Purlear Creek - Phase II
Stream Restoration
Annual Monitoring Report

Monitoring Year: 2008
Measurement Year: 3
As-built Date: 2005
NCEEP Project Number: 010559701

Submitted to: NCDENR-Ecosystem Enhancement Program
1619 Mail Service Center
Raleigh, NC 27699-1619

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PURLEAR CREEK - PHASE II STREAM RESTORATION
2008 MONITORING REPORT

CONDUCTED FOR THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

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I. Executive Summary/Project Abstract

This report represents monitoring year 3 for the Purlear Creek Phase II stream restoration project in Wilkes County, North Carolina. The project background is summarized in Section II of this report. The project is comprised of two reaches. The upper reach is Reach 4 and the lower reach is Reach 1. The channel has remained stable since construction. The majority of channel banks are well-covered with vegetation. Study reaches show no significant changes in channel pattern.

The channel profile did not change significantly from the as built condition with the exception of some aggradation along the upstream portion of Reach 4 and just upstream of a beaverdam in Reach 1. The aggradation observed in Reach 4 was likely caused by excess sediment from upstream sources. This aggradation is illustrated in the longitudinal profile and cross sections 1, 2, and 3 in Appendix B of this report. The cross sectional areas and dimensions of the remaining cross sections were comparable to the as built conditions. All of the permanent cross sections appear to be stable.

One problem area was identified in Reach 1. Problem area 3 (PA 3) consists of a beaver dam on Reach 1 that was first observed in 2007. The beaver dam was still intact during the July 2008 survey and October 2008 photographs. The beaver dam is backing up water, obstructing flow, and trapping sediment upstream of the dam. It is recommended that the beaver dam be removed so the stream can flow as intended.

One problem area (PA4) was noted in Reach 4. Cows were observed within the fenced buffer on two separate occasions during the 2008 monitoring period. Cows in the buffer area can have a negative impact on water quality, streambank stability, and riparian vegetation.

The higher rainfall compared to previous years resulted in much lower vegetation mortality, 1.3%. Only 2 trees were found dead, 3 stems were added to the database, and 1 tree thought missing was discovered. Estimated planted stem density rose to 708 stems per acre. Mortality is expected to be higher next year if cows are not effectively prevented from gaining access to the buffer.

The restored wetland along Reach 4 exceeded minimal conditions for hydrology and vegetation survival during the 2008 monitoring period.

II. Project Background

1. Location and Setting
   Phase II of the Purlear Creek Stream and Wetland Restoration project falls within the Hayes Property in Wilkes County, North Carolina approximately 8 miles northwest of the Town of Wilkesboro. Figure 1 shows a map with detailed directions to the project site. An aerial photograph of the project is contained in Figure 2.

2. Project Structure, Mitigation Type, Approach and Objectives
   Phase II of the Purlear Creek stream and wetland restoration project strived to restore two (2) stream reaches and restore and enhance adjacent riparian wetlands. Both streams lie within an area that is actively used for cattle grazing. The alignments of the channels indicated that the channels had been straightened and channelized in the past. The designer used a Priority I approach to restore the upper reach (Reach 4). A new channel was dug into the abandoned floodplain. For the lower reach (Reach 1), the designer used a Priority II approach to restore the reach. The existing channel banks were laid back to create an expanded floodplain and new channel alignment was placed within the expanded

floodplain. For both reaches, in-stream structures such as A-Vane, Cross-Vanes, and J-Hooks were installed to provide additional stability to the channel. Root wads were installed to provide additional habitat.

Much of the riparian wetlands had been cleared and cattle grazing severely limited regrowth of woody vegetation. Groundwater and surface water hydrologic components were impaired due to channelization of the adjacent stream. One of the objectives of the priority I restoration of the adjacent stream was to restore the wetland hydrology by increasing the frequency and duration of overbank flows into the wetland and raising the groundwater elevations that are influenced by the base flow elevation of the stream.

Most of the riparian corridor (including the riparian wetland) had been cleared and maintained as pasture. The ecological function of the corridor relative to the streams and wetland had been impaired. The restoration effort planted the area with a mix of woody vegetation to help reestablish a viable riparian forest community. The planting plan assumes that there is adequate seed source for herbaceous species to reestablish in the area. The planted area shall be maintained to promote the growth of planted and preferred volunteer species and to limit populations of nuisance and invasive species.

Table I lists project structure and objectives while Table II lists project activity and reporting history. The project contact table is listed in Table III and Table IV lists the background information for the project.

Table I. Project Mitigation Structure and Objectives Table
Purlear Creek Phase II / Project ID 010559701

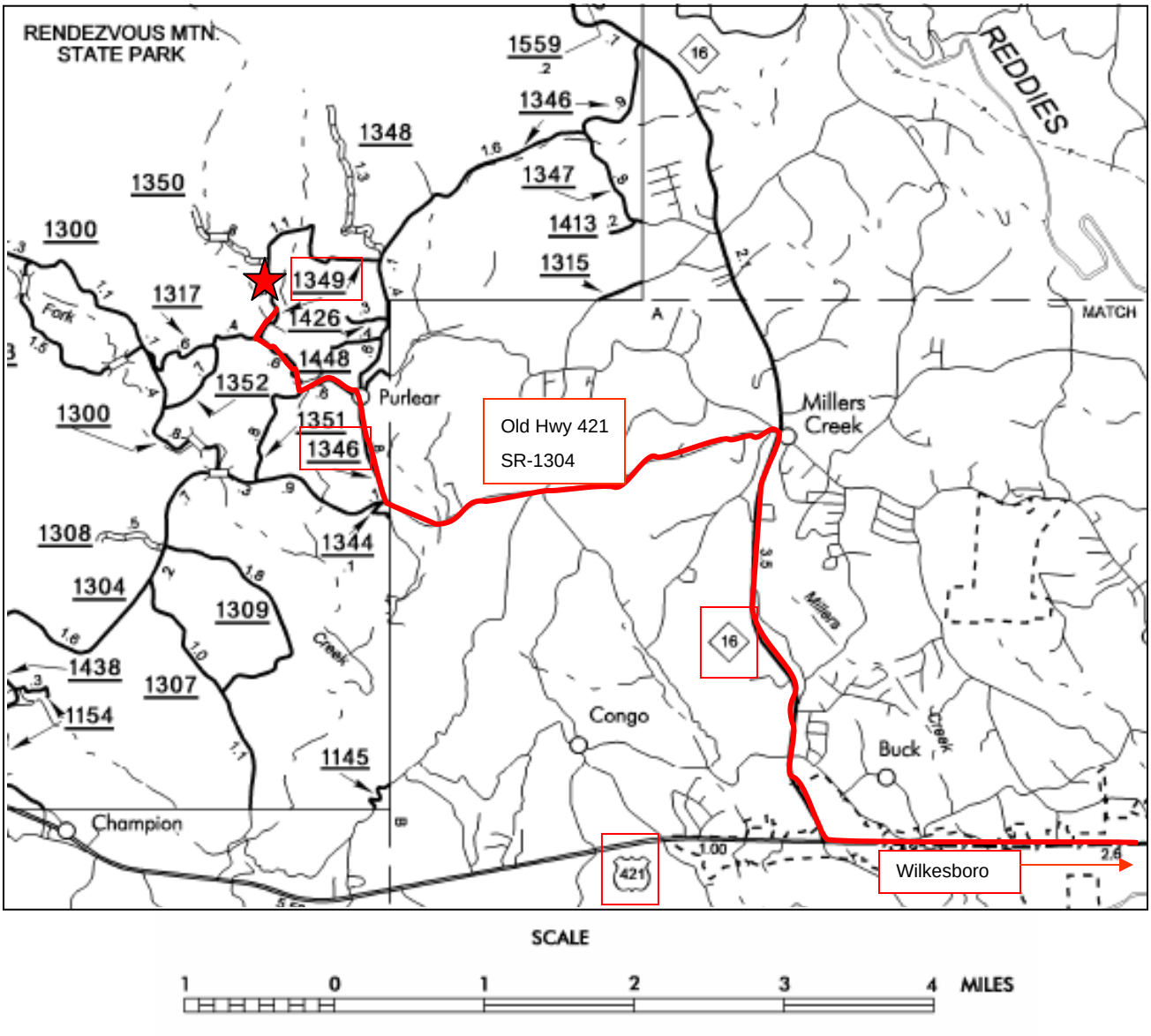
Project Segment or Reach ID	Existing (ft or ac)	Mitigation Type	Approach	Linear Footage (lf) or Acreage (ac)	Stationing	Comment
Reach 1	1100	Restoration	Priority II	1,140 lf	00 + 00 - 11 + 40	--
Reach 4	1412	Restoration	Priority I	1,480 lf	00 + 00 - 14 + 80	--
Tract W1	0.21	Restoration	Rehabilitation	0.21 ac.	307 + 50 - 310 + 50	Improvement of vegetation and hydrology of seep wetland
Tract W2	0.84	Restoration	Re-establishment	0.84 ac.	301 + 60 - 313 + 90	Restoration of riverine wetland located along left side of Reach 4

Table II. Project Activity and Reporting History Purlear Creek Phase II / Project ID 010559701				
Activity or Report	**Scheduled Completion**	**Data Collection Complete**	**Actual Completion or Delivery**	**Comments**
Restoration Plan			April 2004	
Final Design – 90%	March 2004	--	May 2004	
Construction	Spring 2005	--	Spring 2006	Construction delay due to delay in obtaining easment and mulitple bids
Temporary S&E mix applied to entire project area	--	--	--	
Permanent seed mix applied	--	--	--	
Containerized and B&B plantings for reach/segments 1&2	--	--	January 2006	
Mitigation Plan / As-built (Year 0 Monitoring – baseline)	December 2005	--	May 2006	Delay in planting
Year 1 monitoring	December 2006	October 2006	December 2006	
Year 2 Monitoring	December 2007	October 2007	December 2007	Survey completed in August, photo points completed in October
Year 3 Monitoring	December 2008	October 2008	December 2008	Survey completed in July, photo points and additional survey completed in October
Year 4 Monitoring	--	--	--	
Year 5 Monitoring	--	--	--	
Year 5+ Monitoring	--	--	--	

Table III. Project Contact Table Purlear Creek Phase II / Project ID 010559701		
Designer	P.O. Box 33068	
Kimley-Horn and Associates	Raleigh, NC 27636-3068	
Primary Designer POC	Will Wilhelm, P.E.	(704) 319-7684
Construction Contractor	220 Stoneridge Drive, Suite 405	
L-J, INC	Columbia, SC 29210	
Primary Contractor POC	Richard Goodwin	(803) 929-1181
Planting Contractor	P.O. Box 655	
HARP	Newell, NC 28126	
Planting contractor POC	Jim Matthews, Ph.D.	(704) 841-2841
Seeding Contractor		
UNKNOWN		
Planting contractor POC	UNKNOWN	
Seed Mix Sources	UNKNOWN	
Nursery Stock Suppliers	UNKNOWN	
Monitoring Performers		
North Carolina State University	Campus Box 7625 Raleigh, NC 27695	
Stream Monitoring POC	Zan Price	828-712-9194
Vegetation Monitoring POC	Karen Hall	919-515-8242
Wetland Monitoring POC	Zan Price	828-712-9194

Table IV. Project Background Table Purlear Creek Phase II / Project ID 010559701		
Project County	Wilkes	
Drainage Area	Reach 1	3.0 mi^2
	Reach 4	0.4 mi^2
Drainage impervious cover estimate (%)	Reach 1	< 5%
	Reach 4	< 5%
Stream Order	Reach 1	3
	Reach 4	1
Physiographic Region	Piedmont	
Ecoregion	Northern Inner Piedmont	
Rosgen Classification of As-built	Reach 1	C4/1
	Reach 4	C4
Cowardin Classification	PEM01E	
Dominant soil types	Chewacla loam (CkA); Pacolet Sandy clay loam (PcC2); Pacolet sandy loam (PaD); Wehadkee loam (WhA)	
Reference site ID	Upstream 1; Upper Big Warrior Creek; Basin Creek	
USGS HUC for Project and Reference	03040101 (All project and reference reaches)	
NCDWQ Sub-basin for Project and Reference	03-07-01 (All project and reference reaches)	
NCDWQ classification for Project and Reference	Project Reaches & Upstream 1 Reference	12-31-1-8-(2)
	Upper Warrior Creek	12-29-1 (2)
	Basin Creek	12-46-2-2
Any portion of any project segment 303d listed?	No	
Any portion of any project segment upstream of a 303d listed segment?	N/A	
Reasons for 303d listing or stressor	N/A	
% of project easement fenced	100%	

Figure 1. Project Location

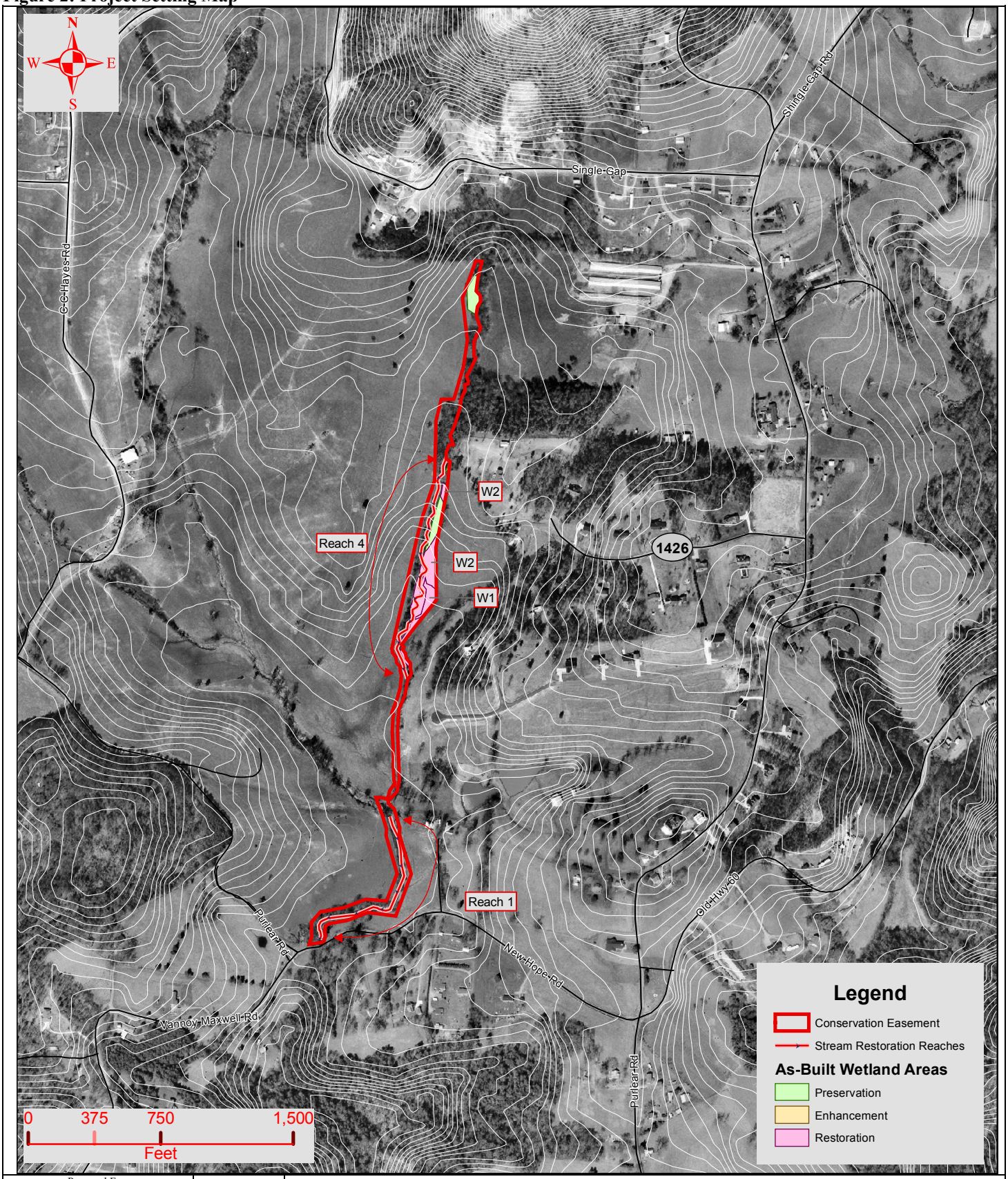


Directions from Hwy. 421 in Wilkesboro:

From Wilkesboro on Hwy. 421, turn right onto NC-16. Follow NC-16 for 3.5 miles to the Miller's Creek intersection. Turn left onto Old Hwy. 421 (SR-1304) and follow for 2.6 miles. Turn right onto Purlear Road (SR-1346) and follow for 0.8 miles. You will come to a stop sign at a church, turn left to stay on Purlear Road (also called New Hope Road). Follow Purlear Road for 0.6 miles until the intersection with Vannoy Maxwell Road. Project begins at this intersection and continues through the intersection with CC Hayes Road (SR- 1349).

Contact the EEP Project Manager for access and landowner notification instructions. Access is not permitted to this site without prior approval.

Figure 2: Project Setting Map



Prepared For: Ecosystem Enhancement Program	**Project**	Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006 Wilkes County, North Carolina
	Date 6/5/06	**Project Number** 010559701

REACH 4
WETLAND REACH

NORTH

NOTE: PEBBLE COUNT ZONE

LEGEND
- 2008 THALWEG
- 2008 WATER EDGE
- 2008 TOP OF BANK
- ALIGNMENT
- FENCE LINE
- CROSS SECTION
- PHOTO POINT (P#)
- VEG PLOT

CROSS SECTION #1
REACH 4
RIFFLE

CROSS SECTION #2
REACH 4
POOL

CROSS SECTION #3
REACH 4
RIFFLE

CROSS SECTION #4
REACH 4
POOL

CROSS SECTION #5
REACH 4
RIFFLE

CROSS SECTION #6
REACH 4
POOL

P11 P12 P13 P14 P15 P16 P17 P18 P19 P20 P21 P22 P23 P24 P25 P26 P27 P28

RDS-W1A
RDS-W1B
RDS-W1
RDS-W2A
RDS-W2B
RDS-W2

Veg Plot #1
Veg Plot #2
Veg Plot #3
Veg Plot #4
Veg Plot #5
Veg Plot #6

00+0 1+00 2+00 3+00 4+00 5+00 6+00 7+00 00+8 9+00 10+00 11+00 12+00 13+00 14+00 14+79.60

FLOW DIRECTION

BOX CULVERT

SCALE 1" = 50'
25 0 25 50

Ecosystem Enhancement PROGRAM

NO	REVISIONS	DRN	CHK	DATE
1	AS-BUILT PLAN	DRC	JMP	12/01/06
2	2007 MONITORING	ZP	JMP	12/01/07
3	2008 MONITORING	ZP	JZ	11/19/08

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Raleigh, NC 27695

PURLEAR CREEK – PHASE 2
REACH 4 – WETLAND AREA
WILKES COUNTY, N.C.

MONITORING PLAN SHEET
FIGURE 3a

DATE 03/01/2006
PROJECT NO. 295
FILENAME PULEARII08.DWG
SHEET NO.

