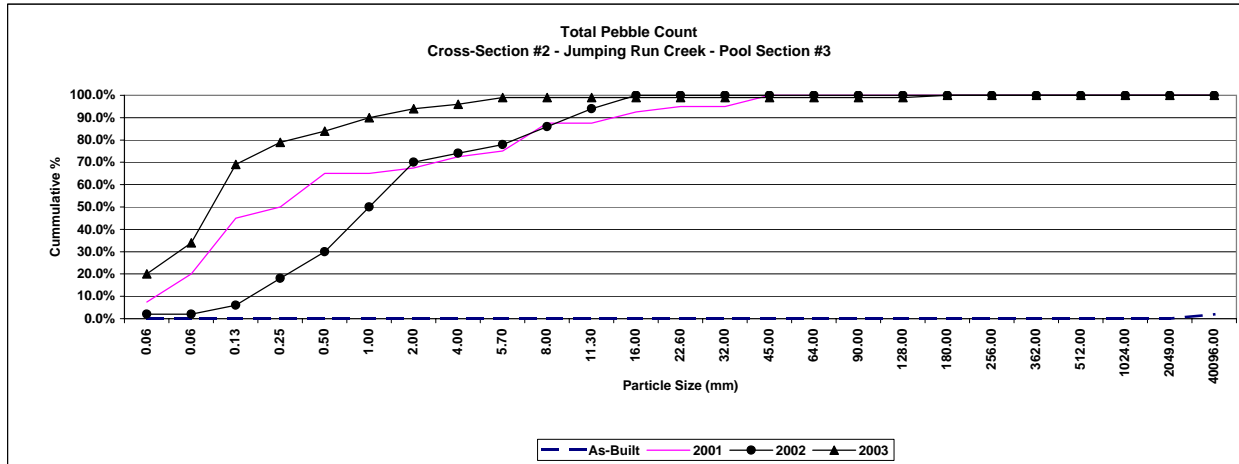
Bankfull Area				
	2000	2001	2002	2003
Area	27.1	25.97	29.27	28.98
Width	15.0	15.0	20.3	28.8
Mean Depth	1.8	1.7	1.4	1.0
Max Depth	3.6	2.9	3.1	3.1



Project Name	Payne Dairy - Jumping Run Creek
Cross Section	#2 Section 3
Feature	Pool
Date	9/30/03
Crew	Shaffer, Bidelspach, Clinton

Description	Material	2000			2001			2002			2003					
		Size (mm)	As-Built	Pool	%	Cum %	Pool	%	Cum %	Pool	%	Cum %	Pool - Ban	%	Cum %	
Silt/Clay	silt/clay	0.061			0.0%	0.0%	3	7.5%	7.5%	1	2.0%	2.0%	6	14	20.0%	20.0%
Sand	very fine sand	0.062			0.0%	0.0%	5	12.5%	20.0%	0	0.0%	2.0%	2	12	14.0%	34.0%
	fine sand	0.125			0.0%	0.0%	10	25.0%	45.0%	2	4.0%	6.0%	22	13	35.0%	69.0%
	medium sand	0.25			0.0%	0.0%	2	5.0%	50.0%	6	12.0%	18.0%	9	1	10.0%	79.0%
	course sand	0.50			0.0%	0.0%	6	15.0%	65.0%	6	12.0%	30.0%	5		5.0%	84.0%
	very course sand	1.0			0.0%	0.0%	0	0.0%	65.0%	10	20.0%	50.0%	6		6.0%	90.0%
Gravel	very fine gravel	2.0			0.0%	0.0%	1	2.5%	67.5%	10	20.0%	70.0%	4		4.0%	94.0%
	fine gravel	4.0			0.0%	0.0%	2	5.0%	72.5%	2	4.0%	74.0%	2		2.0%	96.0%
	fine gravel	5.7			0.0%	0.0%	1	2.5%	75.0%	2	4.0%	78.0%	3		3.0%	99.0%
	medium gravel	8.0			0.0%	0.0%	5	12.5%	87.5%	4	8.0%	86.0%	0		0.0%	99.0%
	medium gravel	11.3			0.0%	0.0%	0	0.0%	87.5%	4	8.0%	94.0%	0		0.0%	99.0%
	course gravel	16.0			0.0%	0.0%	2	5.0%	92.5%	3	6.0%	100.0%			0.0%	99.0%
	course gravel	22.6			0.0%	0.0%	1	2.5%	95.0%	0	0.0%	100.0%			0.0%	99.0%
	very course gravel	32			0.0%	0.0%	0	0.0%	95.0%	0	0.0%	100.0%			0.0%	99.0%
	very course gravel	45			0.0%	0.0%	2	5.0%	100.0%	0	0.0%	100.0%			0.0%	99.0%
Cobble	small cobble	64			0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	99.0%
	medium cobble	90			0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	99.0%
	large cobble	128			0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	99.0%
	very large cobble	180			0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%	1		1.0%	100.0%
Boulder	small boulder	256			0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%
	small boulder	362			0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%
	medium boulder	512			0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%
	large boulder	1024			0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%
	very large boulder	2049			0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%
Bedrock	bedrock	40096	1		2.0%	2.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%
TOTAL / %of whole count			no data		2.0%		40	100.0%		50	100.0%		60	40	100.0%	

	d16	d35	d50	d85	d95
As-Built	0.00	0.00	0.00	0.00	0.00
2001	0.08	0.15	0.38	8.87	8.87
2002	0.34	0.94	1.50	8.95	8.95
2003	0.00	0.10	0.14	0.75	3.93



Project Name Jumping Run Area 4
Cross Section #1 (pins M-N)
Feature Riffle
Date 10/7/2003
Crew Shaffer, Bidelspach, Clinton

