# Pott Creek II Stream Restoration Project
# Year 5 Monitoring Report - 2009


**November 2009**
**Prepared By:**

**Mid-Atlantic Mitigation, LLC**

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## 1.0 EXECUTIVE SUMMARY/PROJECT ABSTRACT

On behalf of the North Carolina Department of Transportation (NCDOT), Mid-Atlantic Mitigation, LLC (MAM) with technical assistance from Mulkey Engineers and Consultants (Mulkey) restored 10,054 linear feet of stream that was severely degraded due to past channelization, removal and ongoing clearing and maintenance of the riparian buffer, and continuous cattle grazing. Construction of the project began in October 2004 and was completed in April 2005. The Pott Creek II Stream Restoration Project will provide NCDOT with 10,054 Stream Mitigation Units (SMUs).

The project goals are to provide a stable network of stream channels that neither aggrade nor degrade while maintaining their dimension, pattern, and profile with the capacity to transport the watershed's water and sediment load. The objective of the restoration plan is to restore the primary stream function and values associated with nutrient removal and transformation, sediment retention, flood-flow attenuation, wildlife (both aquatic and terrestrial) habitat, and also to provide restoration of riparian zones that have been historically used for pasture. Ultimately, the Pott Creek II site will improve the overall downstream water quality by reducing the amount of sediment being produced by bank erosion and increased scour and will also improve fish and aquatic habitat by providing both natural material stabilization structures (rootwads, rock vanes, and riparian buffer) and by reducing the silt and clay fines in the streambed. Additional water quality benefits will be generated by removing cattle from the riparian corridor. Degraded agricultural/pasture wetlands and existing bottomland hardwood wetlands on site will be preserved.

Pott Creek enters from the north and runs the entire length of the project crossing under Paint Shop Road and continuing south. Unnamed Tributary 1 (UT 1) enters from the west and had been heavily degraded by cattle traffic and grazing. UT2, UT3, and UT5 enter from the east and were severely entrenched. UT 4 enters from the west, south of the confluence of Pott Creek and Rhodes Mill Creek, and was also severely degraded by cattle traffic and grazing and also showed evidence of past channelization. Approximately 7209 linear feet of the channel on Pott Creek was restored and relocated consistent with C-type stream channels; approximately 1827 linear feet of channel was restored on the perennial tributaries; and approximately 1018 linear feet of channel on Rhodes Mill Creek were restored by construction of a channel with proper dimension, pattern, and profile.

The streams and vegetation will be monitored annually for five years (October 2005 thru October 2009) by Mid-Atlantic Mitigation LLC (a division of EarthMark Mitigation Services) and the monitoring report will be submitted to NCEEP/NCDOT by the end of the calendar year. Ten 50' by 50' and one 100' by 25' permanent vegetative plots were established on-site. Survivability within these plots will help determine the success of the project. Six permanent cross-sections throughout Pott Creek, two throughout Rhodes Mill Creek, and one on unnamed tributaries 1 thru 4 were established. Cross-sections will document changes in dimension, pattern and profile of the restored stream(s).

Approximately 3000 linear feet of longitudinal profiles have been established throughout the project and will monitor the riffle-run-pool-glide sequences and overall stability of the restored stream(s). Within the profiles, pebble counts will be performed to monitor any unacceptable increase in sand and finer substrate. All cross-sections and longitudinal profile sections are noted on the As-built plans. In April 2008, in response to EEP concerns over ineffective monitoring techniques in Years 1 through 3, MAM resurveyed the bed profile of the entire project. This April 2008 survey is considered the new baseline and part of the Year 3 Monitoring Report. A supplemental report containing this survey work, updated As-Built drawings, and a report from the designing engineer, Jenny Fleming, was submitted in June of 2008. Therefore, Years 3, 4 and 5 all contain complete profile survey information.

The fifth year vegetative monitoring was performed on September 29th and October 6th, 2009. Survey of the cross sections and profiles was completed October 27th and 28th, 2009. The vegetation in all of the plots continues to meet and/or exceed the requirements. Limited noxious species are found in some areas. Privet along the main channel of Pott Creek upstream of the Bridge on stream bank left between stations 37+00 and 54+00 was treated with herbicide in spring of 2009. Detailed information on invasive species and herbicide treatments is included in Section 3.1.2.