REACH 1

MAIN STEM REACH

NORTH

CROSS SECTION #7
REACH 1
RIFFLE

CROSS SECTION #8
REACH 1
RIFFLE

CROSS SECTION #9
REACH 1
POOL

CROSS SECTION #10
REACH 1
POOL

P1
P2
P3
P4
P5
P6
P7
P8
P9
P10

Veg Plot #7
Veg Plot #8

0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
9+00
10+00
11+00
11+40.52

BRIDGE

FLOW DIRECTION
FLOW DIRECTION

NOTE: PEBBLE COUNT ZONE

LEGEND
2008 THALWEG
2008 WATER EDGE
2008 TOP OF BANK
ALIGNMENT
FENCE LINE
CROSS SECTION
PHOTO POINT P#
VEG PLOT

SCALE 1" = 50'
25 0 25 50

Ecosystem Enhancement PROGRAM

NO	REVISIONS	DRN	CHK	DATE
1	AS-BUILT PLAN	DRC	JMP	12/01/06
2	2007 MONITORING	ZP	JMP	12/01/07
3	2008 MONITORING	ZP	JZ	11/19/08

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PURLEAR CREEK - PHASE 2
REACH 1 - MAIN STEM REACH
WILKES COUNTY, N.C.

MONITORING PLAN SHEET
FIGURE 3b

DATE 03/01/2006
PROJECT NO. 295
FILENAME PULEARII08.DWG
SHEET NO.

III. Project Condition and Monitoring Results

A. Vegetation Assessment

Eight vegetation monitoring plots in the riparian buffer of the Purlear Phase II project were surveyed. All the plots had been previously established and sampled after construction during the previous two monitoring years. Plot numbering is consistent with numbering from the Vegetation Baseline Data post-construction monitoring report.

The higher rainfall compared to previous years resulted in much lower mortality, 1.3%. Only 2 trees were found dead, 3 stems were added to the database, and 1 tree thought missing was discovered. Estimated planted stem density rose to 708 stems per acre. Mortality is expected to be higher next year if cows are not effectively prevented from gaining access to the buffer.

No vegetative problem areas were observed. Vegetation data is presented in Appendix A of this report.

B. Stream Assessment

The stream channel is in a stable condition, with only localized problem areas identified in this survey.

Hydrologic Assessment

One bankfull event was recorded in 2008 as shown in Table V. Overall, three bankfull events have been recorded in two separate monitoring years.

Table V. Verification of Bankfull Events
Purlear Creek Phase II / Project ID 010559701

Date of Data Collection	Date of Occurrence	Method	Photo #
Monthly	6/28/2006	On-site transducer/data logger	
Monthly	7/31/2006	On-site transducer/data logger	
8/27/2008	8/27/2008	Proximal USGS Gage Resource*	

*Bankfull event verified at two proximal USGS gage sites in Wilkes County (Reddies Rivers, North Wilkesboro and Elk Creek, Elkville, NC) using the rural Piedmont regional curve developed by NCSU (Harman et al 1999).

Bank Stability Assessment - Monitoring Year 05

Table VI. BEHI and Sediment Export Estimates shall be included in the monitoring year 5 report.

Project Problem Area

The problem area Table B1, plan sheet and photographs can be found in Appendix B. Two problem areas were identified in the 2006 monitoring report in Reach 1. Problem area 1 and problem area 2 from previous monitoring reports appeared to stabilize in 2008. Both areas shall continue to be monitored in subsequent monitoring events. Problem area 3 (PA 3) consists of a beaver dam on Reach 1 that was first observed in 2007. The beaver dam was still intact during the July 2008 survey and October 2008 photographs. The beaver dam is backing up water, obstructing flow, and trapping sediment upstream of the dam. It is recommended that the beaver dam be removed so the stream can flow as intended.

One problem area (PA4) was noted in Reach 4. Cows were observed within the fenced buffer on two separate occasions during the 2008 monitoring period. Cows in the buffer area can have a negative impact on water quality, streambank stability, and riparian vegetation.

Stream Visual Assessment

Table VII lists the results of a visual assessment conducted over each study reach. The data used to calculate the percentages listed in this table are found in Table B2 in Appendix B.

Table VII. Categorical Stream Feature Visual Stability Assessment
Purlear Creek Phase II / Project ID 010559701

Reach 1 (1140 Feet)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
A. Riffles	100%	69%	69%	60%	--	--
B. Pools	100%	92%	92%	92%	--	--
C. Thalweg	80%	80%	100%	100%	--	--
D. Meanders	100%	92%	100%	100%	--	--
E. Bed General	100%	90%	100%	98%	--	--
F. Bank	--	--	100%	100%		
G. Vanes / J Hooks etc.	100%	100%	100%	100%	--	--
H. Wads and Boulders	100%	100%	100%	100%	--	--
Reach 4 (1480 Feet)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
A. Riffles	100%	75%	85%	70%	--	--
B. Pools	100%	97%	97%	94%	--	--
C. Thalweg	100%	100%	100%	100%	--	--
D. Meanders	100%	100%	100%	100%	--	--
E. Bed General	100%	83%	100%	85%	--	--
F. Bank	--	--	100%	100%		
G. Vanes / J Hooks etc.	98%	100%	100%	100%	--	--
H. Wads and Boulders	--	--	--	--	--	--

Reach 1 - Main Stem Purlear Creek

The channel profile is similar to the as-built survey condition, with bedform features maintaining their locations and depths. The only exception is the area just upstream of the beaver dam where

water is backed up and some sediment aggradation has occurred. This sediment should flush through the system once the beaver dam is removed. Channel cross sections showed no significant changes in cross sectional area and appear to be stable.

The typical bed material particle size is comparable to previous monitoring years. A visual assessment of this reach showed a total decrease in number of riffles and pools but those that remain are stable. Meanders are maintaining location and stability throughout the reach. No structures have failed their purpose in this reach.

Reach 4 - Upper Middle Tributary

The channel profile is similar to the as-built survey condition, with the majority of bedform features maintaining their locations and depths. Some aggradation has occurred in the upstream portion of the reach as illustrated in the channel profile and cross sections 1, 2, and 3. The cause of the aggradation is likely from excess sediment from upstream sources. There is no evidence of sediment from bank erosion along the reach. The downstream cross sections (4, 5, and 6) showed no significant changes in cross sectional area. The channel thalweg is being maintained in the proper location and banks show no signs of degrading.

The typical bed material particle size is finer than the as built condition. A visual assessment of this reach showed a total decrease in number of riffles and pools but those that remain are stable. Channel pattern is similar to as-built conditions. Dense vegetation is establishing along the channel banks. This vegetation is providing an excellent root mass to stabilize the banks. There are no areas of visible meander migrations throughout this reach. No erosion areas were observed along this reach.

Quantitative Measures Summary Tables

The tables below present all of the quantitative summary data from the survey cross-sectional surveys, longitudinal surveys, and pebble counts. The associated raw data and plots are located in Appendix B of this report.

Table VIIIa. Baseline Morphology and Hydraulic Summary
Purlear Creek Phase II / Project ID 010559701
Reach 1 - 1140 Feet

Parameter		USGS Gage Data			Regional Curve (3.0 mi^2)			Pre-Existing Condition			Project Reference Stream			Design			As-built		
Dimension	**Units**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**
BF Width	ft	--	--	--	--	--	28.6	--	--	23.9	--	--	--	--	--	24.2	25.7	26.8	26.3
Floodprone Width	ft	--	--	--	--	--	--	--	--	50	--	--	--	--	--	62	--	--	74.0
BF Cross Sectional Area	ft^2	--	--	--	--	--	45.6	--	--	40.3	--	--	--	--	--	43.5	25.8	48.9	37.3
BF Mean Depth	ft	--	--	--	--	--	1.6	--	--	1.7	--	--	--	--	--	1.8	1.0	1.9	1.4
BF Max Depth	ft	--	--	--	--	--	--	--	--	2.8	--	--	--	--	--	2.7	2.0	3.4	2.7
Width/Depth Ratio		--	--	--	--	--	--	--	--	14.2	11.2	20.8	16	--	--	13.5	--	--	15.9
Entrenchment Ratio		--	--	--	--	--	--	--	--	2.1	1.4	9.9	4	--	--	2.6	--	--	3.1
Wetted Perimeter	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hydraulic radius	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.9	1.8	1.4
Pattern																			
Channel Beltwidth	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	28	61	43
Radius of Curvature	ft	--	--	--	--	--	--	--	--	75	--	--	--	48	83	66	33	57	43
Meander Wavelength	ft	--	--	--	--	--	--	--	--	200	--	--	--	--	--	200	126	220	179
Meander Width ratio		--	--	--	--	--	--	--	--	--	1.7	3.4	2.3	--	--	--	1.1	2.3	1.6
Profile																			
Riffle length	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Riffle slope	ft/ft	--	--	--	--	--	--	--	--	0.015	--	--	--	--	--	0.009	0.001	0.01	0.005
Pool length	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	28	76	53
Pool spacing	ft	--	--	--	--	--	--	61	181	121	--	--	--	121	194	194	127	200	145
Substrate																			
d50	mm	--	--	--	--	--	--	--	--	1	--	--	--	--	--	6	5.3	6.7	6.0
d84	mm	--	--	--	--	--	--	--	--	35	--	--	--	--	--	22	21.8	24.9	23.4
Additional Reach Parameters																			
Valley Length	ft	--			--			1000			--			1000			1035		
Channel Length	ft	--			--			1100			--			1100			1139		
Sinuosity		--			--			1.1			1.1	1.4	1.2	1.1			1.1		
Water Surface Slope	ft/ft	--			--			0.005			0.01	0.016	0.013	0.005			0.006		
BF slope	ft/ft	--			--			0.005			0.01	0.016	0.013	0.005			0.006		
Rosgen Classification		--			--			B4c/1			B4c - C4			C4/1			C4/1		
*Habitat Index		--			--			--			--			--			--		
*Macrobenthos		--			--			--			--			--			--		

Table VIIIb. Baseline Morphology and Hydraulic Summary
Purlear Creek Phase II / Project ID 010559701
Reach 4 - 1480 Feet

Parameter		USGS Gage Data			Regional Curve (0.4 mi^2)			Pre-Existing Condition			Project Reference Stream			Design			As-built		
Dimension	**Units**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**
BF Width	ft	--	--	--	--	--	8	--	--	7.4	--	--	--	--	--	8	7.2	9.7	8.5
Floodprone Width	ft	--	--	--	--	--	--	--	--	9.5	--	--	--	--	--	55	--	--	60.1
BF Cross Sectional Area	ft^2	--	--	--	--	--	11.5	--	--	3.5	--	--	--	--	--	4.1	4.1	5.1	4.6
BF Mean Depth	ft	--	--	--	--	--	1.1	--	--	0.5	--	--	--	--	--	0.5	0.5	0.6	0.5
BF Max Depth	ft	--	--	--	--	--	--	--	--	1.4	--	--	--	--	--	1.4	0.9	1.4	1.1
Width/Depth Ratio		--	--	--	--	--	--	--	--	15.5	11.2	20.8	16	--	--	16	--	--	15.4
Entrenchment Ratio		--	--	--	--	--	--	--	--	1.3	1.4	9.9	4	--	--	6.8	--	--	7.1
Wetted Perimeter	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hydraulic radius	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5	0.5	0.5
Pattern																			
Channel Beltwidth	ft	--	--	--	--	--	--	--	--	40	--	--	80	--	--	--	18.5	55.3	34.7
Radius of Curvature	ft	--	--	--	--	--	--	10	40	25	--	--	24	48	83	66	12.8	38.1	20.6
Meander Wavelength	ft	--	--	--	--	--	--	50	60	55	60	80	70	--	--	200	75.4	124.6	93
Meander Width ratio		--	--	--	--	--	--	--	--	5.4	--	--	10	--	--	--	2.2	6.5	4.1
Profile																			
Riffle length	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Riffle slope	ft/ft	--	--	--	--	--	--	0.007	0.02	0.01	--	--	--	--	--	0.009	0.002	0.03	0.01
Pool length	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.7	24.6	15.8
Pool spacing	ft	--	--	--	--	--	--	--	--	70	--	--	--	40	64	64	26.6	63.8	43.5
Substrate																			
d50	mm	--	--	--	--	--	--	--	--	0.5	--	--	--	--	--	6	0.5	2.0	1.3
d84	mm	--	--	--	--	--	--	--	--	5	--	--	--	--	--	22	9.3	26.2	17.8
Additional Reach Parameters																			
Valley Length	ft		--			--			1284			--			1284			1327	
Channel Length	ft		--			--			1412			--			1541			1460	
Sinuosity			--			--			1.1		1.1	1.4	1.2		1.2			1.1	
Water Surface Slope	ft/ft		--			--			0.0165		0.01	0.016	0.013		0.0183			0.013	
BF slope	ft/ft		--			--			0.0165		0.01	0.016	0.013		0.0183			0.013	
Rosgen Classification			--			--			F4			B4c - C4			C4			C5	
*Habitat Index			--			--			--			--			--			--	
*Macrobenthos			--			--			--			--			--			--	

Table IXa. Morphology and Hydraulic Monitoring Summary
Purlear Creek Phase II / Project ID 010559701
Reach 4 (1,480 feet)

Parameter		Cross Section 1					Cross Section 2					Cross Section 3				
		Riffle					Pool					Riffle				
Dimension	**Units**	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5
BF Width	ft	11.1	-	17.3			9.4	10.8	7.5			7.8	7.3	9		
Floodprone Width	ft	72	-	72			-	-	-			72.0	72	72		
BF Cross Sectional Area	sq ft	6.7	-	3.8			4.2	5.9	2.7			4.8	4.3	3.2		
BF Mean Depth	ft	0.6	-	0.2			0.4	0.6	0.4			0.6	0.6	0.4		
BF Max Depth	ft	1.3	-	0.5			1.0	0.9	1.1			1.4	1.4	0.9		
Width/Depth Ratio		18.4	-	78.8			-	-	-			12.7	12.3	25.3		
Entrenchment Ratio		6.5	-	4.2			-	-	-			9.2	9.9	8.0		
Bank Height Ratio		1.0	-	1.0			1.0	1.0	1.0			1.0	1.0	1.0		
Wetted Perimeter	ft	12.3		17.7			-	-	-			9.0	8.5	9.8		
Hydraulic radius	ft	0.5		0.2			-	-	-			0.5	0.5	0.3		
		2006		2007		2008										
Substrate		Upper	Lower	Upper	Lower	Upper	Lower									
d50	mm	silt	silt	0.5	0.12	0.07	silt									
d84	mm	silt	1.03	36.3	5.5	0.25	0.17									

Parameter		Cross Section 4					Cross Section 5					Cross Section 6				
		Pool					Riffle					Pool				
Dimension	**Units**	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5
BF Width	ft	13.7	11.8	13.2			9.9	8.8	10.1			8	10.9	9.8		
Floodprone Width	ft	-	-	-			46	46	46			-	-	-		
BF Cross Sectional Area	sq ft	14.2	13.3	13.6			7.0	6.2	5.6			7.9	8.2	7.0		
BF Mean Depth	ft	1.0	1.1	1.0			0.7	0.7	0.6			1.0	0.8	0.7		
BF Max Depth	ft	2.5	2.6	2.5			1.4	1.4	1.2			1.7	1.9	1.9		
Width/Depth Ratio							14.0	12.5	18.2							
Entrenchment Ratio							4.6	5.2	4.6							
Bank Height Ratio		1.0	1.0	1.0			1.4	1.4	1.4			1.0	1.0	1.0		
Wetted Perimeter	ft						11.3	10.2	11.3							
Hydraulic radius	ft						0.6	0.6	0.5							

Parameter		MY-01 (2006)			MY-02 (2007)			MY-03 (2008)			MY-04 (2009)			MY-05 (2010)		
Pattern		**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**
Channel Beltwidth	ft	17	42	29	17	42	29	17	42	29						
Radius of Curvature	ft	13	112	26	13	112	26	13	112	26						
Meander Wavelength	ft	62	171	88	62	171	88	62	171	88						
Meander Width ratio					2.1	5.2	3.6	1.8	4.4	3.0						
Profile																
Riffle length	ft	5	93	17	6	38	18	8	35	18						
Riffle slope	ft/ft	0.002	0.061	0.021	0.004	0.056	0.020	0.010	0.048	0.020						
Pool length	ft	10	38	21	10	57	24	10	57	24						
Pool spacing	ft	25	73	40	28	66	40	26	67	40						
Additional Parameters																
Valley Length	ft	1277			1277			1277								
Channel Length	ft	1480			1480			1480								
Sinuosity		1.2			1.2			1.2								
Water Surface Slope	ft/ft	0.016			0.016			0.016								
BF slope	ft/ft				0.016			0.016								
Rosgen Classification		C6			C5			C5								

Table IXb. Morphology and Hydraulic Monitoring Summary
Purlear Creek Phase II / Project ID 010559701
Reach 1 (1,140 feet)

Parameter		Cross Section 7					Cross Section 8					Cross Section 9					Cross Section 10				
		Riffle					Riffle					Pool					Pool				
Dimension	**Units**	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5
BF Width	ft	42.3	40	39.3			31.3	30.2	28.8			28.8	29.3	28.6			34.5	30	29.4		
Floodprone Width	ft	100	100	100			98	98	98			-	-	-			-	-	-		
BF Cross Sectional Area	sq ft	50.7	46.9	47.1			54.8	57.9	50.6			31.5	28.6	30.2			42.4	45.2	46.1		
BF Mean Depth	ft	1.2	1.2	1.2			1.8	1.9	1.8			1.1	1	1.1			1.2	1.5	1.6		
BF Max Depth	ft	2.7	2.7	2.7			3.5	3.5	3.5			3.2	3.4	3.3			3.0	3.1	3.1		
Width/Depth Ratio		35.2	34.2	32.8			14.0	15.8	16.4			-	-	-			-	-	-		
Entrenchment Ratio		2.4	2.5	2.5			3.1	3.2	3.4			-	-	-			-	-	-		
Bank Height Ratio		1.0	1.0	1.0			1.0	1.0	1.0			1.0	1.0	1.0			1.6	1.6	1.6		
Wetted Perimeter	ft	44.7	42.3	41.7			34.8	34.0	32.4			-	-	-			-	-	-		
Hydraulic radius	ft	1.1	1.1	1.1			1.6	1.7	1.6			-	-	-			-	-	-		
Substrate		**2006**	**2007**	**2008**																	
d50	mm	9.65	14.12	6.4																	
d84	mm	37.01	43.62	27.3																	

Parameter		MY-01 (2006)			MY-02 (2007)			MY-03 (2008)			MY-04 (2009)			MY-05 (2010)		
Pattern		**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**
Channel Beltwidth	ft	36	44	40	36	44	40	36	44	40						
Radius of Curvature	ft	38	88	50	38	88	50	38	88	50						
Meander Wavelength	ft	201	255	228	201	255	228	201	255	228						
Meander Width ratio					1.0	1.3	1.1	1.1	1.3	1.2						
Profile																
Riffle length	ft	9	50	18	21	47	23	20	48	26						
Riffle slope	ft/ft	0.004	0.046	0.012	0.001	0.048	0.012	0.003	0.022	0.012						
Pool length	ft	17	113	74	21	113	74	14	113	65						
Pool spacing	ft	59	134.5	100	59	134.5	100	51	160	102						
Additional Parameters																
Valley Length	ft	1021			1021			1021								
Channel Length	ft	1140			1140			1140								
Sinuosity		1.12			1.12			1.12								
Water Surface Slope	ft/ft	0.0085			0.0086			0.0086								
BF slope	ft/ft				0.0071			0.0071								
Rosgen Classification		C4			C4			C4								

C. Wetland Assessment

See Table X below for a performance summary of the wetlands adjacent to Reach 4. New monitoring wells (RDS-W1b and RDS W2b) were installed on March 21, 2008. Groundwater levels were within 12-inches of the ground surface for 90 percent of the growing season and 100 percent of the growing season in RDS-W1b and RDS W2b, respectively. See Appendix A for vegetation survival in plots 1 and 6. See Appendix C for the monitoring well water level measurement data.