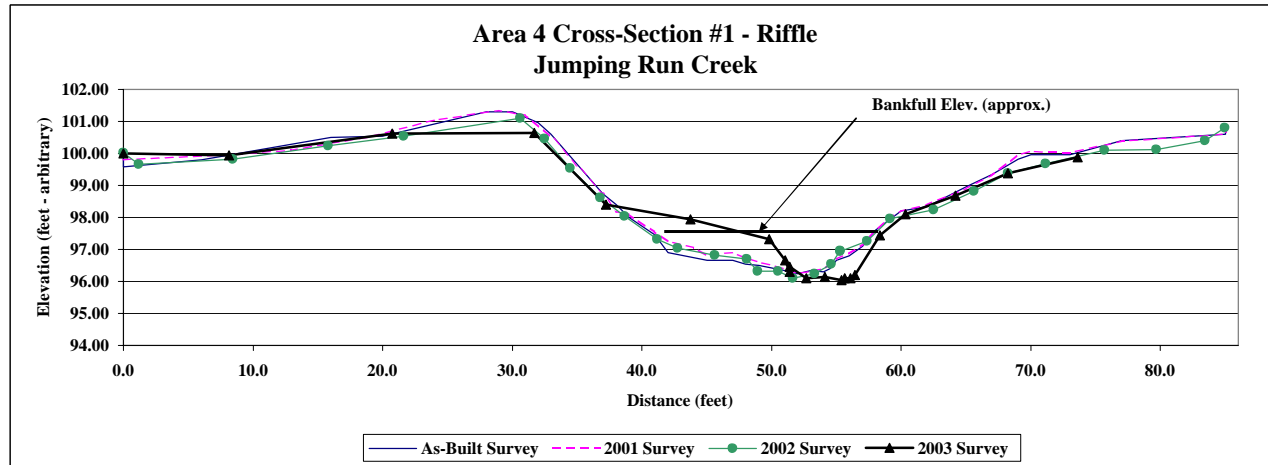
*2003 Survey Elevations Adjusted +26.28 ft
 *2003 Survey Stations Adjusted -3.94 ft

2000 As-Built Survey			2001 2001 Survey			2002 2002 Survey			2003 2003 Survey		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station**	Elevation*	Notes
0.0	100.00	Pin-M	0.0	99.79		0.0	100.01	PIN-M	0	100	PIN-M
0.0	99.58		9.0	99.98		1.2	99.65	G	8.13	99.94	
6.0	99.80		13.0	100.11		8.4	99.81	G	20.74	100.63	
16.0	100.50		19.0	100.51		15.8	100.25	G	31.69	100.64	
20.0	100.55		24.0	101.05		21.6	100.55	G	37.2	98.41	
28.0	101.30		29.0	101.35		30.6	101.09	TOB	43.75	97.94	
30.0	101.30		31.0	101.21		32.5	100.47	G	49.8	97.33	LBF (est)
32.0	100.95		33.0	100.53		34.5	99.55	G	51.06	96.66	
33.0	100.60		35.0	99.61		36.8	98.63	G	51.39	96.3	
35.0	99.65		37.0	98.73		38.7	98.05	G	51.41	96.46	
37.0	98.75		38.0	98.17		41.2	97.31	LBF	52.7	96.1	
38.0	98.40		39.0	98.11		42.7	97.03	G	54.12	96.14	
39.0	98.00		41.0	97.56	LBF (est)	45.6	96.83	G	55.37	96.05	
41.0	97.45	LBF (est)	42.0	97.27		48.1	96.71	LEOW	55.62	96.1	
42.0	96.90		44.0	97.07		48.9	96.33	CHN	56.06	96.1	
45.0	96.65		45.0	96.81		50.5	96.31	CHN	56.43	96.2	
47.0	96.65		47.0	96.89		51.6	96.11	TW	58.37	97.44	RBF (est)
48.0	96.55		48.0	96.73		53.3	96.23	CHN	60.31	98.09	
49.0	96.50		49.0	96.6		54.6	96.55	REOW	64.2	98.67	
51.0	96.35		51.0	96.39		55.3	96.97	G	68.23	99.38	
52.0	96.25		52.0	96.25		55.3	96.93	G	73.62	99.88	PIN N
53.0	96.35		53.0	96.32		57.4	97.27	RBF	85.19	100.79	
54.0	96.30		54.0	96.4		59.1	97.97	G			
54.5	96.40		54.5	96.55		62.5	98.23	G			
55.0	96.65		55.0	96.71		65.6	98.81	G			
56.0	96.80		56.0	96.88		68.2	99.37	G			
57.0	97.10		57.0	97.16		71.1	99.67	G			
58.0	97.60	RBF (est)	58.0	97.58	RBF (est)	75.7	100.09	G			
60.0	98.20		59.0	97.96		79.7	100.13	G			
62.0	98.35		60.0	98.21		83.5	100.41	G			
65.0	98.95		62.0	98.39		85.0	100.79	PIN N			
67.0	99.35		65.0	98.91							
69.0	99.81		67.0	99.32							
70	99.95		69.0	99.96							
73	99.95		70.0	100.06							
77	100.4		73.0	100.01							
85	100.6		77.0	100.37							
85	100.79	Pin-N	85.0	100.61							
			85.0	100.8	Pin-N						