# 2.0 PROJECT BACKGROUND

## 2.1 LOCATION AND SETTING

The Pott Creek II Stream Restoration Project is located in Catawba County approximately five miles west of Maiden and eight miles southwest of Newton, North Carolina. It is located approximately one mile west of the intersection of the Hickory-Lincolnton Hwy and Paint Shop Road on either side of Paint Shop Road.

The Pott Creek II Stream Restoration Project lies in the South Fork Catawba River Basin and in the US Geologic Survey (USGS) Hydrologic Unit Code (HUC) 03050102.

The restoration project is being managed and monitored by Mid-Atlantic Mitigation, LLC.

## 2.2 STRUCTURE AND OBJECTIVES

The restoration of Pott Creek utilized a combination of natural channel design methodologies with limited soil bio-engineering applications and methods consistent with a Rosgen Priority Level II-type restoration along Pott Creek and Rhodes Mill Creek. Level II restoration involved constructing a new channel at the existing elevation. Pott Creek was constructed to the west of the existing channel and Rhodes Mill Creek was constructed to the north of the existing channel. A Priority Level I restoration (reconnecting the channel to its historical floodplain) was not feasible due to limited relief across the site and controlling outfall and inflow elevations. Advantages of the Priority II restoration include a decrease in bank height ratio and improved stream pattern

geometry resulting in reduced streambank erosion, establishment of riparian vegetation to help stabilize the banks, establishment of a floodplain to help remove stress from the channel during flood events, improvement of aquatic habitat, abatement of wide-scale flooding of original land surface, and reduction of sediment and easier downstream grade transition. The Level II restoration will stabilize pattern and the channel profile, reduce overall shear, restore natural dimension, and reduce sedimentation. A Priority Level I restoration was utilized on UT 1, the largest of the five tributaries. Level I restoration is advantageous because it promotes re-connection to the floodplain and a stable channel. It also reduces the bank height ratio and streambank erosion, reducing overall land loss, decreasing sediment, and raising the water table. The slope of the new channel was reduced until its bankfull elevation was consistent with the adjacent floodplain on either side.

## 2.3 PROJECT HISTORY AND BACKGROUND

**Table I. Project Deliverables**

| **Mitigation Type** | **Linear Feet** | **SMU Formula** |
|---|---|---|
| Stream Restoration (Pott Creek main channel) | 7209.0 | 7209.0 |
| Stream Enhancement –Category I (Pott Creek main channel) | 0 | 0 |
| Stream Restoration (Rhodes Mill Creek) | 1018.0 | 1018.0 |
| Stream Restoration (Pott Creek unnamed tributaries) | 1827.0 | 1827.0 |
| **TOTALS** | | **10,054.0** |

**Table II. Project Activity and Reporting History**

| **Activity or Report** | **Calendar Year of Completion or Planned Completion** | **Actual Completion Date** |
|---|---|---|
| Restoration Plan | March 2004 | September 2004 |
| Construction | *August 2004 | April 2005 |
| Temporary and Permanent seeding | August 2004 | April 2005 |
| Bareroot Plantings | October 2004 | February 2005 |
| Mitigation Plan | November 2004 | June 2005 |
| Year 1 Monitoring | December 2004 | October 2005 |
| Year 2 Monitoring | October 2006 | October 2006 |
| Year 3 Monitoring | October 2007 | October 2007 |
| Year 4 Monitoring | October 2008 | October 2008 |
| Year 5 Monitoring | October 2009 | October 2009 |

* By contract amendment the planned completion date was extended until April 2005

**Table III. Project Contacts**

| | |
|---|---|
| **Project Manager**<br>Mid-Atlantic Mitigation, LLC | 1960 Derita Road<br>Concord, NC 28027<br>Rich Mogensen (704) 782-4133 |
| **Designer**<br>Mulkey Engineers and Consultants | 6750 Tryon Road<br>Raleigh, NC 27511 |
| **Construction Contractor**<br>Shamrock Environmental Corporation | P.O Box 14987<br>Browns Summit, NC 27214 |
| **Planting & Seeding Contractor**<br>Mid-Atlantic Mitigation, LLC<br><br>Seed mixes provided by IKEX<br>Nursery Stock provided by NC Forest Service; Mellow Marsh Farm; and Pinelands Nursery & Supply | 1960 Derita Road<br>Concord, NC 28027<br>Kristy Rodrigue (704) 277-3383 |
| **Monitoring Performers**<br>Mid-Atlantic Mitigation, LLC | 1960 Derita Road<br>Concord, North Carolina 28027<br>Christine Cook (704) 782-4140 |