Table X. Wetland Criteria Attainment
Purlear Creek Phase II / Project ID 010559701

Tract	Well ID	Well Hydrology Threshold Met?	Tract Mean	Vegetation Plot ID	Vegetation Survival Threshold Met?	Tract Mean
W2	RDS-W1b	Y	100%	V1	Y	100%
	RDS-W2b	Y		V6	Y	

*Note: New monitoring wells were installed in March 2008.

VI. Methodology Section

Monitoring methods used are based on US Army Corps of Engineering and NC Division of Water Quality Guides as referenced below.

The taxonomic standard for vegetation used in this report was based on "Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas", by Alan S. Weakley. The vegetation monitoring protocol used for collecting vegetation data was the CVS-EEP Protocol for Recording Vegetation Version 4.0 (Lee et al. 2006).

References:

Harman, W.H. et al. 1999. *Bankfull Hydraulic Geometry Relationships for North Carolina Streams*. AWRA Wildland Hydrology Symposium Proceedings. Edited By: D.S. Olsen and J.P. Potyondy. AWRA Summer Symposium. Bozeman, MT.

Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2006. *CVS-EEP Protocol for Recording Vegetation*, Version 4.0 (http://cvs.bio.unc.edu/methods.htm)

Rosgen, D L. (1996) *Applied River Morphology*. Wildland Hydrology Books, Pagosa Springs, CO.

USACOE (2003) *Stream Mitigation Guidelines*. USACOE, USEPA, NCWRC, NCDENR-DWQ

Weakley, Alan S., *Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas*

APPENDIX A

1. Vegetation Data Tables
   - Table 1. Vegetation Metadata
   - Table 2. Vegetation Vigor by Species
   - Table 3. Vegetation Damage by Species
   - Table 4. Vegetation Damage by Plot
   - Table 5. Stem Count by Plot and Species
   - Table 6. Vegetation Problem Area Tables
   - Table 10. Vigor
   - Table 11. Damage

2. Vegetation Problem Area Photos – No problem areas observed
3. Vegetation Monitoring Plot Photos

Notes:

- No separate plan view was established for vegetation conditions. See monitoring plan view for this information.
- No vegetation problems areas have been identified on this project. Therefore, those sections have been omitted from the appendix.

Table 1. Vegetation Metadata

Report Prepared By	Nathan Buchanan
Date Prepared	11/25/2008 23:26

database name	CVS_EEP_EntryTool_v220.mdb
database location	C:\Users\nathan\Desktop
computer name	IMELT

DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------

Metadata	This worksheet, which is a summary of the project and the project data.
Proj, planted	Each project is listed with its PLANTED stems, for each year. This excludes live stakes and lists stems per acre.
Proj, total stems	Each project is listed with its TOTAL stems, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems. Listed in stems per acre.
Plots	List of plots surveyed.
Vigor	Frequency distribution of vigor classes.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
ALL Stems by Plot and spp	Count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.

PROJECT SUMMARY----------

Project Code	Purl2
project Name	Purlear 2
Description	downstream 3000 feet
River Basin	
length(ft)	
stream-to-edge width (ft)	
area (sq m)	
Required Plots (calculated)	
Sampled Plots	8

Table 2. Vegetation Vigor by Species

	Species	4	3	2	1	0	Missing	Unknown
	Asimina triloba					1	4	
	Cephalanthus occidentalis	1					1	
	Cornus amomum		2	14	8		3	1
	Diospyros virginiana		5	4	1		2	
	Juglans nigra							1
	Morus alba			5			2	
	Nyssa sylvatica			2				
	Quercus alba	1						
	Quercus michauxii	1	9	2	1	1	2	
	Quercus phellos	3	4	2			1	2
	Salix nigra	1						
	Morus rubra			1				
	Cornus			4			2	1
	Cercis canadensis		2	2				
	Quercus	2	5	3	1		4	2
	Liriodendron tulipifera			1				
	Platanus occidentalis	1	5	1			5	1
	Populus deltoides	1						
	Unknown		3	3	1		20	
TOT:	**19**	**11**	**35**	**44**	**12**	**2**	**46**	**8**

Table 3. Vegetation Damage by Species

	Species	All Damage Categories	(no damage)	Deer	Diseased	Human Trampled	Insects	Livestock	Rodents	Unknown
	Asimina triloba	5	5							
	Cephalanthus occidentalis	2	2							
	Cercis Canadensis	4		1			3			
	Cornus	7	3					4		
	Cornus amomum	28	3	1	13		3	5		3
	Diospyros virginiana	12	2		3		5	1	1	
	Juglans nigra	1								1
	Liriodendron tulipifera	1						1		
	Morus alba	7	2					5		
	Morus rubra	1						1		
	Nyssa sylvatica	2					1	1		
	Platanus occidentalis	13	7			1	4			1
	Populus deltoids	1	1							
	Quercus	17	6	2			4			5
	Quercus alba	1	1							
	Quercus michauxii	16	3		2		7	1	3	
	Quercus phellos	12	4				1		1	6
	Salix nigra	1	1							
	Unknown	27	20		2			2	1	2
TOT:	**19**	**158**	**60**	**4**	**20**	**1**	**28**	**21**	**6**	**18**

Table 4. Vegetation Damage by Plot

	plot	All Damage Categories	(no damage)	Deer	Diseased	Human Trampled	Insects	Livestock	Rodents	Unknown
	1	18	6		4		5	2	1	
	2	27	9		2	1	7	8		
	3	11	2				5	4		
	4	17	15				1			1
	5	37	20		1		4	5	4	3
	6	17	7		2		1	2	1	4
	7	25		4	11		3			7
	8	6	1				2			3
TOT:	**8**	**158**	**60**	**4**	**20**	**1**	**28**	**21**	**6**	**18**

Table 5. Stem Count by Plot and Species

	Species	Total Planted Stems	# plots	avg# stems	1	2	3	4	5	6	7	8
	Cephalanthus occidentalis	1	1	1						1		
	Cercis canadensis	4	3	1.33		1	1				2	
	Cornus	5	1	5					5			
	Cornus amomum	25	3	8.33	2	6					17	
	Diospyros virginiana	10	4	2.5	3	1				4		2
	Juglans nigra	1	1	1							1	
	Liriodendron tulipifera	1	1	1						1		
	Morus alba	5	2	2.5		2	3					
	Morus rubra	1	1	1		1						
	Nyssa sylvatica	2	2	1		1			1			
	Platanus occidentalis	8	3	2.67		5	2	1				
	Populus deltoides	1	1	1						1		
	Quercus Unknown	13	4	3.25	5				3		3	2
	Quercus alba	1	1	1	1							
	Quercus michauxii	13	4	3.25	2	3	2		6			
	Quercus phellos	11	4	2.75				1	2	6	2	
	Salix nigra	1	1	1						1		
	Unknown	7	4	1.75			1		3	2		1
TOT:	**18**	**110**	**18**		**13**	**20**	**9**	**2**	**20**	**16**	**25**	**5**

Table 6. Vegetation Problem Areas

No Problem Areas Observed.

Table 10. Vigor

vigor	Count	Percent
0	2	1.3
1	12	7.6
2	44	27.8
3	35	22.2
4	11	7
Missing	46	29.1
Unknown	8	5.1

Table 11. Damage

Damage	Count	Percent Of Stems
(no damage)	60	38
Insects	28	17.7
Livestock	21	13.3
Diseased	20	12.7
Unknown	18	11.4
Rodents	6	3.8
Deer	4	2.5
Human Trampled	1	0.6

Vegetation Monitoring Plot Photos

Purlear 1

Plot 01, 19-September-2008

Plot 02, 19-September-2008

Purlear 1

Plot 03, 19-September-2008

Plot 04, 19-September-2008

Purlear 1

Plot 05, 19-September-2008

Plot 06, 19-September-2008

Purlear 1

Plot 07, 19-September-2008

Plot 08, 19-September-2008

Plot 00, 30-July-2008

Plot 00, 30-July-2008

APPENDIX B

Morphology Raw Data

1. Current Condition Plan View
2. Stream Problem Area Table
3. Stream Problem Area Photos/Project Photo Log
4. Visual Morphological Stability Assessment Tables
5. Cross section and Pebble Count Plots and Raw Data Tables
6. Longitudinal Plots
7. Feature Slope and Length Calculations
8. Channel Pattern Measurements

REACH 4
WETLAND REACH

NORTH

CROSS SECTION #2
REACH 4
POOL

CROSS SECTION #3
REACH 4
RIFFLE

CROSS SECTION #1
REACH 4
RIFFLE

CROSS SECTION #4
REACH 4
POOL

CROSS SECTION #5
REACH 4
RIFFLE

CROSS SECTION #6
REACH 4
POOL

Veg Plot #1
Veg Plot #2
Veg Plot #3
Veg Plot #4
Veg Plot #5
Veg Plot #6

PA4

FLOW DIRECTION

00+0
1+00
2+00
3+00
4+00
5+00
6+00
7+00
00+8
9+00
10+00
11+00
12+00
13+00
14+00
14+79.60

LEGEND
2008 THALWEG
2008 WATER EDGE
2008 TOP OF BANK
ALIGNMENT
FENCE LINE
CROSS SECTION
PROBLEM PHOTO PA#
PROBLEM AREA

SCALE 1" = 50'
25 0 25 50

Ecosystem Enhancement PROGRAM

NO	DESCRIPTION	DRN	CHK	DATE
1	AS-BUILT PLAN	DRC	JMP	12/01/06
2	2007 MONITORING	ZP	JMP	12/01/07
3	2008 MONITORING	ZP	JZ	11/19/08

REVISIONS

NC STATE UNIVERSITY

BIOLOGICAL & AGRICULTURAL ENGINEERING
Weaver Labs Campus Box 7625
North Carolina State University
Raleigh, NC 27695

PURLEAR CREEK – PHASE 2
REACH 4 – WETLAND AREA
WILKES COUNTY, N.C.

CURRENT CONDITION PLAN VIEW
FIGURE B1

DATE 03/01/2006
PROJECT NO. 295
FILENAME PULEARII08.DWG
SHEET NO.

REACH 1
MAIN STEM REACH

NORTH

CROSS SECTION #7
REACH 1
RIFFLE

0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
9+00

Veg Plot #7

Veg Plot #8

CROSS SECTION #8
REACH 1
RIFFLE

CROSS SECTION #9
REACH 1
POOL

CROSS SECTION #10
REACH 1
POOL

10+00
11+00
11+40.52

FLOW DIRECTION

FLOW DIRECTION

PA3

LEGEND
2008 THALWEG
2008 WATER EDGE
2008 TOP OF BANK
ALIGNMENT
FENCE LINE
CROSS SECTION
PROBLEM PHOTO
PROBLEM AREA
PA#

SCALE 1" = 50'

25 0 25 50

Ecosystem Enhancement PROGRAM

NO	REVISIONS	DRN	CHK	DATE
1	AS-BUILT PLAN	DRC	JMP	12/01/06
2	2007 MONITORING	ZP	JMP	12/01/07
3	2008 MONITORING	ZP	JZ	11/19/08

NC STATE UNIVERSITY

BIOLOGICAL & AGRICULTURAL ENGINEERING
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North Carolina State University
Raleigh, NC 27695

PURLEAR CREEK – PHASE 2
REACH 1 – MAIN STEM REACH
WILKES COUNTY, N.C.

CURRENT CONDITION PLAN VIEW
FIGURE B2

DATE 03/01/2006
PROJECT NO. 295
FILENAME PULEARII08.DWG
SHEET NO.

Table B1. Stream Problem Areas Purlear Creek Phase II / Project ID 010559701					
Feature Issue	**Reach**	**Station numbers**	**Description**	**Suspected Cause**	**Photo number**
Beaver dam	1	7+69	Beaver dam backing up water and impeding flow	Beaver activity	PA03
	-			--	--
Cattle Intrusion	4	Throughout	Cattle observed within the fenced in buffer	Inadequate fencing	PA04
	-			--	--

2008 Purlear Phase II
Problem Area Photo Log – Reach 1

Oct. 18 2007

Oct. 6 2008

PA3. Reach 1 – Station 7+69 – Beaver dam

2008 Purlear Phase II
Problem Area Photo Log – Reach 4

Sept. 17, 2008 **Oct. 6 2008**

PA4. Reach 4 – Throughout – Cattle observed in fenced buffer

2008 Purlear Phase II Photo Log – Reach 1

Oct. 18 2007 **Oct. 6, 2008**


P1. Reach 1 – Start and X7 looking upstream


P2. Reach 1 – Start and X7 looking downstream

Oct. 18 2007 **Oct. 6, 2008**


P3. Reach 1 – X8 looking upstream


P4. Reach 1 – X8 looking downstream


P5. Reach 1 – X9 looking upstream

Oct. 18 2007

Oct. 6, 2008

P6. Reach 1 – X9 looking downstream

P7. Reach 1 – X10 looking upstream

P8. Reach 1 – X10 looking downstream

Oct. 18 2007 **Oct. 6, 2008**

P9. Reach 1 – End Project looking upstream

P10. Reach 1 – End Project looking downstream

2008 Purlear Phase II
Photo Log – Reach 4

Oct. 18 2007 **Oct. 7, 2008**


P11. Reach 4 – Start looking upstream


P12. Reach 4 – Start and X1 looking downstream

Oct. 18 2007 Oct. 7, 2008


P13. Reach 4 – X1 looking upstream


P14. Reach 4 – X1 looking downstream


P15. Reach 4 – X2 looking upstream

Oct. 18 2007 Oct. 7, 2008


P16. Reach 4 – X2 looking downstream


P17. Reach 4 – X3 looking upstream


P18. Reach 4 – X3 looking downstream

Oct. 18 2007 Oct. 7, 2008


P19. Reach 4 – X4 looking upstream


P20. Reach 4 – X4 looking downstream


P21. Reach 4 – X5 looking upstream

Oct. 18 2007 Oct. 7, 2008


P22. Reach 4 – X5 looking downstream


P23. Reach 4 – X6 looking upstream


P24. Reach 4 – X6 looking downstream

Oct. 18 2007 Oct. 7, 2008


P25. Reach 4 – Bridge looking upstream


P26. Reach 4 – Bridge looking downstream


P27. Reach 4 – End of reach looking upstream

Oct. 18 2007 **Oct. 7, 2008**

P28. Reach 4 – End of reach looking downstream

Table B2. Visual Morphological Stability Assessment
Purlear Creek Phase II / Project ID 010559701
Reach 1 (1140 Feet)

Feature Category		Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-built	Total Number/feet in unstable state	% Perform in Stable Condition	Feature Perform. Mean or Total
A. Riffles	1	Present?	8	13	NA	62%	60%
	2	Armor stable (e.g. no displacement)?	8	13	NA	62%	
	3	Facet grade appears stable?	8	13	NA	62%	
	4	Minimal evidence of embedding/fining?	7	13	NA	54%	
	5	Length appropriate?	8	13	NA	62%	
B. Pools	1	Present? (e.g not subject to severe aggrad. or migrat.?)	11	12	NA	92%	92%
	2	Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	11	12	NA	92%	
	3	Length appropriate?	11	12	NA	92%	
C. Thalweg	1	Upstream of meander bend (run/inflection) centering?	5	5	NA	100%	100%
	2	Downstream of meander (glide/inflection) centering?	5	5	NA	100%	
D. Meanders	1	Outer bend in state of limited/controlled erosion?	4	4	NA	100%	100%
	2	Of those eroding, # w/concomitant point bar formation?	--	--	NA		
	3	Apparent Rc within spec?	4	4	NA	100%	
	4	Sufficient floodplain access and relief?	4	4	NA	100%	
E. Bed General	1	General channel bed aggradation areas (bar formation)	1100	1140	1/40*	96%	98%
	2	Channel bed degradation – areas of increasing down-cutting or head cutting?	NA	NA	0/0	100%	
F. Bank	1	Actively eroding, wasting, or slumping bank	NA	NA	0/0	100%	100%
G. Vanes	1	Free of back or arm scour?	3	3	NA	100%	100%
	2	Height appropriate?	3	3	NA	100%	
	3	Angle and geometry appear appropriate?	3	3	NA	100%	
	4	Free of piping or other structural failures?	3	3	NA	100%	
H. Wads/ Boulders	1	Free of scour?	1	1	NA	100%	100%
	2	Footing stable?	1	1	NA	100%	

*Note:Aggradation observed upstream of beaver dam

Reach 4 (1480 Feet)

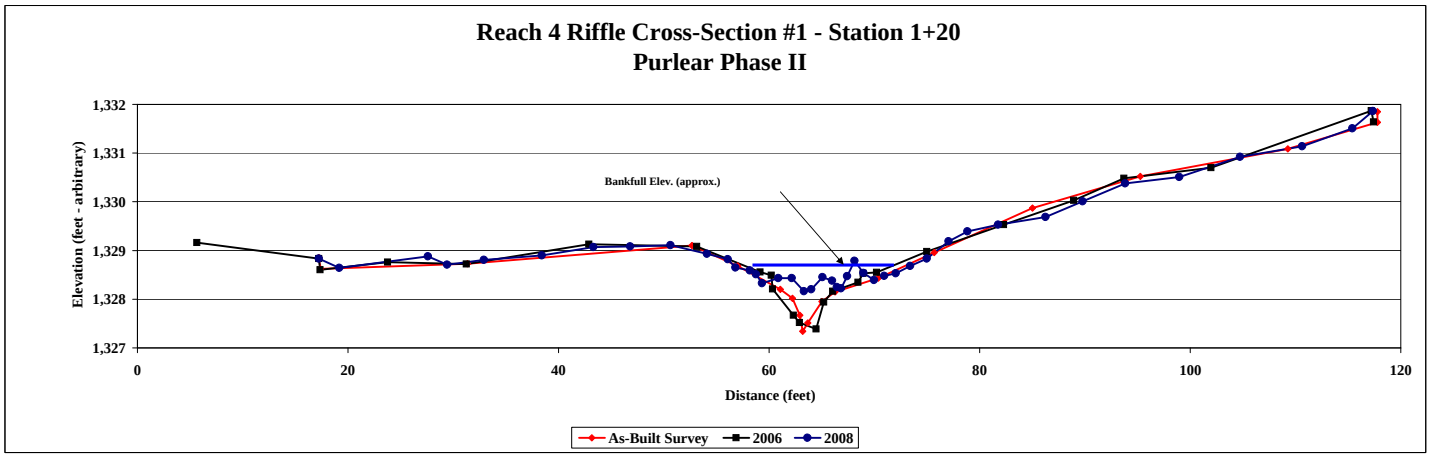
Feature Category		Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-built	Total Number/feet in unstable state	% Perform in Stable Condition	Feature Perform. Mean or Total
A. Riffles	1	Present?	28	35	NA	80%	70%
	2	Armor stable (e.g. no displacement)?	28	35	NA	80%	
	3	Facet grade appears stable?	28	35	NA	80%	
	4	Minimal evidence of embedding/fining?	10	35	NA	29%	
	5	Length appropriate?	28	35	NA	80%	
B. Pools	1	Present? (e.g not subject to severe aggrad. or migrat.?)	32	34	NA	94%	94%
	2	Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	32	34	NA	94%	
	3	Length appropriate?	32	34	NA	94%	
C. Thalweg	1	Upstream of meander bend (run/inflection) centering?	27	27	NA	100%	100%
	2	Downstream of meander (glide/inflection) centering?	27	27	NA	100%	
D. Meanders	1	Outer bend in state of limited/controlled erosion?	27	27	NA	100%	100%
	2	Of those eroding, # w/concomitant point bar formation?	--	--	NA		
	3	Apparent Rc within spec?	27	27	NA	100%	
	4	Sufficient floodplain access and relief?	27	27	NA	100%	
E. Bed General	1	General channel bed aggradation areas (bar formation)	1040	440	1/440*	70%	85%
	2	Channel bed degradation – areas of increasing down-cutting or head cutting?	NA	NA	0/0	100%	
F. Bank	1	Actively eroding, wasting, or slumping bank	NA	NA	0/0	100%	100%
G. Vanes	1	Free of back or arm scour?	29	29	NA	100%	100%
	2	Height appropriate?	29	29	NA	100%	
	3	Angle and geometry appear appropriate?	29	29	NA	100%	
	4	Free of piping or other structural failures?	29	29	NA	100%	
F. Wads/ Boulders	1	Free of scour?	--	--			--
	2	Footing stable?	--	--			