Photo of Area 4 Cross-Section #1 - Looking Downstream

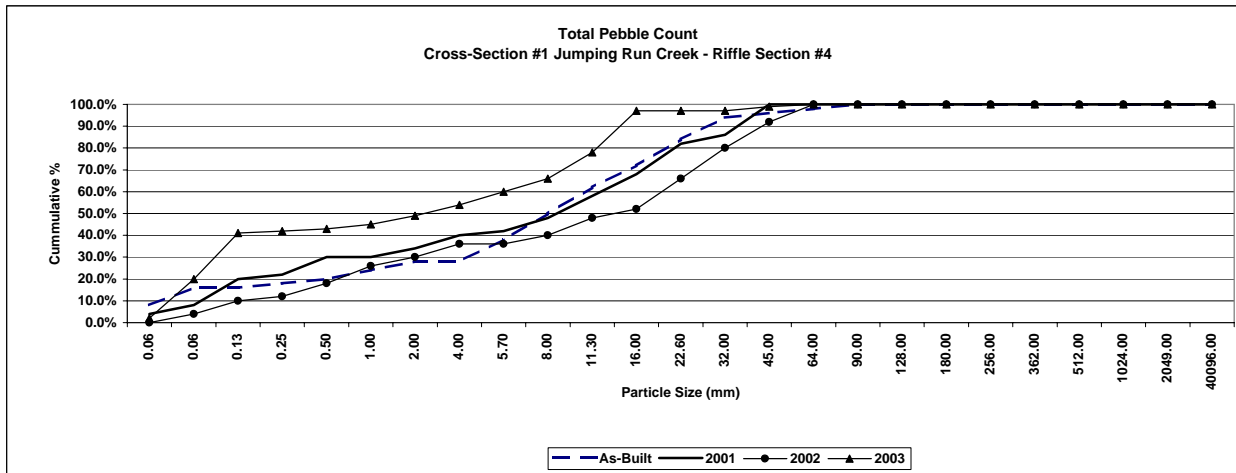
	2000	2001	2002	2003
Area	13.5	11.14	11.91	8.58
Width	17.0	17.0	18.0	8.6
Mean Depth	0.8	0.7	0.7	1.0
Max Depth	1.2	1.2	1.3	1.4



Project Name	Payne Dairy - Jumping Run Creek
Cross Section	#1 Section 3
Feature	Riffle
Date	9/30/03
Crew	Shaffer, Bidelspach, Clinton

Description	Material	2000			2001			2002			2003		
		Size (mm)	Riffle	%	Riffle	%	Riffle	%	Riffle - Bed	Riffle - Ban	%	Cum %	
Silt/Clay	silt/clay	0.061	4	8.0%	2	4.0%	4.0%	0.0%	0	2	2.0%	2.0%	
Sand	very fine sand	0.062	4	8.0%	2	4.0%	8.0%	2	4.0%	0	18	18.0%	
	fine sand	0.125		0.0%	6	12.0%	20.0%	3	6.0%	1	20	21.0%	
	medium sand	0.25	1	2.0%	1	2.0%	22.0%	1	2.0%	1		42.0%	
	course sand	0.50	1	2.0%	4	8.0%	30.0%	3	6.0%	1		43.0%	
	very course sand	1.0	2	4.0%		0.0%	30.0%	4	8.0%	2		45.0%	
Gravel	very fine gravel	2.0	2	4.0%	2	4.0%	34.0%	2	4.0%	4		49.0%	
	fine gravel	4.0		0.0%	3	6.0%	40.0%	3	6.0%	5		54.0%	
	fine gravel	5.7	5	10.0%	1	2.0%	42.0%		0.0%	6		60.0%	
	medium gravel	8.0	6	12.0%	3	6.0%	48.0%	2	4.0%	6		66.0%	
	medium gravel	11.3	6	12.0%	5	10.0%	58.0%	4	8.0%	12		78.0%	
	course gravel	16.0	5	10.0%	5	10.0%	68.0%	2	4.0%	19		97.0%	
	course gravel	22.6	6	12.0%	7	14.0%	82.0%	7	14.0%			97.0%	
	very course gravel	32	5	10.0%	2	4.0%	86.0%	7	14.0%			97.0%	
	very course gravel	45	1	2.0%	7	14.0%	100.0%	6	12.0%	2		99.0%	
Cobble	small cobble	64	1	2.0%		0.0%	100.0%	4	8.0%			100.0%	
	medium cobble	90	1	2.0%		0.0%	100.0%		0.0%			100.0%	
	large cobble	128		0.0%		0.0%	100.0%		0.0%			100.0%	
	very large cobble	180		0.0%		0.0%	100.0%		0.0%			100.0%	
Boulder	small boulder	256		0.0%		0.0%	100.0%		0.0%			100.0%	
	small boulder	362		0.0%		0.0%	100.0%		0.0%			100.0%	
	medium boulder	512		0.0%		0.0%	100.0%		0.0%			100.0%	
	large boulder	1024		0.0%		0.0%	100.0%		0.0%			100.0%	
	very large boulder	2049		0.0%		0.0%	100.0%		0.0%			100.0%	
Bedrock	bedrock	40096	0	0.0%	0	0.0%	100.0%	0	0.0%			100.0%	
TOTAL / % of whole count			50	100.0%	50	100.0%		50	100.0%	60	40	100.0%	

	d16	d35	d50	d85	d95
As-Built	0.28	6.25	9.65	27.30	46.50
2001	0.16	3.31	10.45	32.90	32.90
2002	0.63	4.54	16.48	43.83	43.83
2003	0.09	0.16	3.37	15.43	18.71



Project Name	Jumping Run Area 4
Cross Section	#2 (pins O-P)
Feature	Pool
Date	10/7/2003
Crew	Shaffer, Bidelspach, Clinton