Project Name	Purlear Phase II
Cross Section	X1 Reach 4
Feature	Riffle
Date	9/17/2008
Crew	Price, Church

2005 As-Built Survey			2006 MY - 01			2007 MY - 02			2008 MY - 03		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**
117.77	1,331.85	PIN	5.64	1329.16	(FENCE)				17.23	1328.83	x1lp08
117.77	1,331.63	FP	17.23	1328.83	(X1LP)				19.19	1328.64	x108
109.28	1,331.09	FP	17.36	1328.6	(X1)				27.59	1328.88	x108
95.26	1,330.52	FP	23.76	1328.76	(X1)			Wrong cross section surveyed	29.42	1328.71	x108
85.02	1,329.87	FP	31.25	1328.72	(X1)			in the field.	32.92	1328.81	x108
75.69	1,328.96	RB	42.9	1329.13	(X1)			No data for 2007	38.42	1328.9	x108
70.35	1,328.43	RB	53.14	1329.08	(X1)				43.32	1329.07	x108
66.26	1,328.15	RB	59.16	1328.56	(X1)				46.82	1329.08	x108
65	1,327.95	REW	60.2	1328.49	(X1W)				50.64	1329.11	x108
63.68	1,327.51	SB	60.32	1328.21	(X1)				54.1	1328.93	x108
63.18	1,327.34	SB	62.31	1327.67	(X1)				56.08	1328.82	x108
62.93	1,327.67	SB	62.88	1327.52	(X1)				56.8	1328.65	x108
62.21	1,328.02	LEW	64.47	1327.39	(X1)				58.19	1328.59	x108
61.05	1,328.20	LB	65.19	1327.94	(X1)				58.74	1328.51	x108
57.02	1,328.68	BKF	66.04	1328.16	(X1)				59.34	1328.33	x108
52.68	1,329.10	FP	68.46	1328.35	(X1)				60.88	1328.43	x108
31.35	1,328.73	FP	68.93	1328.53	(X1W)				62.15	1328.43	x108
17.4	1,328.62	FP	70.21	1328.55	(X1)				63.3	1328.16	x108
17.23	1,328.85	PIN1	74.98	1328.98	(X1)				64.01	1328.2	x108
			82.27	1329.53	(X1)				65.08	1328.45	x108
			88.95	1330.03	(X1)				65.99	1328.38	x108
			93.72	1330.48	(X1)				66.45	1328.25	x108
Adjusted			101.98	1330.7	(X1)				66.85	1328.22	x108
Right	17.23'		117.2	1331.87	(X1RP)				67.41	1328.47	x108
			117.43	1331.64	(X1)				68.13	1328.79	x1w08
									68.98	1328.54	x108
			Adusted						69.96	1328.39	x108
			up	1235.77'					70.94	1328.48	x108
									72.04	1328.53	x108
									73.39	1328.68	x108
									74.98	1328.83	x108
									77.04	1329.19	x108
									78.86	1329.39	x108
									81.75	1329.53	x108
									86.27	1329.69	x108
									89.78	1330.01	x108
									93.84	1330.38	x108
									98.97	1330.51	x108
									104.74	1330.92	x108
									110.63	1331.14	x108
									115.42	1331.51	x108
									117.37	1331.86	x1rp08

Photo of Cross-Section #1 - Looking Downstream

	As-Built	2006	2007	2008
Area	7.31	6.7		3.8
Width	17.5	11.1		17.3
Mean Depth	0.4	0.6		0.2
Max Depth	1.3	1.3		0.5
w/d ratio	41.8	18.3		78.8
FPW	72	72		72
ER (greater than)	4.1	6.5		4.2
Stream Type	C	C		C

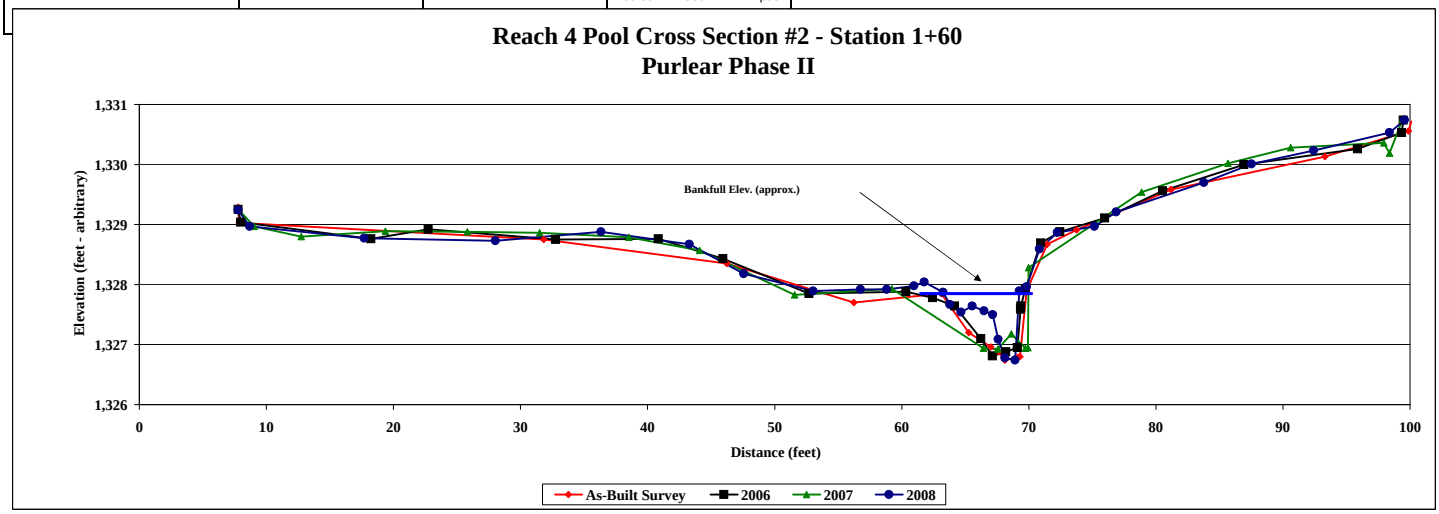


Project Name	Purlear Phase II
Cross Section	X2 Reach 4
Feature	Pool
Date	9/17/2008
Crew	Price, Church

2005 As-Built Survey			2006 MY - 01			2007 MY - 02			2008 MY - 03		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**
100.11	1,330.72	PIN	7.78	1329.25	(X2LP)	7.78	1329.25	XS2LP07	7.78	1329.24	x2lp08
99.88	1,330.56	FP	7.98	1329.04	(X2)	9.05	1328.97	XS2	8.7	1328.97	x208
93.3	1,330.13	FP	18.22	1328.76	(X1)	12.73	1328.8	XS2	17.71	1328.77	x208
81.2	1,329.58	FP	22.73	1328.92	(X2)	19.36	1328.89	XS2	28.03	1328.73	x208
73.76	1,328.91	RB	32.76	1328.75	(X2)	25.81	1328.88	XS2	36.33	1328.88	x208
71.44	1,328.67	RB	40.84	1328.76	(X2)	31.5	1328.86	XS2	43.28	1328.67	x208
69.83	1,327.90	RB	45.94	1328.43	(X2)	38.54	1328.79	XS2	47.57	1328.18	x208
69.31	1,326.80	SB	52.71	1327.85	(X2)	44.09	1328.57	XS2	53.03	1327.89	x208
69.12	1,326.79	SB	60.34	1327.88	(X2)	51.57	1327.83	XS2	56.76	1327.92	x208
68.12	1,326.74	SB	62.44	1327.78	(X2)	59.22	1327.93	XS2	58.82	1327.92	x208
67.64	1,326.88	SB	64.16	1327.64	(X2W)	66.44	1326.94	XS2	60.96	1327.98	x208
67.02	1,326.96	LEW	66.24	1327.1	(X2)	67.57	1326.93	XS2	61.78	1328.04	x208
65.28	1,327.20	LB	67.14	1326.81	(X2)	68.61	1327.18	XS2W	63.25	1327.87	x208
63.12	1,327.85	BKF	68.2	1326.88	(X2)	69.73	1326.94	XS2	63.78	1327.67	x208
56.23	1,327.70	LB	69.11	1326.95	(X2)	69.92	1326.95	XS2	64.66	1327.54	x208
46.24	1,328.35	FP	69.35	1327.59	(W)	69.97	1328.28	XS2	65.54	1327.64	x208
31.83	1,328.75	FP	69.38	1327.64	(X2W)	78.86	1329.54	XS2	66.47	1327.56	x208
7.86	1,329.03	FP	69.74	1327.93	(X2)	85.67	1330.02	XS2	67.16	1327.5	x208
7.78	1,329.29	PIN	70.93	1328.69	(X2)	90.6	1330.28	XS2	67.6	1327.09	x208
			72.44	1328.88	(X2)	97.94	1330.36	XS2	68.13	1326.78	x208
			75.98	1329.11	(X2)	98.38	1330.19	XS2	68.92	1326.74	x208
			80.54	1329.56	(X2)	99.42	1330.76	XS2RP07	69.25	1327.89	x2w08
			86.94	1330	(X2)				69.82	1327.96	x208
			95.87	1330.26	(X2)				70.85	1328.59	x208
			99.34	1330.53	(X2)				72.25	1328.87	x208
			99.47	1330.74	(X2RP)				75.17	1328.97	x208
									76.88	1329.21	x208
									83.79	1329.7	x208
									87.53	1330.01	x208
									92.41	1330.23	x208
									98.38	1330.53	x208
									99.56	1330.74	x2rp08

Photo of Cross-Section #2 - Looking Downstream

	As-Built	2006	2007	2008
Area	4.9	4.2	5.9	2.7
Width	6.2	9.4	10.8	7.5
Mean Depth	0.8	0.4	0.6	0.4
Max Depth	1.1	1.0	0.9	1.1



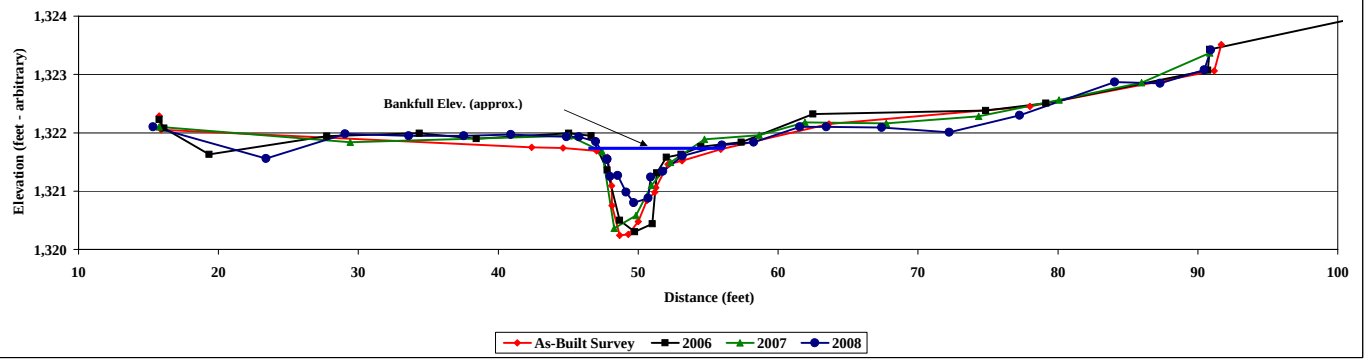
Project Name	Purlear Phase II
Cross Section	X3 Reach 4
Feature	Riffle
Date	9/17/2008
Crew	Price, Church

2005 As-Built Survey			2006 MY - 01			2007 MY - 02			2008 MY - 03		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**
91.67	1,323.51	PIN	15.76	1322.23	(X3LP)	15.76	1322.1	XS3LP07	15.32	1322.1	xs3lp08
91.18	1,323.06	FP	16.1	1322.08	(X3)	29.41	1321.84	XS3	23.41	1321.56	xs308
77.99	1,322.45	FP	19.34	1321.63	(X3)	45.06	1321.95	XS3	29.06	1321.98	xs308
63.63	1,322.15	FP	27.75	1321.94	(X3)	47.42	1321.68	XS3	33.6	1321.95	xs308
55.9	1,321.72	RB	34.36	1321.99	(X3)	48.28	1320.36	XS3	37.53	1321.95	xs308
53.13	1,321.52	BKF	38.43	1321.9	(X3)	49.84	1320.58	XS3	40.91	1321.97	xs308
52.12	1,321.46	RB	45.03	1321.99	(X3)	50.95	1321.1	XS3W	44.88	1321.93	xs308
51.27	1,321.06	REW	46.65	1321.95	(X3)	52.31	1321.49	XS3	45.76	1321.93	xs308
51.19	1,320.98	SB	47.79	1321.36	(X3)	54.73	1321.89	XS3	46.97	1321.85	xs308
50.61	1,320.84	SB	48.68	1320.5	(X3)	58.65	1321.96	XS3	47.75	1321.54	xs3w08
50	1,320.48	SB	49.75	1320.3	(X3)	61.92	1322.18	XS3	47.79	1321.55	xs308
49.3	1,320.26	SB	51.01	1320.44	(X3)	67.72	1322.16	XS3	48	1321.25	xs308
48.67	1,320.24	SB	51.33	1321.31	(X3W)	74.34	1322.28	XS3	48.54	1321.27	xs308
48.13	1,320.75	SB	52.02	1321.58	(X3)	80.09	1322.56	XS3	49.13	1320.98	xs308
48.1	1,321.09	LEW	53.06	1321.63	(X3)	85.99	1322.86	XS3	49.69	1320.8	xs308
47.8	1,321.58	LB	54.49	1321.76	(X3)	90.85	1323.37	XS3RP07	50.71	1320.88	xs308
47.03	1,321.69	LB	57.36	1321.84	(X3)				50.89	1321.24	xs308
44.63	1,321.74	BKF	62.5	1322.32	(X3)				51.77	1321.34	xs308
42.38	1,321.75	FP	74.83	1322.38	(X3)				53.15	1321.6	xs308
15.91	1,322.05	FP	79.14	1322.51	(X3)				55.99	1321.79	xs308
15.76	1,322.29	PIN	90.72	1323.07	(X3)				58.25	1321.84	xs308
			90.85	1323.43	(X3RP)				61.55	1322.1	xs308
			101.55	1323.98	(FENCE)				63.46	1322.1	xs308
									67.41	1322.09	xs308
									72.24	1322.01	xs308
									77.26	1322.3	xs308
									84.06	1322.87	xs308
									87.3	1322.85	xs308
									90.46	1323.08	xs308
									90.91	1323.42	xs3rp08

Photo of Cross-Section #3 - Looking Downstream

	As-Built	**2006**	**2007**	**2008**
Area	4.93	4.8	4.3	3.2
Width	10.3	7.8	7.3	9.0
Mean Depth	0.5	0.6	0.6	0.4
Max Depth	1.5	1.4	1.4	0.9
w/d ratio	21.5	12.9	12.3	25.3
FPW	72	72	72	72
ER (greater than)	7.0	9.2	9.9	8.0
Stream Type	C	C	C	C

Reach 4 Riffle Cross Section #3 - Station 4+63
Purlear Phase II



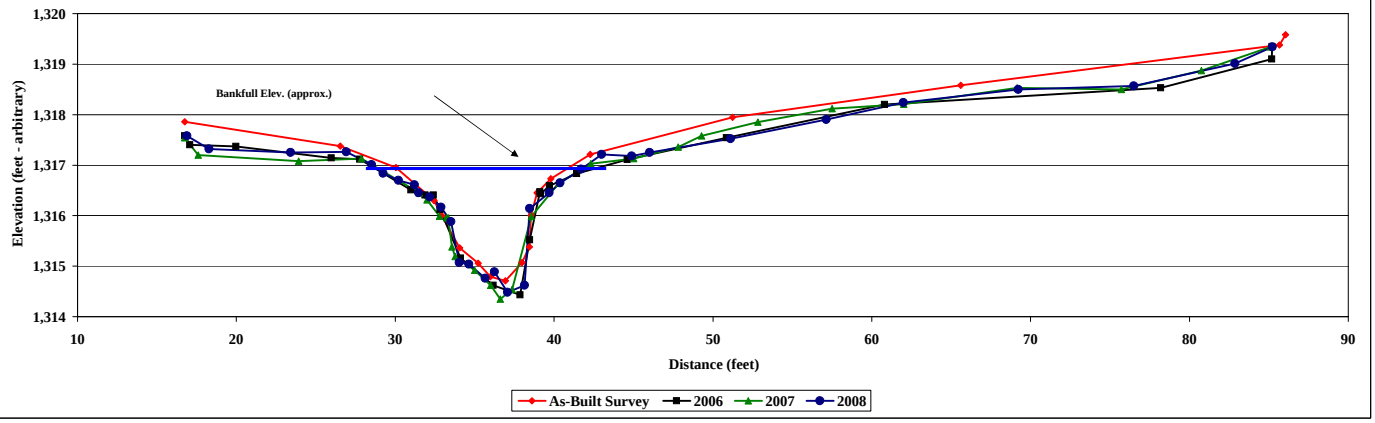
Project Name	Purlear Phase II
Cross Section	X4 Reach 4
Feature	Pool
Date	9/17/2008
Crew	Price, Church