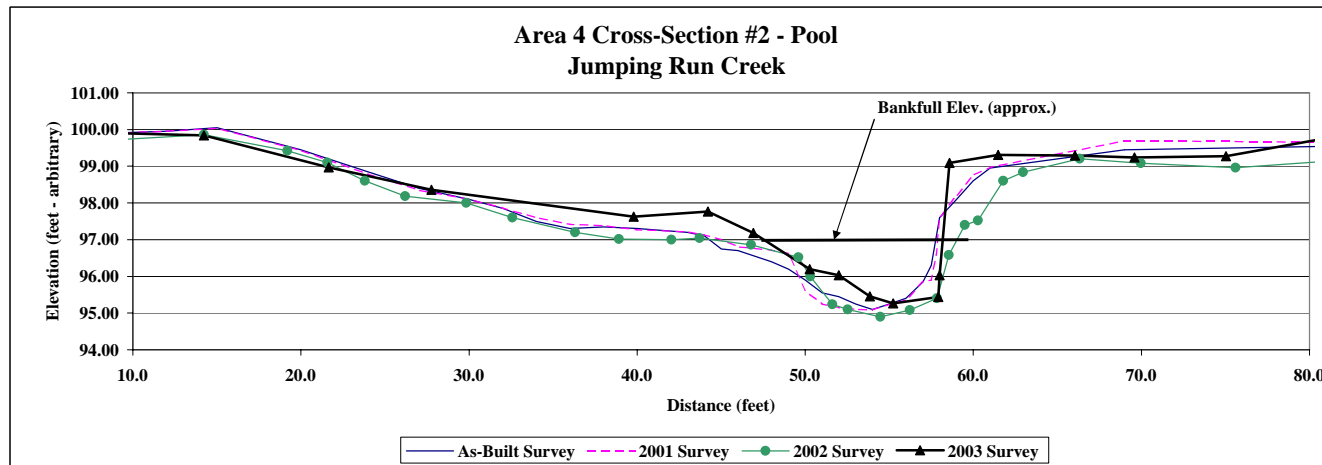
*2003 Survey Elevations Adjusted +26.46 ft
 **2003 Survey Stations Adjusted -3.94 ft

2000 As-Built Survey			2001 2001 Survey			2002 2002 Survey			2003 2003 Survey		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station**	Elevation*	Notes
0.0	100.00	Pin-O	2.0	99.79		0	100	PIN-O	-2	100	LP2
0.0	99.70		12.0	99.95		1.07	99.50	G	1.74	99.99	
2.0	99.80		15.0	100.03		8.24	99.70	G	14.23	99.84	
12.0	99.95		20.0	99.43		14.24	99.86	G	21.66	98.97	
15.0	100.05		24.0	98.79		19.19	99.42	G	27.77	98.36	
20.0	99.45		27.0	98.35		21.57	99.10	G	39.79	97.63	
24.0	98.85		30.0	98.1		23.81	98.60	G	44.21	97.77	
27.0	98.40		32.0	97.86		26.21	98.18	G	46.92	97.18	LBF (est)
30.0	98.10		34.0	97.6		29.83	98.00	G	50.27	96.2	
32.0	97.85		36.0	97.42		32.58	97.60	G	51.99	96.03	
34.0	97.50		38.0	97.38		36.32	97.20	G	53.85	95.46	
36.0	97.30		40.0	97.27		38.91	97.02	G	55.23	95.26	
38.0	97.35		43.0	97.22		42.03	97.00	G	57.91	95.44	
40.0	97.30		44.0	97.13	LBF (est)	43.71	97.04	LBF	58	96.03	
43.0	97.20		45.0	97		46.78	96.86	G	58.58	99.09	RBF (est)
44.0	97.10	LBF (est)	46.0	96.81		49.61	96.52	LEOW	61.48	99.31	
45.0	96.75		48.0	96.71		50.31	96.00	CHN	66.05	99.29	
46.0	96.70		49.0	96.62		51.61	95.24	CHN	69.58	99.24	
48.0	96.40		50.0	95.62		52.54	95.10	CHN	75.04	99.27	
49.0	96.20		51.0	95.25		54.46	94.90	TW	80.66	99.74	
50.0	95.90		52.0	95.15		56.22	95.08	CHN	85.58	99.94	RP2
51.0	95.55		53.0	95.1		57.85	95.40	CHN			
52.0	95.45		54.0	95.09		58.54	96.58	REOW			
53.0	95.25		55.0	95.24		59.49	97.40	G			
54.0	95.10		56.0	95.35		60.28	97.52	RBF			
55.0	95.25		57.0	95.85		61.78	98.60	G			
56.0	95.40		57.5	95.9		62.96	98.84	G			
57.0	95.85		57.8	96.6		66.34	99.20	G			
57.5	96.30		58.0	97.61	RBF (est)	69.96	99.08	G			
58.0	97.60	RBF (est)	59.0	98.2		75.60	98.96	G			
59.0	98.10		60.0	98.75		81.24	99.14	G			
60.0	98.60		61.0	98.97		85.3	99.30	G			
61.0	98.95		69.0	99.69		87.9	99.52	G			
69	99.45		88.0	99.63		88.7	99.92	PIN-P			
88	99.60		88.0	99.94	Pin-P						
88	99.95	Pin-P									



Photo of Area 4 Cross-Section #2 - Looking Downstream

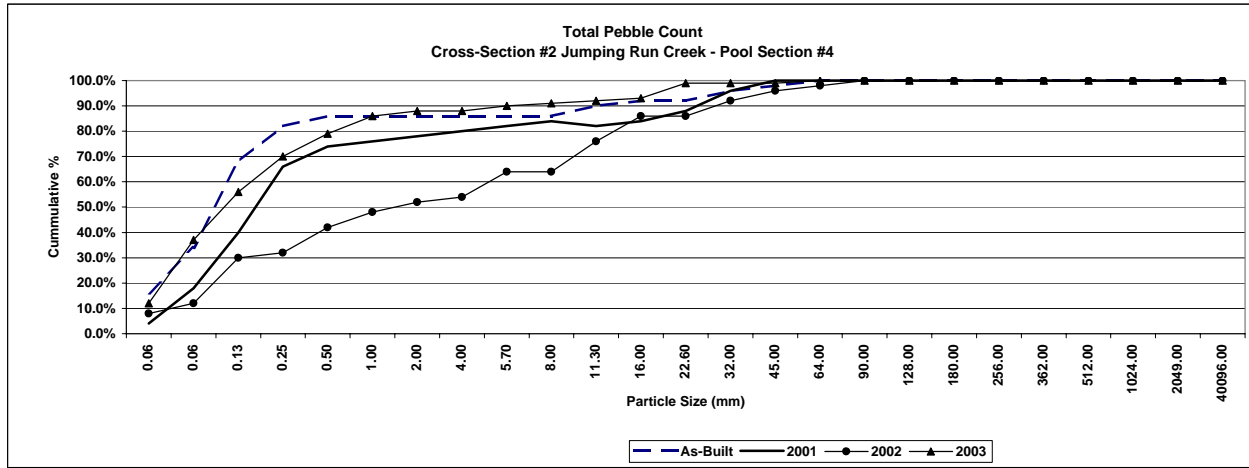
Bankfull Area				
	As-Built	2001	2002	2003
Area	15.9	15.98	17.57	13.11
Width	14.0	14.0	15.8	11.7
Mean Depth	1.1	1.1	1.1	1.1
Max Depth	2.0	2.0	2.2	1.8



Project Name	Payne Dairy - Jumping Run Creek
Cross Section	#2 Section 4
Feature	Pool
Date	9/30/03
Crew	Shaffer, Bidelspach, Clinton

Description	Material	2000			2001			2002			2003				
		Size (mm)	Pool	%	Pool	%	Cum %	Pool	%	Cum %	Pool - Bed	Pool - Ban	%	Cum %	
Silt/Clay	silt/clay	0.061	8	16.0%	16.0%	2	4.0%	4.0%	4	8.0%	8.0%	3	9	12.0%	12.0%
Sand	very fine sand	0.062	9	18.0%	34.0%	7	14.0%	18.0%	2	4.0%	12.0%	3	22	25.0%	37.0%
	fine sand	0.125	17	34.0%	68.0%	11	22.0%	40.0%	9	18.0%	30.0%	17	2	19.0%	56.0%
	medium sand	0.25	7	14.0%	82.0%	13	26.0%	66.0%	1	2.0%	32.0%	14		14.0%	70.0%
	course sand	0.50	2	4.0%	86.0%	4	8.0%	74.0%	5	10.0%	42.0%	9		9.0%	79.0%
	very course sand	1.0	0	0.0%	86.0%	1	2.0%	76.0%	3	6.0%	48.0%	7		7.0%	86.0%
Gravel	very fine gravel	2.0	0	0.0%	86.0%	1	2.0%	78.0%	2	4.0%	52.0%	2		2.0%	88.0%
	fine gravel	4.0	0	0.0%	86.0%	1	2.0%	80.0%	1	2.0%	54.0%	0		0.0%	88.0%
	fine gravel	5.7	0	0.0%	86.0%	1	2.0%	82.0%	5	10.0%	64.0%	2		2.0%	90.0%
	medium gravel	8.0	0	0.0%	86.0%	1	2.0%	84.0%	0	0.0%	64.0%	1		1.0%	91.0%
	medium gravel	11.3	2	4.0%	90.0%	-1	-2.0%	82.0%	6	12.0%	76.0%	1		1.0%	92.0%
	course gravel	16.0	1	2.0%	92.0%	1	2.0%	84.0%	5	10.0%	86.0%	1		1.0%	93.0%
	course gravel	22.6	0	0.0%	92.0%	2	4.0%	88.0%	0	0.0%	86.0%	6		6.0%	99.0%
	very course gravel	32	2	4.0%	96.0%	4	8.0%	96.0%	3	6.0%	92.0%			0.0%	99.0%
	very course gravel	45	1	2.0%	98.0%	2	4.0%	100.0%	2	4.0%	96.0%			0.0%	99.0%
Cobble	small cobble	64	1	2.0%	100.0%	0	0.0%	100.0%	1	2.0%	98.0%	1		1.0%	100.0%
	medium cobble	90	0	0.0%	100.0%	0	0.0%	100.0%	1	2.0%	100.0%			0.0%	100.0%
	large cobble	128	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%
	very large cobble	180	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%
Boulder	small boulder	256	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%
	small boulder	362	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%
	medium boulder	512	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%
	large boulder	1024	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%
	very large boulder	2049	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%
TOTAL / % of whole count			50	100.0%		50	100.0%		50	100.0%		67	33	100.0%	

	d16	d35	d50	d85	d95
As-Built	0.06	0.10	0.14	0.56	35.70
2001	0.09	0.17	0.26	28.95	28.95
2002	0.11	0.49	2.25	18.17	18.17
2003	0.07	0.09	0.16	1.29	21.97



Project Name Jumping Run Area 1
 Task Longitudinal Profile
 Section Area #1
 Date 10/7/03
 Crew Shaffer, Bidelspach, Clinton

Symbol Key
 T Thalweg
 TR Head of Riffle
 TP Head of Pool
 TU Head of Run
 TM Max Pool

2002 Survey
 Conducted by S&EC, PA, Inc
 * Previous surveys elevations adjusted down by: 5.8

Original Station	Original TW Elevation	Adjusted Station	Adjusted TW Elevation
0	100.13	TW FNC	0 94.33
12	100.89	TOP Vane	12 95.09
23	98.53	TWP	23 92.73
29	99.87	TWG	29 94.07
51	99.87	TWR	51 94.07
80	99.97	TW-Riffle X-section	80 94.17
101	99.71	TWR	101 93.91
123	99.21	TWP	123 93.41
129	99.75	TWG	129 93.95
144	99.97	TWRI	144 94.17
157	100.03	TOP Vane	157 94.23
175	98.09	TWR	175 92.29
186	98.69	TWRI	186 92.89
192	98.29	TWP	192 92.49
200	98.89	TWRI	200 93.09
205	98.01	TWS	205 92.21
212	98.21	TWHC	212 92.41
220	97.67	TWP	220 91.87
225	98.31	TWG	225 92.51
247	98.33	TWRI	247 92.53
257	97.57	TW Pool	257 91.77
259	97.75	TW Pool X-section	259 91.95
268	98.17	TWG	268 92.37
275	98.03	TWRI	275 92.23
284	98.55	TOP Vane	284 92.55