2005 As-Built Survey			2006 MY - 01			2007 MY - 02			2008 MY - 03		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**
86.06	1,319.58	PIN	16.74	1317.58	(XS4LP)	16.74	1317.54	XS4LP07	16.9	1317.58	xs4lp08
85.66	1,319.38	FP	17.07	1317.4	(XS4)	17.59	1317.2	XS4	18.27	1317.32	xs408
65.6	1,318.58	RB	19.98	1317.37	(XS4)	23.92	1317.08	XS4	23.41	1317.25	xs408
51.23	1,317.95	RB	25.97	1317.14	(XS4)	27.86	1317.13	XS4	26.92	1317.26	xs408
42.27	1,317.21	RB	27.77	1317.12	(XS4)	31.51	1316.45	XS4	28.51	1317.01	xs408
39.8	1,316.73	RB	30.99	1316.51	(XS4)	32	1316.31	XS4	29.23	1316.84	xs408
38.93	1,316.45	RB	31.88	1316.41	(XS4W)	32.79	1315.99	XS4	30.21	1316.7	xs408
38.54	1,316.00	REW	32.4	1316.41	(W)	33.23	1315.96	XS4	31.22	1316.61	xs408
38.45	1,315.38	SB	32.82	1316.12	(XS4)	33.32	1315.96	XS4W	31.48	1316.45	xs4w08
37.98	1,315.07	SB	34.12	1315.16	(XS4)	33.58	1315.38	XS4	32.18	1316.37	xs408
36.93	1,314.71	SB	36.17	1314.62	(XS4)	33.78	1315.19	XS4	32.88	1316.17	xs408
35.98	1,314.79	SB	37.87	1314.43	(XS4)	35.01	1314.92	XS4	33.51	1315.88	xs408
35.23	1,315.06	SB	38.47	1315.52	(XS4)	36.01	1314.62	XS4	34.04	1315.07	xs408
34.06	1,315.36	SB	39.11	1316.47	(XS4W)	36.61	1314.35	XS4	34.64	1315.04	xs408
32.92	1,316.00	LEW	39.16	1316.43	(W)	37.35	1314.54	XS4	35.66	1314.76	xs408
32.45	1,316.30	LB	39.72	1316.59	(XS4)	38.56	1315.98	XS4W	36.26	1314.89	xs408
30.05	1,316.95	BKF	41.42	1316.83	(XS4)	40.29	1316.64	XS4	37.08	1314.48	xs408
26.53	1,317.38	FP	44.62	1317.11	(XS4)	42.32	1317.03	XS4	38.14	1314.62	xs408
16.74	1,317.86	PIN	50.85	1317.54	(XS4)	45.01	1317.13	XS4	38.46	1316.14	xs408
			60.8	1318.2	(XS4)	47.82	1317.36	XS4	39.7	1316.45	xs408
			78.19	1318.53	(XS4)	49.29	1317.58	XS4	40.39	1316.65	xs408
			85.18	1319.1	(XS4)	52.83	1317.85	XS4	41.7	1316.92	xs408
			85.21	1319.35	(X4RP)	57.51	1318.12	XS4	43	1317.21	xs408
						62.01	1318.21	XS4	44.9	1317.18	xs408
						69.14	1318.53	XS4	46.02	1317.25	xs408
						75.72	1318.5	XS4	51.12	1317.52	xs408
						80.75	1318.87	XS4	57.15	1317.9	xs408
						85.1	1319.34	XS4RP07	62	1318.24	xs408
									69.23	1318.5	xs408
									76.5	1318.57	xs408
									82.87	1319.01	xs408
									85.22	1319.34	xs4rp08

Photo of Cross-Section #4 - Looking Downstream

	As-Built	**2006**	**2007**	**2008**
Area	12.1	14.2	13.3	13.6
Width	11.3	13.7	10.3	13.2
Mean Depth	1.1	1.0	1.3	1.0
Max Depth	2.2	2.5	2.6	2.5

Reach 4 Pool Cross Section #4 - Station 7+60
Purlear Phase II



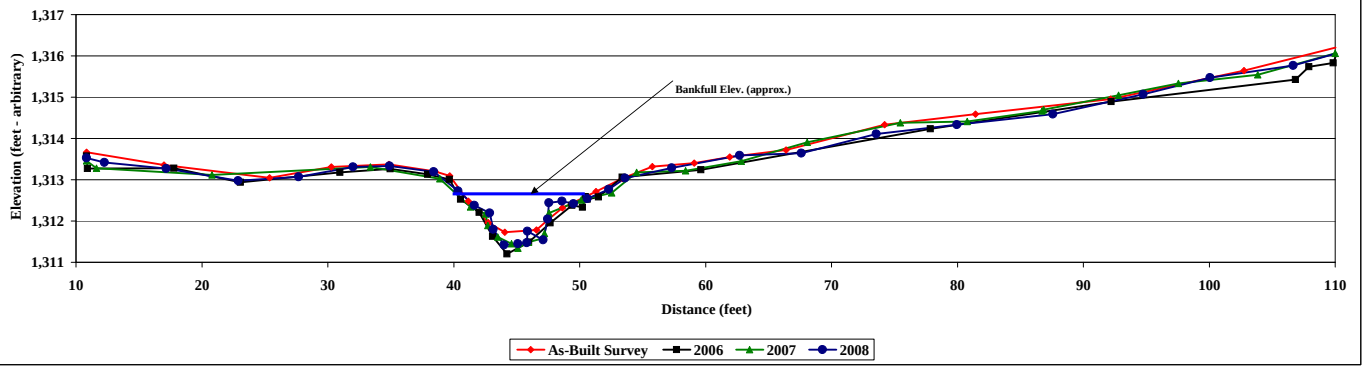
Project Name	Purlear Phase II
Cross Section	X5 Reach 4
Feature	Riffle
Date	9/17/2008
Crew	Price, Church

2005 As-Built Survey			2006 MY - 01			2007 MY - 02			2008 MY - 03		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**
110.02	1,316.20	pin	10.83	1313.57	(X5LP)	10.83	1313.46	XS5LP07	10.83	1313.53	xs5lp08
102.75	1,315.64	fp	10.91	1313.27	(X5)	11.63	1313.28	XS5	12.27	1313.42	xs508
92.16	1,314.95	fp	17.77	1313.28	(X5)	20.79	1313.12	XS5	17.16	1313.27	xs508
81.44	1,314.59	fp	23.07	1312.94	(X5)	33.37	1313.31	XS5	22.89	1312.98	xs508
74.22	1,314.33	fp	30.97	1313.18	(X5)	38.89	1313.02	XS5	27.7	1313.07	xs508
66.38	1,313.72	fp	34.95	1313.26	(X5)	41.33	1312.34	XS5	32.02	1313.31	xs508
61.91	1,313.55	fp	37.93	1313.13	(X5)	42.53	1312.17	XS5W	34.91	1313.33	xs508
59.1	1,313.40	fp	39.65	1313.01	(X5)	42.7	1311.89	XS5	38.42	1313.19	xs508
55.78	1,313.32	fp	40.54	1312.53	(X5W)	43.49	1311.61	XS5	40.35	1312.73	xs508
53.39	1,313.03	bank	42.01	1312.21	(X5)	44.58	1311.45	XS5	41.65	1312.38	xs508
51.29	1,312.71	bkf	43.08	1311.63	(X5)	45.09	1311.34	XS5	42.85	1312.19	xs508
48.64	1,312.32	bank	44.24	1311.2	(X5)	45.93	1311.49	XS5	43.15	1311.8	xs508
47.5	1,312.04	rew	45.97	1311.49	(X5)	47.07	1311.58	XS5	43.99	1311.42	xs508
46.58	1,311.78	sb	47.65	1311.95	(X5)	47.2	1311.7	XS5	45.09	1311.45	xs508
44.05	1,311.73	sb	49.4	1312.38	(X5)	47.56	1312.19	XS5W	45.8	1311.47	xs508
42.73	1,311.96	lew	50.24	1312.33	(X5)	50.13	1312.51	XS5	45.86	1311.75	xs508
41.16	1,312.48	bkf	50.45	1312.59	(W)	52.53	1312.68	XS5	47.11	1311.54	xs508
39.69	1,313.09	fp	50.6	1312.53	(X5W)	54.53	1313.18	XS5	47.47	1312.05	xs508
38.51	1,313.20	fp	51.5	1312.58	(X5)	58.42	1313.22	XS5	47.57	1312.44	xs5w08
34.85	1,313.37	fp	53.37	1313.06	(X5)	62.83	1313.45	XS5	48.6	1312.48	xs508
30.28	1,313.31	fp	59.63	1313.24	(X5)	68.06	1313.91	XS5	49.52	1312.42	xs508
25.38	1,313.05	fp	77.84	1314.23	(X5)	75.46	1314.38	XS5	50.62	1312.54	xs508
17	1,313.36	fp	92.2	1314.89	(X5)	80.78	1314.41	XS5	52.31	1312.77	xs508
10.83	1,313.67	pin	106.85	1315.43	(X5)	86.72	1314.67	XS5	53.6	1313.04	xs508
			107.92	1315.74	(X5)	86.84	1314.7	XS5	57.31	1313.29	xs508
			109.86	1315.83	(X5)	92.79	1315.05	XS5	62.71	1313.59	xs508
			110.1	1316.05	(X5RP)	97.55	1315.33	XS5	67.62	1313.64	xs508
						103.86	1315.54	XS5	73.57	1314.11	xs508
						110.01	1316.06	XS5RP07	79.95	1314.33	xs508
									87.59	1314.59	xs508
									94.74	1315.07	xs508
									100.07	1315.47	xs508
									106.67	1315.77	xs508
									110.11	1316.06	xs5rp08

Photo of Cross-Section #5 - Looking Downstream

	As-Built	**2006**	**2007**	**2008**
Area	5.1	7.0	6.2	5.6
Width	10.1	9.9	8.8	10.1
Mean Depth	0.5	0.7	0.7	0.6
Max Depth	0.9	1.4	1.3	1.2
w/d ratio	20.0	14.0	12.5	18.2
FPW	46	46	46	46
ER (greater than)	4.5	4.6	5.2	4.6
Stream Type	C	C	C	C

Reach 4 Riffle Cross Section #5 - Station 10+75
Purlear Phase II

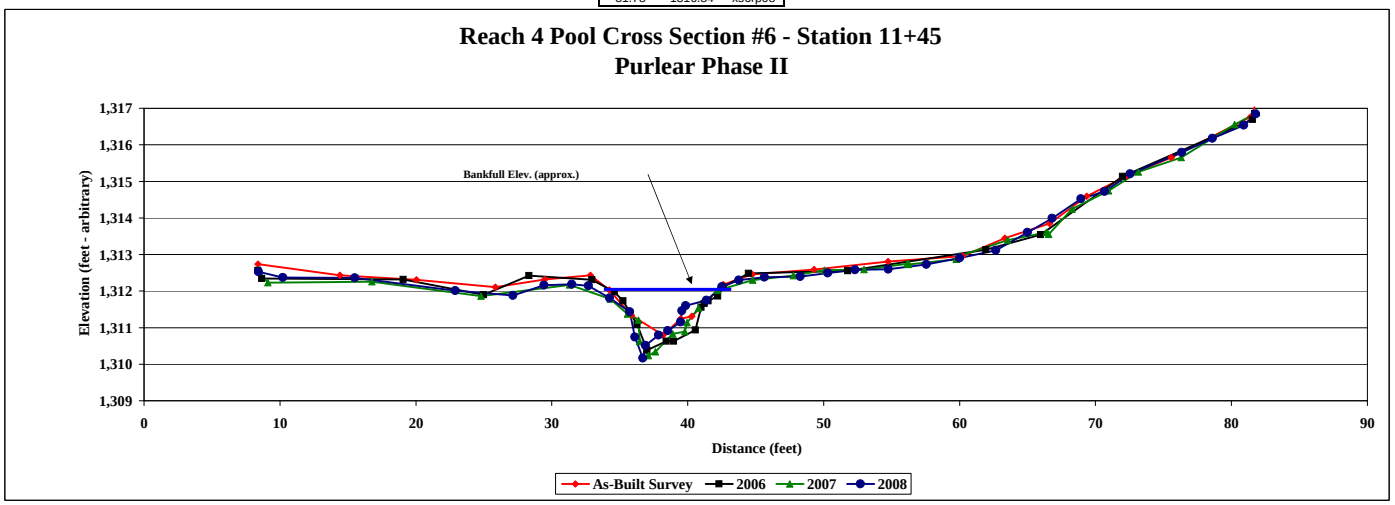


Project Name	Purlear Phase II
Cross Section	X6 Reach 4
Feature	Pool
Date	9/17/2008
Crew	Price, Church

2005 As-Built Survey			2006 MY - 01			2007 MY - 02			2008 MY - 03		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**
81.7	1,317.03	pin	8.38	1312.56	(X6LP)	8.38	1312.58	XS6LP07	8.42	1312.53	xs6lp08
81.4	1,316.76	ltr	8.66	1312.34	(X6)	9.1	1312.23	XS6	10.21	1312.37	xs608
75.58	1,315.65	ltr	19.08	1312.32	(X6)	16.76	1312.26	XS6	15.51	1312.36	xs608
72.33	1,315.15	ltr	24.98	1311.9	(X6)	24.8	1311.86	XS6	22.9	1312.01	xs608
69.35	1,314.59	ltr	28.31	1312.42	(VP)	31.31	1312.17	XS6	27.15	1311.88	xs608
66.62	1,313.85	ltr	32.95	1312.31	(X6)	34.29	1311.78	XS6	29.43	1312.16	xs608
63.33	1,313.45	fp	34.6	1311.98	(X6)	35.56	1311.37	XS6	31.47	1312.19	xs608
60.21	1,312.96	fp	35.25	1311.73	(X6W)	36.38	1311.21	XS6W	32.69	1312.14	xs608
54.73	1,312.81	fp	36.27	1311.08	(X6)	36.47	1310.62	XS6	34.25	1311.81	xs608
49.3	1,312.59	fp	37	1310.38	(X6)	37.11	1310.23	XS6	35.74	1311.43	xs608
44.76	1,312.46	fp	38.41	1310.63	(X6)	37.62	1310.34	XS6	36.12	1310.74	xs608
42.6	1,312.18	bkf	38.95	1310.63	(X6)	38.89	1310.83	XS6	36.7	1310.16	xs608
40.3	1,311.31	rew	40.57	1310.93	(X6)	39.78	1310.89	XS6	36.88	1310.51	xs608
39.48	1,311.24	sb	40.98	1311.56	(X6)	39.94	1311.14	XS6W	37.85	1310.79	xs608
38.18	1,310.79	sb	41.22	1311.66	(X6W)	40.79	1311.54	XS6	38.54	1310.92	xs608
35.85	1,311.34	lew	41.51	1311.73	(W)	42.22	1312.02	XS6	39.47	1311.15	xs608
34.24	1,312.03	bkf	42.22	1311.86	(X6)	44.77	1312.3	XS6	39.58	1311.46	xs6w08
32.85	1,312.43	fp	42.62	1312.12	(X6)	47.77	1312.42	XS6	39.85	1311.6	xs608
29.48	1,312.32	fp	44.48	1312.48	(X6)	50.04	1312.57	XS6	41.39	1311.75	xs608
25.86	1,312.11	fp	51.78	1312.55	(X6)	52.96	1312.59	XS6	42.52	1312.12	xs608
20.04	1,312.31	fp	61.93	1313.13	(X6)	56.14	1312.75	XS6	43.77	1312.3	xs608
14.4	1,312.43	fp	65.97	1313.54	(X6)	56.25	1312.75	XS6	45.64	1312.38	xs608
8.38	1,312.74	pin	72	1315.14	(X6)	56.25	1312.73	XS6	48.28	1312.4	xs608
			81.56	1316.69	(X6)	59.75	1312.87	XS6	50.3	1312.49	xs608
			81.72	1316.85	(X6RP)	59.96	1312.96	XS6	52.32	1312.58	xs608
						63.53	1313.39	XS6	54.76	1312.6	xs608
						66.39	1313.6	XS6	57.57	1312.73	xs608
						66.41	1313.6	XS6	60.01	1312.9	xs608
						66.55	1313.55	XS6	62.67	1313.11	xs608
						68.28	1314.24	XS6	64.99	1313.6	xs608
						70.95	1314.74	XS6	66.81	1313.99	xs608
						73.14	1315.26	XS6	68.92	1314.52	xs608
						76.31	1315.65	XS6	70.68	1314.72	xs608
						80.24	1316.55	XS6	72.56	1315.21	xs608
						81.85	1316.88	XS6RP07	76.34	1315.79	xs608
						81.9	1316.85	XS6	78.6	1316.18	xs608
									80.91	1316.54	xs608
									81.78	1316.84	xs6rp08

Photo of Cross-Section #6 - Looking Downstream

	As-Built	**2006**	**2007**	**2008**
Area	6.1	7.9	8.2	7.0
Width	8.4	8.0	10.9	9.8
Mean Depth	0.7	1.0	0.8	0.7
Max Depth	1.3	1.7	1.9	1.9



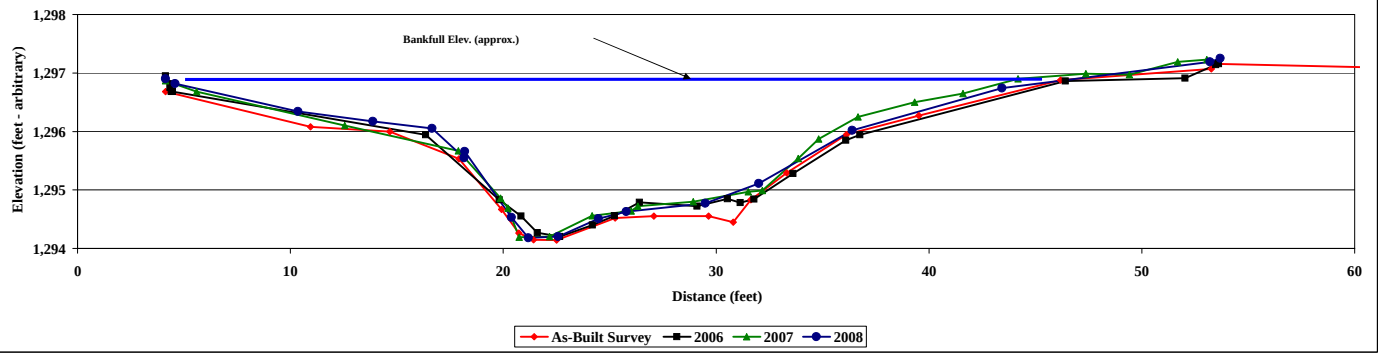
Project Name	Purlear Phase II
Cross Section	X7 Reach 1
Feature	Riffle
Date	7/17/2008
Crew	George, Hancock

2005 As-Built Survey			2006 MY - 01			2007 MY - 02			2008 MY - 03		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**
4.14	1,296.68	PIN	4.14	1296.95	(xs7lp)	4.14	1296.87	XS7LP07	4.14	1296.9	XS7LP08
10.94	1,296.08	FP	4.35	1296.75	(XS7)	5.59	1296.68	XS7	4.58	1296.82	XS7
14.68	1,296.00	BKF	4.41	1296.68	(XS7)	12.56	1296.1	XS7	10.36	1296.34	XS7
17.92	1,295.53	LB	4.44	1296.81	(xs7lp)	17.89	1295.67	XS7	13.87	1296.17	XS7
19.92	1,294.67	LEW	4.47	1296.68	(xs7)	19.88	1294.86	XS7	16.66	1296.05	XS7
20.73	1,294.26	SB	16.35	1295.94	(xs7)	20.22	1294.69	XS7W	18.16	1295.55	XS7
21.43	1,294.15	SB	19.81	1294.83	(xs7w)	20.75	1294.19	XS7	18.19	1295.66	XS7
22.51	1,294.14	SB	20.84	1294.55	(xs7)	22.18	1294.2	XS7	20.38	1294.53	XS7W
25.25	1,294.52	SB	21.6	1294.27	(xs7)	24.17	1294.56	XS7	21.19	1294.18	XS7
27.08	1,294.55	REW	22.66	1294.2	(xs7)	26.01	1294.64	XS7	22.58	1294.2	XS7
29.64	1,294.55	BAR	24.19	1294.4	(xs7)	26.33	1294.72	XS7W	24.48	1294.51	XS7W
30.81	1,294.45	REW	25.22	1294.56	(xs7)	28.93	1294.8	XS7	25.79	1294.63	XS7
31.63	1,294.83	RB	26.4	1294.79	(xs7)	31.51	1294.97	XS7	29.5	1294.77	XS7
33.31	1,295.29	RB	29.1	1294.72	(xs7)	32.17	1294.99	XS7	32	1295.11	XS7
36.13	1,295.95	BKF	30.53	1294.85	(xs7)	33.86	1295.54	XS7	36.4	1296.02	XS7
39.53	1,296.27	TOB	31.14	1294.78	(xs7)	34.82	1295.87	XS7	43.44	1296.74	XS7
46.18	1,296.88	FP	31.78	1294.84	(xs7w)	36.67	1296.25	XS7	53.2	1297.19	XS7
53.26	1,297.07	FP	33.61	1295.28	(xs7)	39.33	1296.5	XS7	53.68	1297.25	XS7RP08
53.35	1,297.16	FP	36.1	1295.85	(xs7)	41.6	1296.65	XS7			
102.6	1,296.75	PIN	36.76	1295.94	(xs7)	44.18	1296.9	XS7			
			46.41	1296.86	(xs7)	47.37	1296.99	XS7			
			52.03	1296.91	(xs7)	49.42	1296.97	XS7			
			53.48	1297.14	(xs7rp)	51.69	1297.19	XS7			
			53.61	1297.16	(XS7)	53.05	1297.23	XS7RP07			

Photo of Cross-Section #7 - Looking Downstream

	As-Built	**2006**	**2007**	**2008**
Area	49.9	50.7	46.9	47.1
Width	35.2	42.3	40.0	39.3
Mean Depth	1.4	1.2	1.2	1.2
Max Depth	2.7	2.7	2.7	2.7
w/d ratio	24.9	35.2	34.2	32.8
FPW	100	100	100	100
ER (greater than)	2.8	2.4	2.5	2.5
Stream Type	C	C	C	C

Reach 1 Riffle Cross Section #7 - Station 1+65
Purlear Phase II



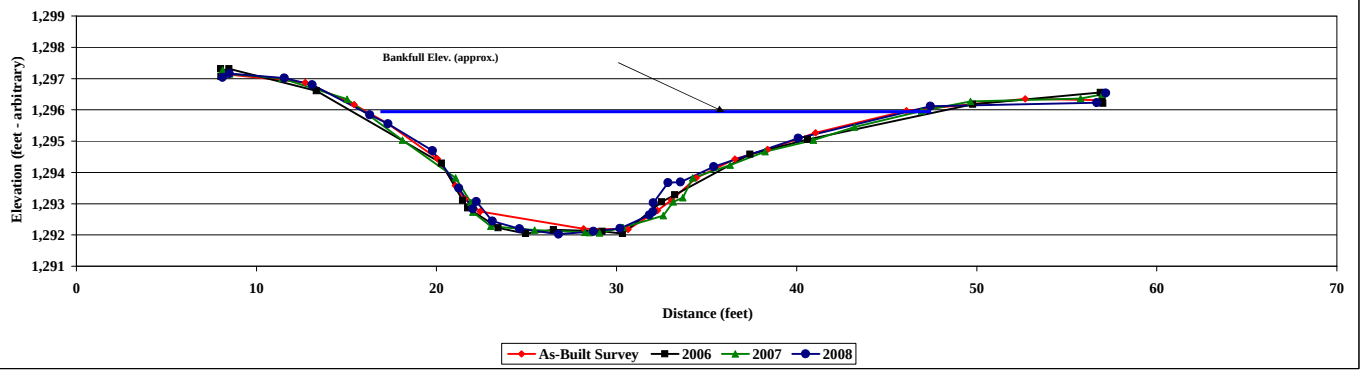
Project Name	Purlear Phase II
Cross Section	X8 Reach 1
Feature	Riffle
Date	7/17/2008
Crew	George, Hancock

2005 As-Built Survey			2006 MY - 01			2007 MY - 02			2008 MY - 03		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**
8.13	1,297.15	FP	8.02	1297.31	(XS8)	8.13	1297.27	XS8LP07	8.13	1297.04	XS8LP08
12.7	1,296.87	TOB	8.04	1297.07	(xs8)	8.52	1297.15	XS8	8.5	1297.16	XS8
15.42	1,296.17	LB	8.13	1297.19	(xs8lp)	11.41	1297.01	XS8	11.55	1297.02	XS8
17.31	1,295.55	BKF	8.48	1297.31	(xs8lp)	15.04	1296.34	XS8	13.09	1296.8	XS8
20.04	1,294.44	LB	13.33	1296.61	(xs8)	18.1	1295.03	XS8	16.3	1295.84	XS8
21.04	1,293.58	LB	20.27	1294.29	(xs8)	21.05	1293.82	XS8	17.31	1,295.55	XS8
21.57	1,293.15	LEW	21.45	1293.11	(xs8w)	21.91	1293.04	XS8W	19.78	1294.69	XS8
22.43	1,292.75	SB	21.73	1292.86	(xs8)	22.01	1292.73	XS8	21.23	1293.5	XS8w
28.17	1,292.20	SB	23.43	1292.23	(xs8)	23.02	1292.28	XS8	22.01	1292.83	XS8
30.63	1,292.18	SB	24.95	1292.04	(xs8)	25.45	1292.16	XS8	22.21	1293.07	XS8
32.27	1,292.78	SB	26.5	1292.17	(xs8)	28.24	1292.08	XS8	23.1	1292.44	XS8
33.06	1,293.12	REW	29.2	1292.11	(xs8)	28.49	1292.07	XS8	24.62	1292.2	XS8
34.43	1,293.82	RB	30.34	1292.04	(xs8)	29.05	1292.06	XS8	26.78	1292.02	XS8
36.58	1,294.43	RB	32.5	1293.06	(xs8w)	30.35	1292.24	XS8	28.71	1292.11	XS8
38.39	1,294.73	RB	33.24	1293.28	(xs8)	32.59	1292.62	XS8	30.2	1292.21	XS8
41.05	1,295.27	RB	37.4	1294.58	(xs8)	33.14	1293.06	XS8W	31.82	1292.64	XS8
46.1	1,295.97	RB	40.6	1295.05	(xs8)	33.67	1293.19	XS8	32.03	1292.74	XS8w
52.69	1,296.35	FP	49.77	1296.18	(xs8)	34.22	1293.82	XS8	32.05	1293.03	XS8
56.9	1,296.31	FP	56.87	1296.55	(XS8)	36.3	1294.23	XS8	32.85	1293.67	XS8
56.99	1,296.55	PIN	56.98	1296.42	(xs8rp)	38.25	1294.66	XS8	33.56	1293.69	XS8
			57.01	1296.21	(xs8)	40.93	1295.03	XS8	35.4	1294.18	XS8
						43.22	1295.45	XS8	40.1	1295.09	XS8
						46.93	1295.96	XS8	47.43	1296.12	XS8
						49.65	1296.27	XS8	56.68	1296.23	XS8RP08
						55.76	1296.36	XS8	57.17	1296.53	
						56.98	1296.49	XS8RP07			

Photo of Cross-Section #8 - Looking Downstream

	As-Built	**2006**	**2007**	**2008**
Area	48.59	54.8	57.9	50.6
Width	23.7	31.3	30.2	28.8
Mean Depth	2.0	1.8	1.9	1.8
Max Depth	3.4	3.5	3.5	3.5
w/d ratio	11.6	17.9	15.7	16.4
FPW	98	98	98	98
ER (greater than)	4.1	3.1	3.2	3.4
Stream Type	C	C	C	C

Reach 1 Riffle Cross Section # 8 - Station 4+60
Purlear Phase II

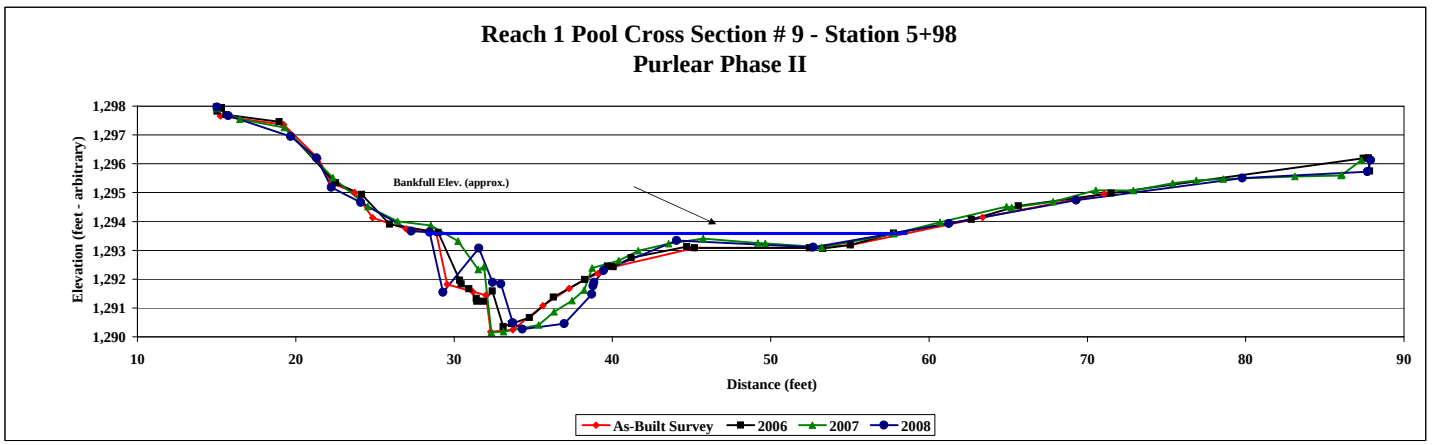


Project Name	Purlear Phase II
Cross Section	X9 Reach 1
Feature	Pool
Date	7/17/2008
Crew	George, Hancock

2005 As-Built Survey			2006 MY - 01			2007 MY - 02			2008 MY - 03		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**
15.04	1,297.97	PIN	14.99	1297.97	(XS9)	15.04	1297.91	XS9LP07	15.04	1297.97	XS9LP08
15.23	1,297.66	FP	15.04	1297.82	(xs9lp)	16.46	1297.55	XS9	15.75	1297.67	XS9
19.23	1,297.36	TOB	15.32	1297.95	(xs9lp)	19.27	1297.26	XS9	19.68	1296.95	XS9
21.42	1,296.18	LB	15.59	1297.7	(xs9)	22.34	1295.51	XS9	21.31	1296.2	XS9
22.24	1,295.34	LB	18.96	1297.46	(xs9)	24.56	1294.52	XS9	22.25	1295.18	XS9
23.72	1,295.00	LB	22.51	1295.34	(xs9)	26.43	1294.01	XS9	24.11	1294.66	XS9
24.86	1,294.13	LB	24.16	1294.94	(xs9)	28.53	1293.86	XS9	27.31	1293.66	XS9
26.98	1,293.74	LB	25.93	1293.91	(xs9)	30.25	1293.32	XS9	28.45	1293.63	XS9
28.87	1,293.59	BKF	29	1293.62	(xs9)	31.53	1292.33	XS9W	29.3	1291.54	XS9
29.57	1,291.82	SB	30.36	1291.96	(xs9)	31.88	1292.43	XS9W	31.56	1293.07	XS9
31.18	1,291.56	SB	30.45	1291.83	(xs9)	32.35	1290.15	XS9	32.44	1291.89	XS9
32.01	1,291.44	SB	30.93	1291.66	(xs9)	33.12	1290.18	XS9	32.96	1291.83	XS9w
32.31	1,290.18	SB	31.41	1291.33	(xs9)	35.34	1290.41	XS9	33.7	1290.49	XS9
33.71	1,290.24	SB	31.45	1291.23	(xs9)	36.32	1290.87	XS9	34.32	1290.27	XS9
35.6	1,291.08	SB	31.84	1291.23	(xs9)	37.44	1291.25	XS9	36.97	1290.46	XS9
37.26	1,291.68	SB	32.42	1291.59	(xs9)	38.22	1291.62	XS9	38.7	1291.48	XS9
38.26	1,291.99	SB	33.11	1290.36	(xs9)	38.72	1292.39	XS9W	38.78	1291.76	XS9
39.11	1,292.20	REW	33.62	1290.46	(xs9)	40.39	1292.64	XS9	38.84	1291.89	XS9w
40.1	1,292.43	PB	34.77	1290.67	(xs9)	41.64	1292.99	XS9	39.45	1292.3	XS9
45.22	1,293.09	PB	36.27	1291.38	(xs9)	43.56	1293.23	XS9	44.06	1293.34	XS9
52.49	1,293.08	PB	38.26	1291.99	(xs9w)	45.73	1293.41	XS9	52.68	1293.11	XS9
55.08	1,293.18	PB	39.7	1292.45	(xs9)	49.19	1293.25	XS9	61.26	1293.93	XS9
63.39	1,294.14	RB	40.05	1292.43	(XS9)	49.66	1293.24	XS9	69.31	1294.74	XS9
71.06	1,294.96	TOB	41.19	1292.74	(xs9)	53.21	1293.11	XS9	79.79	1295.5	XS9
			44.7	1293.13	(xs9)	57.79	1293.57	XS9	87.69	1295.73	XS9
			45.18	1293.09	(XS9)	60.7	1293.97	XS9	87.9	1296.12	XS9RP08
			52.44	1293.08	(XS9)	64.9	1294.52	XS9			
			53.3	1293.06	(xs9)	65.21	1294.48	XS9			
			55.04	1293.18	(XS9)	67.82	1294.68	XS9			
			57.77	1293.6	(xs9)	70.53	1295.08	XS9			
			62.67	1294.07	(xs9)	72.91	1295.07	XS9			
			65.65	1294.54	(xs9)	75.39	1295.33	XS9			
			71.5	1294.98	(xs9)	76.89	1295.43	XS9			
			87.44	1296.19	(XS9)	78.57	1295.47	XS9			
			87.76	1296.2	(xs9rp)	83.1	1295.56	XS9			
						86.01	1295.59	XS9			
						86.07	1295.61	XS9			
						87.31	1296.12	XS9RP			

Photo of Cross-Section #9 - Looking Downstream

	As-Built	**2006**	**2007**	**2008**
Area	33.8	31.5	28.6	30.2
Width	29.2	28.8	29.3	28.6
Mean Depth	1.2	1.1	1.0	1.1
Max Depth	3.4	3.2	3.4	3.3

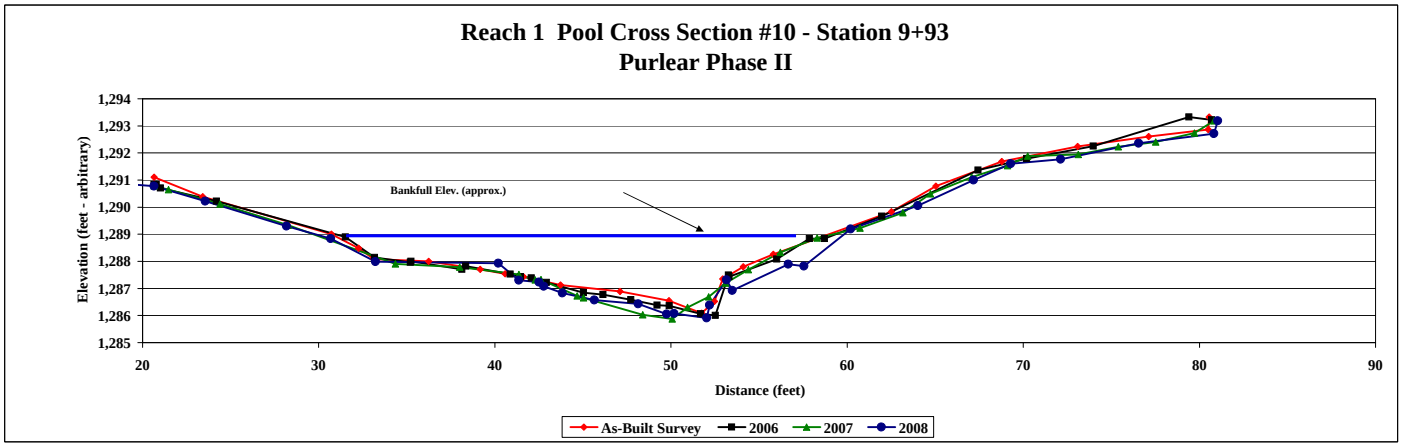


Project Name	Purlear Phase II
Cross Section	X10 Reach 1
Feature	Pool
Date	7/17/2008
Crew	George, Hancock

2005 As-Built Survey			2006 MY - 01			2007 MY - 02			2008 MY - 03		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**
20.66	1,291.11	FP	20.66	1290.84	(xs10lp)	20.66	1290.79	XS10LP07	19.47	1290.84	XS10
23.41	1,290.38		20.79	1290.84	(xs10lp)	21.47	1290.64	XS10	20.66	1290.77	XS10LP08
30.71	1,289.00	BKF	21.02	1290.71	(xs10)	24.39	1290.12	XS10	23.56	1290.22	XS10
32.26	1,288.49	LB	24.2	1290.22	(xs10)	28.27	1289.34	XS10	28.18	1289.3	XS10
33.14	1,288.08	LB	31.52	1288.9	(xs10)	34.36	1287.9	XS10	30.69	1288.84	XS10
36.25	1,288.00	PB	33.17	1288.14	(xs10)	38.01	1287.79	XS10	33.22	1287.99	XS10
39.16	1,287.71	PB	35.2	1287.97	(xs10)	41.36	1287.51	XS10	40.21	1287.93	XS10
40.58	1,287.54	LEW	35.24	1288	(XS10)	42.3	1287.32	XS10W	41.36	1287.3	XS10
41.62	1,287.43		38.14	1287.71	(XS10)	42.61	1287.33	XS10	42.51	1287.23	XS10w
43.73	1,287.13	SB	38.35	1287.82	(xs10)	44.68	1286.73	XS10	42.79	1287.08	XS10
47.1	1,286.89	SB	40.87	1287.53	(xs10)	45.04	1286.65	XS10	43.84	1286.83	XS10
49.89	1,286.55	SB	41.46	1287.43	(xs10)	48.4	1286.03	XS10	45.66	1286.57	XS10
51.74	1,286.09	SB	42.08	1287.38	(xs10)	50.07	1285.87	XS10	48.15	1286.43	XS10
52.47	1,286.52	SB	42.93	1287.22	(xs10)	50.94	1286.3	XS10	49.75	1286.05	XS10
52.93	1,287.35	REW	45.03	1286.84	(xs10)	52.14	1286.69	XS10	50.17	1286.07	XS10
54.1	1,287.80	RB	46.14	1286.77	(xs10)	53.11	1287.2	XS10W	52.03	1285.91	XS10
55.81	1,288.26	RB	47.73	1286.58	(xs10)	54.4	1287.69	XS10	52.2	1286.38	XS10
62.51	1,289.83	RB	49.21	1286.38	(xs10)	56.21	1288.33	XS10	53.15	1287.31	XS10
65.03	1,290.78	RB	49.9	1286.36	(xs10)	58.3	1288.86	XS10	53.48	1286.93	XS10
68.78	1,291.69	TOB	51.68	1286.06	(xs10)	60.73	1289.23	XS10	56.67	1287.89	XS10
73.09	1,292.24	FP	52.52	1286	(xs10)	63.16	1289.79	XS10	57.56	1287.82	XS10
77.12	1,292.61	FP	53.26	1287.49	(xs10)	64.73	1290.49	XS10	60.21	1289.19	XS10
80.49	1,292.87	FP	53.3	1287.43	(xs10w)	67.08	1291.11	XS10	64.02	1290.05	XS10
80.55	1,293.33	PIN	56	1288.08	(xs10)	69.1	1291.53	XS10	67.19	1291	XS10
			57.86	1288.84	(xs10)	70.26	1291.89	XS10	69.29	1291.6	XS10
			58.71	1288.84	(xs10)	73.12	1291.94	XS10	72.12	1291.77	XS10
			61.96	1289.66	(xs10)	75.4	1292.23	XS10	76.55	1292.36	XS10
			67.43	1291.37	(xs10)	77.51	1292.41	XS10	80.82	1292.71	XS10
			70.2	1291.79	(xs10)	79.71	1292.74	XS10	81.04	1293.19	XS10RP08
			73.97	1292.25	(xs10)	80.82	1293.18	XS10RP07			
			79.41	1293.33	(XS10)						
			80.7	1293.22	(xs10rp)						