2003 Survey

TW Shot number	TW Station	TW Elevation	WS Station	WS Elevation	LBKF Station	LBKF Elevation	RBKF Station	RBKF Elevation	Feature
662	0.16	95.21	0	95.46					T
658	39.84	94.47	21.67	95.45	37.83	96.74			TU
654	58.23	94.53	39.48	95.42	59.36	96.36	59	96.44	TP
656	62.53	94.03	58.18	95.35					TM
652	75.05	94.47	62.59	95.42					T
604	77.17	94.38	74.69	95.27					TU
602	80.43	94.2	76.17	95.37					T
650	82.06	94.23	76.77	95.34					T
600	85.53	94.59	80.48	95.35					T
648	90.72	94.18	81.26	95.36					T
598	99.89	94.09	85.62	95.28					T
646	106.61	94.66	90.01	95.28			101.11	95.94	T
596	109.26	94.52	99.69	95.26					TP
594	113.73	93.92	109.56	95.22	116.66	96.25			T
592	125.4	94.05	113.56	95.18					TM
590	133.38	94.23	125.74	95.09			137.63	95.97	TR
584	147.74	94.38	133.22	95.05					LV
586	148.08	93.82	140.21	94.89			150.52	95.7	T
582	154.87	93.57	147.71	94.4	154.74	95.42			TU
580	160.17	92.7	148.01	94.27					TP
578	164.16	92.12	155.12	93.84					TM
576	171.73	93.17	159.9	93.8			170.54	95.45	T
574	181.82	92.83	163.87	93.9	185.23	95.02			TR
572	191.54	92.57	171.95	93.9					TP
570	193.61	92.06	181.71	93.78					TM
568	200.17	92.75	191.78	93.57					TU
566	206.35	92	193.07	93.56					T
564	217.77	92.4	200.26	93.55	221.74	94.72	212.89	94.64	T
526	229.77	92.6	206.19	93.58					T
524	241.02	92.18	217.75	93.53					TP
522	246.1	91.46	229.93	93.55			249.4	94.09	TM
520	253.84	93.11	241.14	93.47	252.48	94.35			T
518	269.57	92.42	245.9	93.46	264	94.11			TR
516	274.94	92.69	253.65	93.46					V
514	279.78	90.57	269.22	93.26					TM
512	284.66	91.94	274.57	93.18	289.51	93.84			T
510	294.53	91.72	279.87	92.73			291.98	93.81	T
			284.38	92.78					

2001 Survey
 Conducted by K-H & Assoc., Inc

Original Station	Original TW Elevation	Adjusted Station	Adjusted TW Elevation
0		0	
20		20	
25	99.3	25	93.5
29	100.2	29	94.4
35	100	35	94.2
44	100.15	44	94.35
64	100.2	64	94.4
73	100.25	73	94.45
79	100.25	79	94.45
90	100.2	90	94.4
103	99.88	103	94.08
117	100.05	117	94.25
123	99.6	123	93.8
128	99.8	128	94
138	99.83	138	94.03
151	100.15	151	94.35
158	100.05	check dam	158 94.25
163	99.45	163	93.65
170	99.15	170	93.35
181	98.25	s of log struc	181 92.45
186	99.03	186	93.23
196	98.79	196	92.99
210	99.27	210	93.47
216	99.05	pp of headcu	216 93.25
218	97.35	tom of head	218 91.55
224	98.09	224	92.29
232	98.64	232	92.84
245	98.44	245	92.64
252	98.45	252	92.65
262	97.57	262	91.77
269	97.93	269	92.13
279	98.25	279	92.45
284.5	98.36	284.5	92.56
287	98.15	lock Structure	287 92.35

Year 1 - Head cut observed at Station 218

2000 As-built
 Conducted by K-H & Assoc., Inc

Longitudinal Profile - Jumping Run Area 1			Adjusted Station	Adjusted Elevation
Station	TW	Notes	Station	Elevation
0	100.14		0	94.34
11.1	100.89	top of rock cross vane	11.1	95.09
15	99.04	pool	15	93.24
20	98.84		20	93.04
25	99.34		25	93.54
29	99.89	end pool/begin glide	29	94.09
35	100.04		35	94.24
44	100.19		44	94.39
64	100.14		64	94.34
73	100.39	top riffle/end glide	73	94.59
79	100.19	xsection riffle	79	94.39
90	100.24	end riffle	90	94.44
103	100.14		103	94.34
117	100.09	log vane	117	94.29
123	99.54	d/s log vane	123	93.74
128	99.54	center of pool	128	93.74
138	99.94	end pool	138	94.14
151	100.14	start riffle	151	94.34
158	100.04	center of notch in log	158	94.24
163	99.54		163	93.74
170	99.19		170	93.39
181	98.19		181	92.39
186	99.14		186	93.34
196	98.79	center of pool	196	92.99
210	99.34	end pool	210	93.54
214	99.04	begin riffle	214	93.24
219	98.84	center of riffle	219	93.04
232	98.69		232	92.89
245	98.59		245	92.79
252	98.49	end run/begin pool	252	92.69
262	97.39	center of pool	262	91.59
269	98.24		269	92.44
279	98.44		279	92.64
284.5	98.39	center of rock struc	284.5	92.59

Project Name Jumping Run
Task Longitudinal Profile
Section: Area #3
Date 10/7/03
Crew Shaffer, Bidelspach, Clinton

Symbol Key
 T Thalweg
 TR Head of Riffle
 TP Head of Pool
 TU Head of Run
 TM Max Pool

2002 Survey
 Conducted by S&EC, PA, Inc
 ** Previous stationing adjusted downstream by: 33
 * Previous surveys elevations adjusted down by: 20.39