Photo of Cross-Section #10 - Looking Downstream

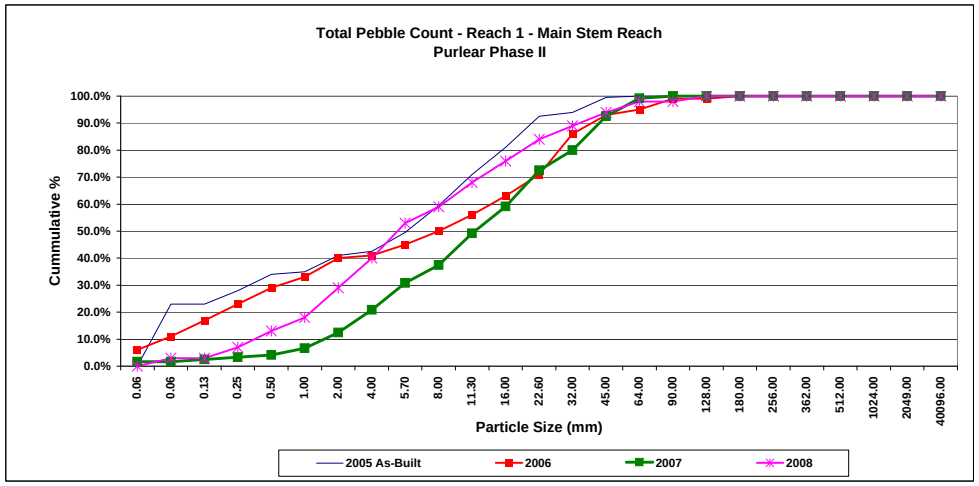
	As-Built	2006	2007	2008
Area	40.0	42.4	45.2	46.1
Width	28.3	34.5	30.0	29.4
Mean Depth	1.4	1.2	1.5	1.6
Max Depth	2.9	3.0	3.1	3.1



Project Name	Purlear Phase II
Cross Section	Reach 1 - Main Stem Reach
Feature	
Date	10/7/2008
Crew	Price

		2005 As-Built					2006				2007				2008			
Description	**Material**	**Size (mm)**	**Pool**	**Riffle**	**%**	**Cum %**	**Pool**	**Riffle**	**%**	**Cum %**	**Pool**	**Riffle**	**%**	**Cum %**	**Pool**	**Riffle**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	0	0	0.0%	0.0%	3	3	6.0%	6.0%	1	1	1.7%	1.7%	0	0	0.0%	0.0%
Sand	very fine sand	0.062	37	9	23.0%	23.0%	5	0	5.0%	11.0%	0	0	0.0%	1.7%	3	0	3.0%	3.0%
	fine sand	0.125	0	0	0.0%	23.0%	4	2	6.0%	17.0%	0	1	0.8%	2.5%	0	0	0.0%	3.0%
	medium sand	0.25	7	3	5.0%	28.0%	5	1	6.0%	23.0%	1	0	0.8%	3.3%	3	1	4.0%	7.0%
	course sand	0.50	9	3	6.0%	34.0%	5	1	6.0%	29.0%	1	0	0.8%	4.2%	4	2	6.0%	13.0%
	very course sand	1.0	0	2	1.0%	35.0%	3	1	4.0%	33.0%	3	0	2.5%	6.7%	3	2	5.0%	18.0%
G r a v e l	very fine gravel	2.0	5	7	6.0%	41.0%	5	2	7.0%	40.0%	3	4	5.8%	12.5%	6	5	11.0%	29.0%
	fine gravel	4.0	3	0	1.5%	42.5%	0	1	1.0%	41.0%	4	6	8.3%	20.8%	7	4	11.0%	40.0%
	fine gravel	5.7	4	10	7.0%	49.5%	4	0	4.0%	45.0%	4	8	10.0%	30.8%	7	6	13.0%	53.0%
	medium gravel	8.0	1	19	10.0%	59.5%	2	3	5.0%	50.0%	4	4	6.7%	37.5%	3	3	6.0%	59.0%
	medium gravel	11.3	4	19	11.5%	71.0%	3	3	6.0%	56.0%	5	9	11.7%	49.2%	4	5	9.0%	68.0%
	course gravel	16.0	12	8	10.0%	81.0%	1	6	7.0%	63.0%	2	10	10.0%	59.2%	1	7	8.0%	76.0%
	course gravel	22.6	8	15	11.5%	92.5%	2	6	8.0%	71.0%	8	8	13.3%	72.5%	3	5	8.0%	84.0%
	very course gravel	32	3	0	1.5%	94.0%	2	13	15.0%	86.0%	6	3	7.5%	80.0%	2	3	5.0%	89.0%
	very course gravel	45	6	5	5.5%	99.5%	3	4	7.0%	93.0%	5	10	12.5%	92.5%	1	4	5.0%	94.0%
Cobble	small cobble	64	1	0	0.5%	100.0%	1	1	2.0%	95.0%	2	6	6.7%	99.2%	0	4	4.0%	98.0%
	medium cobble	90	0	0	0.0%	100.0%	2	2	4.0%	99.0%	1	0	0.8%	100.0%	0	0	0.0%	98.0%
	large cobble	128	0	0	0.0%	100.0%	0	0	0.0%	99.0%	0	0	0.0%	100.0%	1	1	2.0%	100.0%
	very large cobble	180	0	0	0.0%	100.0%	0	1	1.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
Boulder	small boulder	256	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	small boulder	362	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	medium boulder	512	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	large boulder	1024	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	very large boulder	2049	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
Bedrock	bedrock	40096	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
TOTAL / %of whole count			100	100	100.0%		50	50	100%		50	70	100%		48	52	100%	

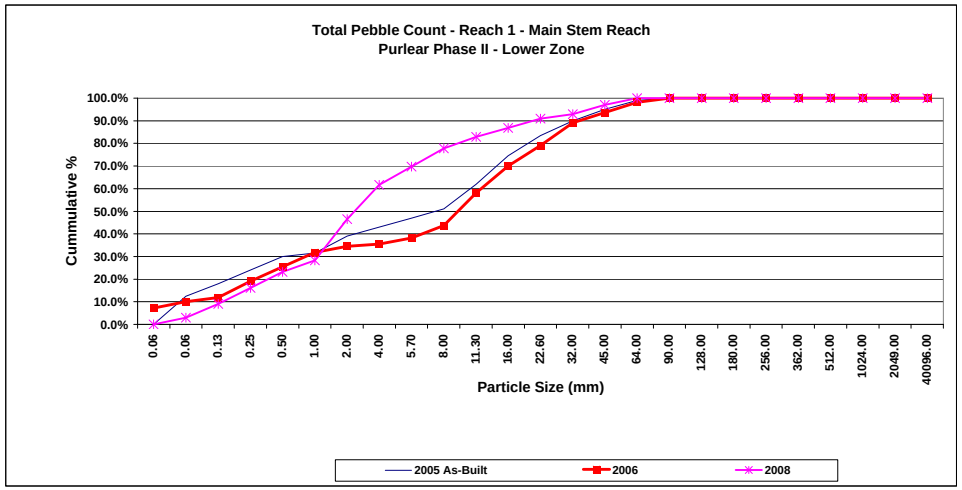
	d16	**d35**	**d50**	**d84**	**d95**
2005 As-Built	0.08	1.50	6.99	21.39	41.41
2006	0.17	1.93	9.65	37.01	77.00
2007	3.78	8.60	14.12	43.62	62.94
2008	1.20	4.01	6.39	27.30	60.12
2009					
2010					



Project Name	Purlear Phase II
Cross Section	Reach 1 - Lower Area
Feature	
Date	10/7/2008
Crew	Price

		2005 As-Built					2006				2008			
Description	**Material**	**Size (mm)**	**Pool**	**Riffle**	**%**	**Cum %**	**Pool**	**Riffle**	**%**	**Cum %**	**Pool**	**Riffle**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	0	0	0.0%	0.0%	8	0	7.3%	7.3%	0	0	0.0%	0.0%
Sand	very fine sand	0.062	15	10	12.5%	12.5%	2	1	2.7%	10.0%	3	0	3.0%	3.0%
	fine sand	0.125	6	5	5.5%	18.0%	1	1	1.8%	11.8%	4	2	6.1%	9.1%
	medium sand	0.25	10	2	6.0%	24.0%	6	2	7.3%	19.1%	5	2	7.1%	16.2%
	course sand	0.50	9	3	6.0%	30.0%	6	1	6.4%	25.5%	2	5	7.1%	23.2%
	very course sand	1.0	3	0	1.5%	31.5%	5	2	6.4%	31.8%	4	1	5.1%	28.3%
G r a v e l	very fine gravel	2.0	10	5	7.5%	39.0%	2	1	2.7%	34.5%	10	8	18.2%	46.5%
	fine gravel	4.0	8	0	4.0%	43.0%	1	0	0.9%	35.5%	9	6	15.2%	61.6%
	fine gravel	5.7	6	2	4.0%	47.0%	1	2	2.7%	38.2%	1	7	8.1%	69.7%
	medium gravel	8.0	3	5	4.0%	51.0%	6	0	5.5%	43.6%	3	5	8.1%	77.8%
	medium gravel	11.3	9	13	11.0%	62.0%	6	10	14.5%	58.2%	2	3	5.1%	82.8%
	course gravel	16.0	8	17	12.5%	74.5%	8	5	11.8%	70.0%	1	3	4.0%	86.9%
	course gravel	22.6	5	13	9.0%	83.5%	2	8	9.1%	79.1%	0	4	4.0%	90.9%
	very course gravel	32	3	10	6.5%	90.0%	2	9	10.0%	89.1%	0	2	2.0%	92.9%
	very course gravel	45	3	7	5.0%	95.0%	1	4	4.5%	93.6%	2	2	4.0%	97.0%
Cobble	small cobble	64	2	6	4.0%	99.0%	0	5	4.5%	98.2%	3	0	3.0%	100.0%
	medium cobble	90	0	2	1.0%	100.0%	0	2	1.8%	100.0%	0	0	0.0%	100.0%
	large cobble	128	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	very large cobble	180	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
Boulder	small boulder	256	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	small boulder	362	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	medium boulder	512	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	large boulder	1024	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	very large boulder	2049	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
Bedrock	bedrock	40096	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
TOTAL / %of whole count			100	100	100.0%		57	53	100%		49	50	100%	

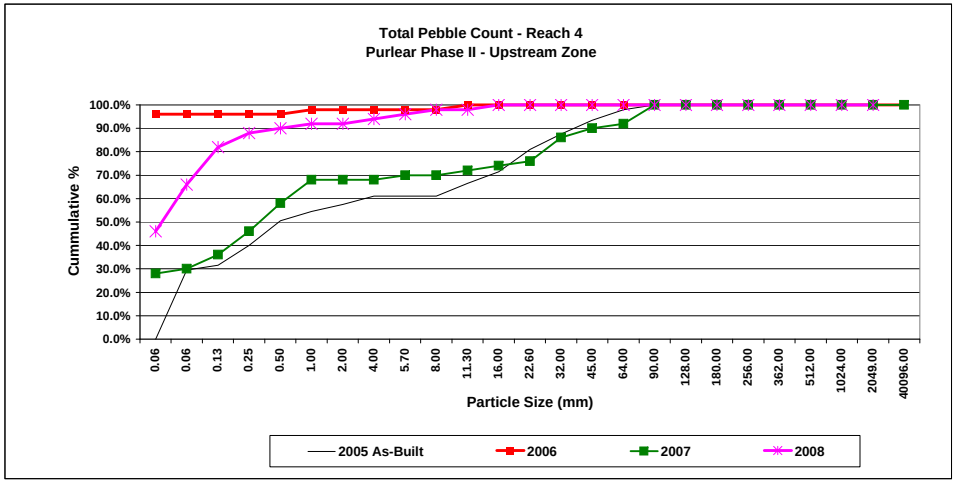
	d16	**d35**	**d50**	**d84**	**d95**
2005 As-Built	0.15	2.20	8.95	28.16	54.50
2006	0.30	3.93	11.40	32.80	61.25
2007	NA	NA	NA	NA	NA
2008	0.37	2.05	3.43	15.29	46.70
2009	0.00	0.00	0.00	0.00	0.00
2010	0.00	0.00	0.00	0.00	0.00



Project Name	Purlear Phase II
Cross Section	Reach 4 - Upstream Zone
Feature	
Date	10/7/2008
Crew	Price

		2005 As-Built					2006				2007				2008			
Description	**Material**	**Size (mm)**	**Pool**	**Riffle**	**%**	**Cum %**	**Pool**	**Riffle**	**%**	**Cum %**	**Pool**	**Riffle**	**%**	**Cum %**	**Pool**	**Riffle**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	0	0	0.0%	0.0%	25	23	96.0%	96.0%	9	5	28.0%	28.0%	13	10	46.0%	46.0%
Sand	very fine sand	0.062	32	27	29.5%	29.5%	0	0	0.0%	96.0%	0	1	2.0%	30.0%	4	6	20.0%	66.0%
	fine sand	0.125	0	4	2.0%	31.5%	0	0	0.0%	96.0%	2	1	6.0%	36.0%	4	4	16.0%	82.0%
	medium sand	0.25	8	9	8.5%	40.0%	0	0	0.0%	96.0%	4	1	10.0%	46.0%	2	1	6.0%	88.0%
	course sand	0.50	11	10	10.5%	50.5%	0	0	0.0%	96.0%	6	0	12.0%	58.0%	0	1	2.0%	90.0%
	very course sand	1.0	6	2	4.0%	54.5%	0	1	2.0%	98.0%	4	1	10.0%	68.0%	0	1	2.0%	92.0%
G r a v e l	very fine gravel	2.0	0	6	3.0%	57.5%	0	0	0.0%	98.0%	0	0	0.0%	68.0%	0	0	0.0%	92.0%
	fine gravel	4.0	2	5	3.5%	61.0%	0	0	0.0%	98.0%	0	0	0.0%	68.0%	1	0	2.0%	94.0%
	fine gravel	5.7	0	0	0.0%	61.0%	0	0	0.0%	98.0%	0	1	2.0%	70.0%	1	0	2.0%	96.0%
	medium gravel	8.0	0	0	0.0%	61.0%	0	0	0.0%	98.0%	0	0	0.0%	70.0%	0	1	2.0%	98.0%
	medium gravel	11.3	4	7	5.5%	66.5%	0	1	2.0%	100.0%	0	1	2.0%	72.0%	0	0	0.0%	98.0%
	course gravel	16.0	3	7	5.0%	71.5%	0	0	0.0%	100.0%	0	1	2.0%	74.0%	0	1	2.0%	100.0%
	course gravel	22.6	16	3	9.5%	81.0%	0	0	0.0%	100.0%	0	1	2.0%	76.0%	0	0	0.0%	100.0%
	very course gravel	32	3	10	6.5%	87.5%	0	0	0.0%	100.0%	0	5	10.0%	86.0%	0	0	0.0%	100.0%
	very course gravel	45	5	7	6.0%	93.5%	0	0	0.0%	100.0%	0	2	4.0%	90.0%	0	0	0.0%	100.0%
Cobble	small cobble	64	8	1	4.5%	98.0%	0	0	0.0%	100.0%	0	1	2.0%	92.0%	0	0	0.0%	100.0%
	medium cobble	90	2	2	2.0%	100.0%	0	0	0.0%	100.0%	0	4	8.0%	100.0%	0	0	0.0%	100.0%
	large cobble	128	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	very large cobble	180	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
Boulder	small boulder	256	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	small boulder	362	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	medium boulder	512	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	large boulder	1024	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	very large boulder	2049	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
Bedrock	bedrock	40096	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
TOTAL / %of whole count			100	100	100.0%		25	25	100.0%		25	25	100%		25	25	100%	

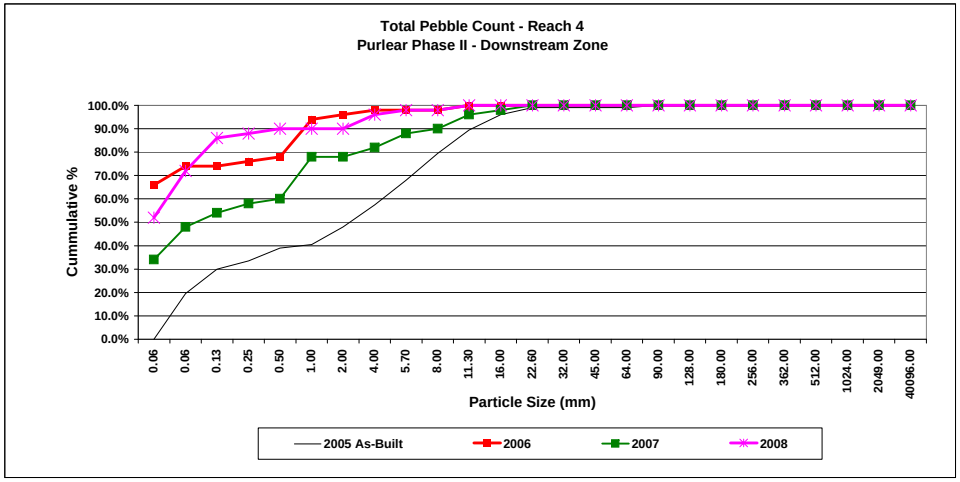
	d16	d35	d50	d84	d95
2005 As-Built	0.08	0.26	0.73	32.47	62.00
2006	0.00	0.00	0.00	0.00	0.00
2007	0.00	0.17	0.50	36.26	89.00
2008	0.06	0.06	0.07	0.25	5.85
2009					
2010					



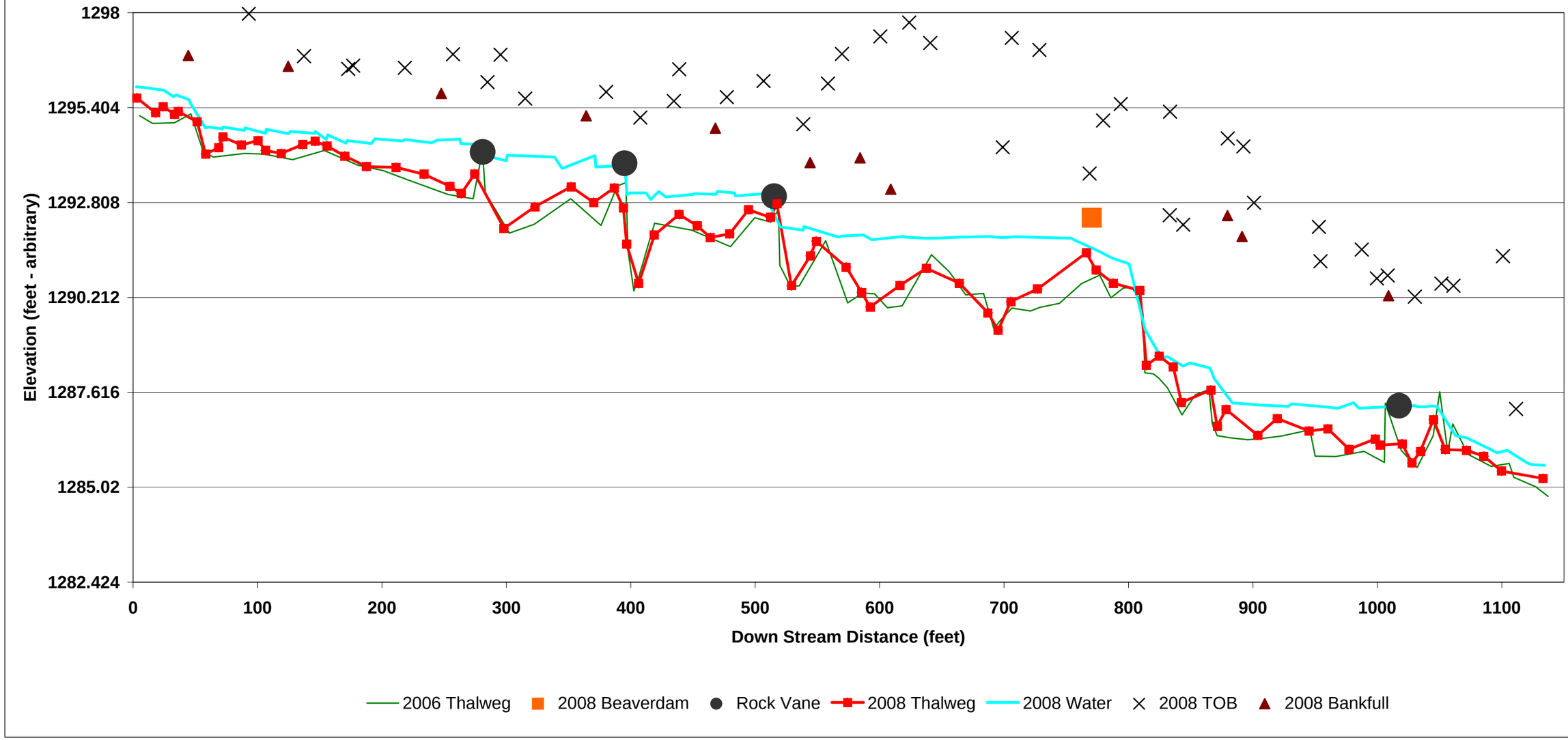
Project Name	Purlear Phase II
Cross Section	Reach 4 - Downstream Zone
Feature	
Date	10/7/2008
Crew	Price

		2005 As-Built					2006				2007				2008			
Description	**Material**	**Size (mm)**	**Pool**	**Riffle**	**%**	**Cum %**	**Pool**	**Riffle**	**%**	**Cum %**	**Pool**	**Riffle**	**%**	**Cum %**	**Pool**	**Riffle**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	0	0	0.0%	0.0%	11	22	66.0%	66.0%	11	6	34.0%	34.0%	15	11	52.0%	52.0%
Sand	very fine sand	0.062	23	16	19.5%	19.5%	3	1	8.0%	74.0%	5	2	14.0%	48.0%	4	6	20.0%	72.0%
	fine sand	0.125	17	4	10.5%	30.0%	0	0	0.0%	74.0%	3	0	6.0%	54.0%	4	3	14.0%	86.0%
	medium sand	0.25	7	0	3.5%	33.5%	1	0	2.0%	76.0%	1	1	4.0%	58.0%	0	1	2.0%	88.0%
	course sand	0.50	8	3	5.5%	39.0%	1	0	2.0%	78.0%	1	0	2.0%	60.0%	1	0	2.0%	90.0%
	very course sand	1.0	3	0	1.5%	40.5%	7	1	16.0%	94.0%	2	7	18.0%	78.0%	0	0	0.0%	90.0%
G r a v e l	very fine gravel	2.0	5	10	7.5%	48.0%	1	0	2.0%	96.0%	0	0	0.0%	78.0%	0	0	0.0%	90.0%
	fine gravel	4.0	10	9	9.5%	57.5%	1	0	2.0%	98.0%	0	2	4.0%	82.0%	1	2	6.0%	96.0%
	fine gravel	5.7	6	15	10.5%	68.0%	0	0	0.0%	98.0%	0	3	6.0%	88.0%	0	1	2.0%	98.0%
	medium gravel	8.0	11	12	11.5%	79.5%	0	0	0.0%	98.0%	0	1	2.0%	90.0%	0	0	0.0%	98.0%
	medium gravel	11.3	3	17	10.0%	89.5%	0	1	2.0%	100.0%	1	2	6.0%	96.0%	0	1	2.0%	100.0%
	course gravel	16.0	3	10	6.5%	96.0%	0	0	0.0%	100.0%	0	1	2.0%	98.0%	0	0	0.0%	100.0%
	course gravel	22.6	4	2	3.0%	99.0%	0	0	0.0%	100.0%	1	0	2.0%	100.0%	0	0	0.0%	100.0%
	very course gravel	32	0	0	0.0%	99.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	very course gravel	45	0	0	0.0%	99.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
Cobble	small cobble	64	0	0	0.0%	99.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	medium cobble	90	0	2	1.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	large cobble	128	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	very large cobble	180	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
Boulder	small boulder	256	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	small boulder	362	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	medium boulder	512	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	large boulder	1024	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
	very large boulder	2049	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
Bedrock	bedrock	40096	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%	0	0	0.0%	100.0%
TOTAL / %of whole count			100	100	100.0%		25	25	100%		25	25	100%		25	25	100%	

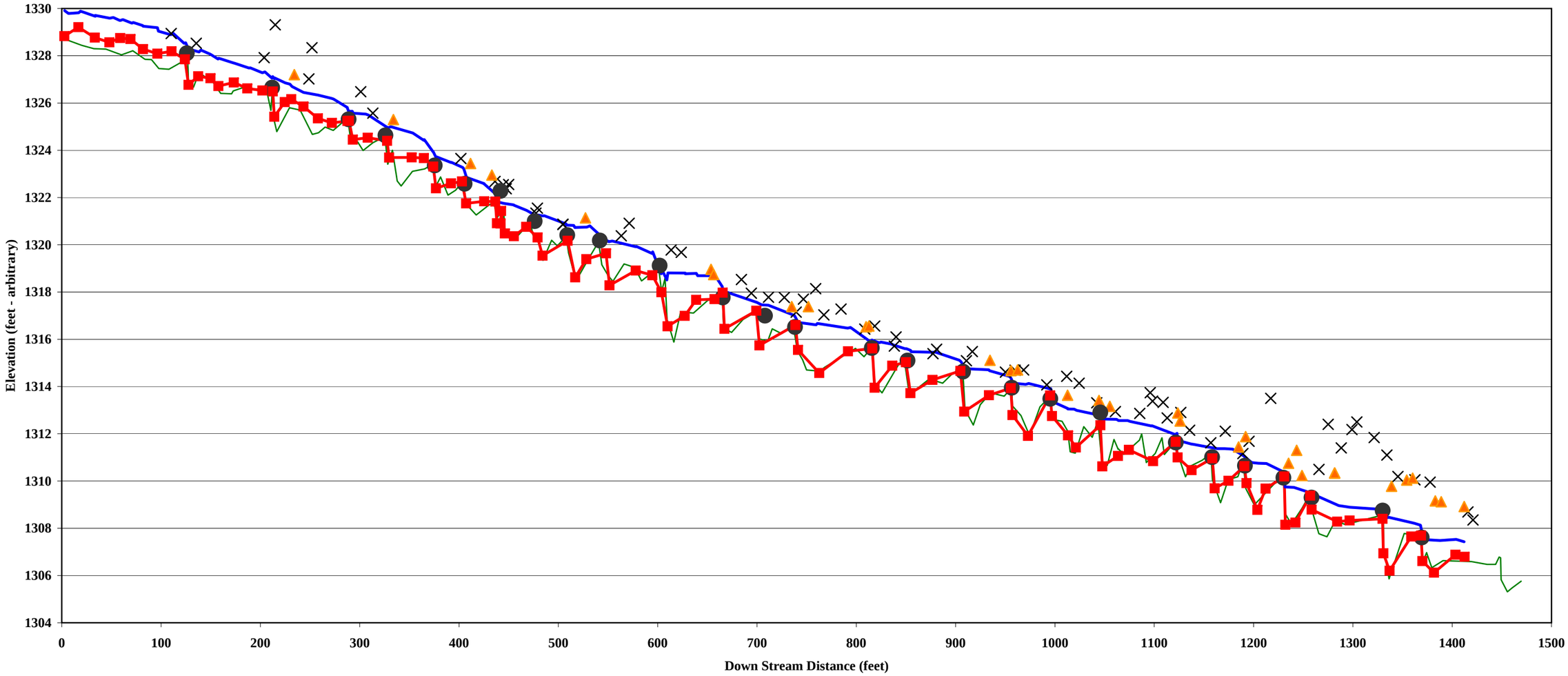
	d16	**d35**	**d50**	**d84**	**d95**
2005 As-Built	0.09	0.48	3.39	11.45	18.43
2006	0.00	0.00	0.00	1.03	2.25
2007	0.00	0.06	0.12	5.52	12.98
2008	0.06	0.06	0.06	0.17	4.54
2009					
2010					



Purlear Phase II
Longitudinal Profile
2008 - Reach 1
Main Channel
Survey: 7/17/08



Purlear Phase II
Longitudinal Profile
2008 -Reach 4
Wetland Area
Survey: 10/6/08



Project Name	Purlear Creek - Phase II
Task	Feature Slope and Length Calculations
Date	Nov. 2008
Crew	C. George, Z. Price

Reach 4 - 2008

Riffle Station	Change	Water Elev	change	slope
17		1329.89		
48	31.17	1329.59	0.3	0.96%
62		1329.53		
96	34.79	1329.19	0.34	0.98%
140		1328.24		
158	17.94	1327.9	0.34	1.90%
190		1327.49		
212	21.86	1327.05	0.44	2.01%
331		1325		
354	22.34	1324.73	0.27	1.21%
288		1325.81		
306	18.53	1325.53	0.28	1.51%
309		1325.49		
326	17.35	1325.01	0.48	2.77%
365		1324.42		
379	14.49	1323.72	0.7	4.83%
404		1323.27		
425	21.41	1322.59	0.68	3.18%
468		1321.46		
478	10.62	1321.21	0.25	2.35%
508		1320.88		
517	8.83	1320.73	0.15	1.70%
578		1319.92		
594	16.65	1319.63	0.29	1.74%
656		1318.69		
671	14.89	1317.98	0.71	4.77%
738		1317.01		
760	21.96	1316.61	0.4	1.82%
791		1316.47		
816	24.25	1315.85	0.62	2.56%
837		1315.77		
855	18.58	1315.47	0.3	1.61%
879		1315.46		
910	30.95	1314.72	0.74	2.39%
938		1314.67		
956	18.41	1314.3	0.37	2.01%
998		1313.37		
1019	21.53	1313.04	0.33	1.53%
1036		1312.99		
1045	9.4	1312.78	0.21	2.23%
1097		1312.33		
1106	8.75	1312.15	0.18	2.06%
1115		1311.96		
1126	11	1311.71	0.25	2.27%
1146		1311.56		
1157	11	1311.41	0.15	1.36%
1179		1311.35		
1190	11.15	1311.06	0.29	2.60%
1224		1310.4		
1232	8	1310.1	0.3	3.75%
1244		1309.73		
1257	13	1309.54	0.19	1.46%
1354		1308.21		
1375	21	1307.52	0.69	3.29%
1404		1307.53		
1412	8	1307.43	0.1	1.25%

Reach 4	min	max	median
Riffle Length	8.0	34.8	17.6
Riffle Slope	0.96%	4.83%	2.01%
Pool Length	10.0	57.0	24.0
Pool Spacing	26	67	40

Reach 1 - 2008

Riffle Station	Change	Water Elev	change	slope
24		1295.88		
46	22.19	1295.51	0.37	1.67%
72		1294.87		
106	34.46	1294.7	0.17	0.49%
146		1294.75		
172	25.69	1294.5	0.25	0.97%
539		1292.15		
570	30.59	1291.89	0.26	0.85%
776		1291.48		
800	24.61	1291.13	0.35	1.42%
849		1288.42		
869	19.84	1287.99	0.43	2.17%
931		1287.3		
957	25.88	1287.22	0.08	0.31%
1072		1286.37		
1120	48.38	1285.69	0.68	1.41%

Pool Station	length	p-p spacing			
Reach 1 - 2008					
3			668		
24	21		776	108	114.5
57			825		
71	14	50.5	868	43	124.5
172			878		
276	104	160	927	49	56
282			957		
395	113	114.5	1038	81	95
399					
497	98	109.5			
520					
557	37	90.5			
575					
640	65	69			
Reach 4 - 2008					
96			740		
122	26		797	57	53.5
129			816		
141	12	26	842	26	60.5
164			854		
194	30	44	895	41	45.5
212			910		
231	19	42.5	934	24	47.5
247			958		
285	38	44.5	992	34	53
295			1018		
311	16	37	1039	21	53.5
329			1047		
364	35	43.5	1082	35	36
378			1094		
397	19	41	1109	15	37
414			1123		
434	20	36.5	1147	24	33.5
446			1161		
465	19	31.5	1178	17	34.5
479			1191		
498	19	33	1224	33	38
515			1232		
539	24	38.5	1247	15	32
547			1264		
568	21	30.5	1298	34	41.5
588			1333		
598	10	35.5	1352	19	61.5
610			1375		
651	41	37.5	1401	26	45.5
672			1449		
698	26	54.5	1460	11	66.5
701					
729	28	30			

Reach 1	min	max	median
Riffle Length	19.8	48.4	25.8
Riffle Slope	0.31%	2.17%	1.19%
Pool Length	14.0	113.0	65.0
Pool Spacing	51	160	102

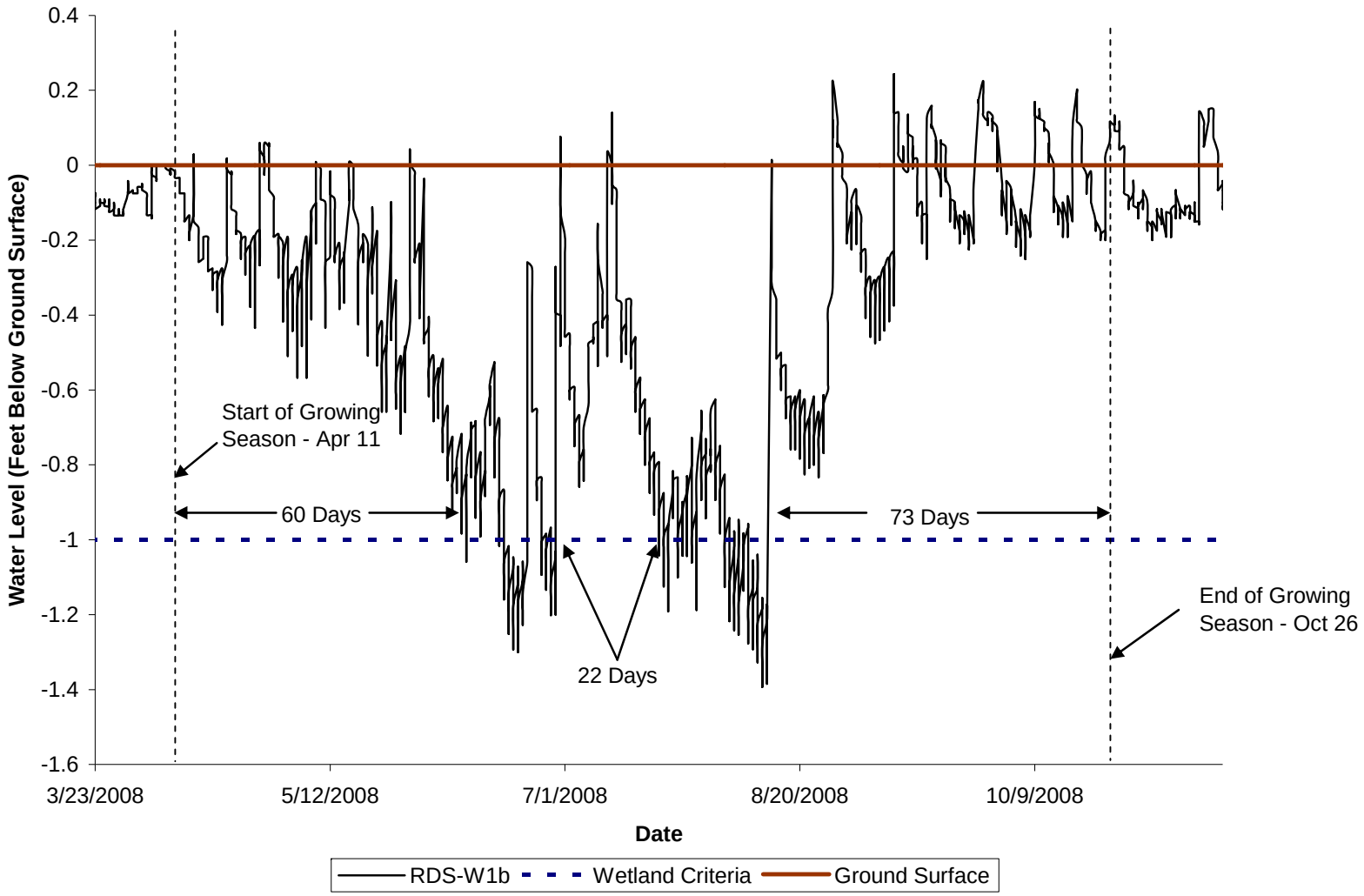
Project Name	Purlear Phase II
Task	Channel Pattern Measurements
Date	
Crew	C. George, Z Price

Reach 4 2008			
Radius of Curvature	**Meander Wavelength**	**Channel Beltwidth**	
41	111	24	
38	97	20	
68	76	26	
26	62	17	
45	117	18	
16	171	21	
29	133	41	
13	132	41	
112	88	36	
17	74	42	
25	64	38	
33	69	31	
18	71	28	
21	97	30	
15	66	22	
13	77	29	
25	98	34	
22		20	
30			
21			
37			
21			
49			
49			
37			
13	62	17	***min***
112	171	42	***max***
26	88	29	***median***

Reach 1 2008			
Radius of Curvature	**Meander Wavelength**	**Channel Beltwidth**	
38	201	36	
50	255	44	
88			
38	201	36	***min***
88	255	44	***max***
50	228	40	***median***

APPENDIX C

1. Wetland Groundwater Level Graphs


Monitoring Well RDS-W1b
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
Water Level (Feet Below Ground Surface)
Start of Growing Season - Apr 11
60 Days
73 Days
22 Days
End of Growing Season - Oct 26
3/23/2008
5/12/2008
7/1/2008
8/20/2008
10/9/2008
Date
RDS-W1b
Wetland Criteria
Ground Surface

Monitoring Well RDS-W2b