2002 Survey		TW		WS		LBKF		RBKF		Feature	
TW Shot number	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	
3	0	76.41	6.04	77.15							T
5	8.03	76.18	7.75	77.06	11.56	78.77					T
7	19.48	76.13	19.37	76.85							T
9	24.01	76.2	23.83	76.75							T
11	31.21	76.06	31.39	76.67							T
13	37.76	75.12	35.11	76.58							TP
15	46.04	73.73	56.92	76.55							TM
17	57.3	75.28	74.47	76.58	66.85	77.64	67.59	77.95			T
19	74.88	75.94	98.1	76.14	81.94	78	86.4	77.47			TR
23	95.08	75.38	101.07	75.98							T
21	99.33	76.05	108.48	75.83							LV
26	109.32	73.94	116.34	75.89	105.09	78.02					TM
28	115.13	74.83	128.56	75.86							T
30	122.06	74.61	136.9	75.86	121.47	77.61					TU
31	123.29	75.62	143.49	75.86							T
32	129.1	73.48	150.82	75.9					129.02	76.91	TP
34	134.72	73.03	164.66	75.91							TM
36	142.44	74.02	175.27	75.73							T
38	150.2	74.8	188.1	75.49							T
40	154.88	73.72	192.23	75.46					154.76	76.83	T
41	164.65	74.99	193.24	75.46	160.31	77.2					TR
43	175.36	74.9	202.94	75.48							T
45	187.32	74.49	209.96	75.47							TU
48	191.48	73.61	219.35	75.46							TP
50	193.4	72.93	223.67	75.37							T
52	200.81	72.25	238.94	75.24	202.93	77.14	205.78	76.57			TM
54	210.03	73.54	249.76	74.85							T
56	219.35	74.78	253.24	74.73							T
58	222.58	74.83	262.96	74.7							TR
60	238.97	74.42	270.97	74.65	235.87	76.84	244.73	76.38			T
62	249.29	74.73	279.07	74.6							LV
65	249.55	74.64	286.74	74.36							T
66	253.61	73.39	288.56	74.23							TM
68	263.08	73.68	294.77	74.22							T
70	270.8	73.9	303.95	74.2	274.96	75.38					T
72	278.57	73.92	307.44	74.22							TR
74	285.78	73.87	314.69	74.23							T
76	288.73	73.48	322.34	74.2	291.91	74.99					T
78	296.13	71.49	328.6	74.18							T
80	301.33	71.28	339.67	73.91							TM
82	315.59	72.18						318.2	76		T
84	322.58	72.99									T
86	327.78	73.7									TR
88	339.67	73.24			347.67	75.96	334.63	75.41			TU

Original Station	Original Elevation	Notes	Adjusted Station**	Adjusted TW Elevation*
30	96.45	TWRI	3	76.06
5	96.09	TWR	38	75.7
18	94.35	TWP	51	73.96
24	95.15	TWG	57	74.76
57	95.85	TWR	90	75.46
69	96.25	TOP Vane	102	75.86
77	94.25	TWP	110	73.86
85	95.67	TOP Vane	118	75.28
103	93.31	TWP	136	72.92
111	94.13	TWG	144	73.74
118	94.71	TWRI	151	74.32
124	94.03	TWP	157	73.64
141	95.01	Riffle X-Sect.	174	74.62
157	94.35	TWR	190	73.96
172	93.05	TWP	205	72.66
183	94.27	TWG	216	73.88
192	94.83	TWR	225	74.44
210	94.21	TWR	243	73.82
217	94.85	TOP Vane	250	74.46
221	93.21	TWP	254	72.82
226	93.83	TWG	259	73.44
252	93.91	TOP Vane	285	73.52
268	91.63	TWP	301	71.24
275	92.5	Pool X-Sect.	308	72.11
286	92.91	TWG	319	72.52
298	93.69	TWRI	331	73.3
305	93.31	TOP Vane	338	72.92

2001 Survey
 Conducted by K-H & Assoc., Inc

Original Station	Original Elevation	Notes	Adjusted Station**	Adjusted TW Elevation*
0	96.41		33	76.02
6	95.97		39	75.58
15	94.58	center of pool, trib	48	74.19
24	95.43		57	75.04
33	95.65		66	75.26
46	96.06		79	75.67
57	95.98		90	75.59
68	96.22	top of log	101	75.83
69	94.93	d/s log	102	74.54
69	94.18	scour pool	102	73.79
78	94.86		111	74.47
81	95.46	top of log vane	114	75.07
85	94.68		118	74.29
92	94.62		125	74.23
104	93.83	pool	137	73.44
108	94.72	top of glide	141	74.33
116	94.48		149	74.09
129	94.79	top of riffle	162	74.4
135	95.02		168	74.63
140	94.93	center of pool	173	74.54
141	95.01	riffle	174	74.62
156	94.57	end riffle/begin run	189	74.18
162	93.69	end run/begin pool	195	73.3
175	93.53	pool	208	73.14
186	94.42	end pool/begin glide	219	74.03
192	94.67		225	74.28
198	94.63		231	74.24
215	94.55	u/s log	248	74.16
219	94.86		252	74.47
221	93.42	top of log	254	73.03
222	93.47	scour pool	255	73.08
228	94.17	riffle	261	73.78
241	93.75	run	274	73.36
256	94.02	top of log vane	289	73.63
258	93.27	d/s log	291	72.88
260	93.27		293	72.88
284	92.61	pool	317	72.22
290	93.23	glide	323	72.84
300	93.98	riffle	333	73.59
302	93.77	riffle	335	73.38
306	93.46	top of log	339	73.07

2000 As-built
 Conducted by K-H & Assoc., Inc

Longitudinal Profile - Jumping Run Area 1					
Alexander County, NC	Station	TW	Notes	Adjusted Station**	Adjusted Elevation*
	0	96.4	riffle	33	76.01
	6	95.95		39	75.56
	15	94.55	center of pool (tributary)	48	74.16
	24	95.45		57	75.06
	33	95.9		66	75.51
	46	96		79	75.61
	57	96		90	75.61
	68	96.25	top of notch in log	101	75.86
	69	94.55		102	74.16
	80	95.3	logvane	113	74.91
	83	94.85	below logvane	116	74.46
	94	94.5	begin pool	127	74.11
	106	94.4		139	74.01
	118	94.7	end of pool/begin glide	151	74.31
	131	94.8		164	74.41
	137	95.15	top of riffle	170	74.76
	142	94.95	center of riffle	175	74.56
	143	94.9	xsection riffle	176	74.51
	154	94.8	end riffle/begin run	187	74.41
	160	93.8	end run/begin pool	193	73.41
	173	93.5	center of pool	206	73.11
	184	94.3	end pool	217	73.91
	190	94.8		223	74.41
	196	94.8		229	74.41
	213	94.55		246	74.16
	219	94.9	top of notch in log	252	74.51
	220	93.55		253	73.16
	226	94.05		259	73.66
	239	93.9		272	73.51
	256	94.1	top of log vane	289	73.71
	258	93.55		291	73.16
	282	92.6	center of pool/xsection	315	72.21
	288	92.8		321	72.41
	298	93.75		331	73.36
	300	94.05	top of riffle	333	73.66
	304	94.05	center of riffle	337	73.66

Project Name	Jumping Run
Task	Feature Slope and Length Calculations
Date	10/7/03
Crew	Shaffer, Bidelspach, Clinton

2003 Data

Area 1						Area 2						Area 3						Area 4									
Riffle						Riffle						Riffle						Riffle									
Station	Change	elevation	change	slope		Station	Change	elevation	change	slope		Station	Change	elevation	change	slope		Station	Change	elevation	change	slope					
133.22		95.05				18.06		87.46				0		77.15				14.22		71.63							
155.15	21.93	93.84	1.21	5.52%		35.45	17.39	87.42	0.04	0.23%		35.11	35.11	76.58	0.57	1.62%		32.1	17.88	71.52	0.11	0.62%					
171.95		93.9				72.96		87.35				74.47		76.58				109		71.42							
191.78	19.83	93.57	0.33	1.66%		92.26	19.3	87.13	0.22	1.14%		98.1	23.63	76.14	0.44	1.86%		132.17	23.17	71.19	0.23	0.99%					
253.65		93.46				102.52		87.18				164.66		75.91				161.08		71.15							
274.57	20.92	93.18	0.28	1.34%		112.58	10.06	87.04	0.14	1.39%		188.1	23.44	75.49	0.42	1.79%		175.39	14.31	70.69	0.46	3.21%					
						214.28		86.99				219.35		75.46				210.49		70.66							
						220.34	6.06	86.89	0.1	1.65%		253.24	33.89	74.73	0.73	2.15%		224.5	14.01	70.35	0.31	2.21%					
						240.3		86.83				279.07		74.6				321.79		70.32							
						253.91	13.61	86.64	0.19	1.40%		288.56	9.49	74.23	0.37	3.90%		346.79	25	69.94	0.38	1.52%					
						280.35		86.62																			
						288	7.65	86.16	0.46	6.01%																	
						317.85		86.16																			
						324.97	7.12	85.64	0.52	7.30%																	
						404.92		85.52																			
						419.87	14.95	85.37	0.15	1.00%																	
Pool	length	p-p spacing				Pool	length	p-p spacing				Pool	length	p-p spacing				Pool	length	p-p spacing							
58.23						35.88						37.76						2.78									
75.05	16.82			min	max	median	73.02	37.14		min	max	median	57.3	19.54			min	max	median	15.44	12.66			min	max	median	
109.26				19.8	21.9	20.9	93.63			6.1	19.3	11.8	123.29				9.5	35.1	23.6	55.4				14.0	25.0	17.9	
133.38	24.12	54.68	Length	1.34%	5.52%	1.66%	108.12	14.49	46.425	Slope	0.23%	7.30%	1.39%	150.2	26.91	89.215	Length	1.62%	3.90%	1.86%	109.36	53.96	73.27	Length	0.62%	3.21%	1.52%
154.87			Length	8.6	24.1	16.9	166.2			Length	14.5	37.8	30.0	187.32			Slope	19.5	39.1	29.5	124.92			Length	12.7	54.0	35.0
171.73	16.86	41.98	Spacing	33	55	44	196.3	30.1	80.375	Spacing	36	80	43	219.35	32.03	66.59	Spacing	67	105	89	149.61	24.69	54.885	Spacing	55	112	90
191.54							220.23						288.73						225								
200.17	8.63	32.555					240.23	20	48.98				327.78	39.05	104.92				261	36	105.735						
229.77							253.33												337								
253.84	24.07	45.95					280.23	26.9	36.55										372	35	111.5						
							288.24																				
							318.2	29.96	36.44																		
							324.39																				
							362.2	37.81	40.075																		

Project Name:	Jumping Run
Task:	Channel Pattern Measurements
Date:	10/7/03
Crew:	Shaffer, Bidelspach, Clinton

Area 1		
Radius of Curvature	Meander Wavelength	Channel Beltwidth
27	115	36
34	123	38
36		40
39		
27	115	36
39	123	40
35	119	38

min
max
median

Area 2		
Radius of Curvature	Meander Wavelength	Channel Beltwidth
22	50	36
22	61	38
24	75	38
25	95	39
26		40
27		47
28		
30		
30		
30		
22	50	36
30	95	47
27	68	39

min
max
median

Area 3		
Radius of Curvature	Meander Wavelength	Channel Beltwidth
34	146	43
41	149	43
46		50
58		51
34	146	43
58	149	51
43	147	47

min
max
median

Area 4		
Radius of Curvature	Meander Wavelength	Channel Beltwidth
30	69	25
35	71	28
36	80	31
39	93	34
45	106	49
47	120	
52		
30	69	25
52	120	49
39	86	31

min
max
median