**Table IV. Project Background**

| **Project Background Table** | |
|---|---|
| Project County | Catawba |
| Drainage Area | 19.7 square miles |
| Drainage Cover Estimate (%) | 3% |
| Physiographic Region | Piedmont |
| Ecoregion | 45a Southern Inner Piedmont |
| Wetland Type | Piedmont Bottomland Forest / Piedmont Swamp Forest |
| Cowardin Classification | PSS1A, PFO1A |
| Dominant soil types | Chewacla (Wehadkee) Congaree |
| Reference site ID | UT to Fourth Creek |
| USGS HUC for Project and Reference | 03050102/ 03050101 |
| NCDWQ Sub-basin for Project and Reference | 03-08-35/ 03-08-32 |
| % of project easement fenced | 30 – no cattle is present on adjacent properties that are not fenced |

## 3.0 PROJECT CONDITION AND MONITORING RESULTS

## 3.1 VEGETATION ASSESSMENT

### 3.1.1 Soil Data

**Table V. Preliminary Soil Data**

| Series | Max Depth (in) | % Clay on Surface | K | T | OM % |
|---|---|---|---|---|---|
| Chewacla | 60 | 10-27 | .28 | 5 | 1-4 |
| Wehadkee | 61 | 15-40 | .32 | 5 | 2-5 |
| Congaree | 62 | 10-25 | .37 | 5 | < 4 |

### 3.1.2 Vegetative Problem Areas

*Rubus sp.* is common throughout the project, primarily in Zone 2 (flood plain). Rubus patches have not out-competed or harmed the planted woody vegetation. In general, it is merely a nuisance while walking the site and during monitoring activities, but appears to pose no threat to planted vegetation, or other desirable populations.

Chinese privet is found bordering the project in the bottomland hardwood forest on stream bank left upstream of the bridge (Paint Shop Rd). The population is infringing on the conservation easement between stations 37+00 and 54+00. Privet growing in the project area received herbicide treatments the week of June 8th, 2009 applied by Habitat Assessment and Restoration Program, Inc. (HARP).

The entrance area stream bank left upstream of the bridge did not contain the minimum 260 stems per acre during a site inspection in February of 2009. On April 1st, 2009, 118 One gallon plants were installed in this area, a complete plant list is located in the table below:

Table VI: 2009 Replant

| Species | Number |
|---|---|
| Acer rubrum | 40 |
| Fraxinus pennsylvanica | 40 |
| Quercus phellos | 20 |
| Quercus bicolor | 18 |
| **Total** | **118** |

**Table VII. Approximate number of Planted species**

| Planted Species | Bareroot Seedling | Tublings | Livestakes |
|---|---|---|---|
| *Quercus nigra* | 2,000 | | |
| *Quercus phellos* | 2,000 | 1,000 | |
| *Quercus palustris* | 2,000 | 1,000 | |
| *Quercus bicolor* | | 1,000 | |
| *Quercus lyrata* | 2,500 | | |
| *Fraxinus pennsylvanica* | 2,000 | | |
| *Platanus occidentalis* | 1,000 | | 1,000 |
| *Celtis laevigata* | 1,050 | | |
| *Diospyros virginiana* | 200 | | |
| *Cornus amomum* | 1,000 | 1,000 | 3,000 |
| *Lindera benzoin* | 1,500 | | |
| *Betula nigra* | 1,000 | | 400 |
| *Cephalanthus occidentalis* | 525 | | |
| *Salix nigra* | | | 3,000 |
| *Salix sericea* | | | 600 |
| *Sambucus canadensis* | | | 1,025 |
| | **16,775** | **4,000** | **9,025** |

**Total Planted Species= 20,775 Total Livestakes planted= 9,025**

### 3.1.3 Stem Counts

Two Planting Zones were established at the Pott Creek II Restoration Project. Zone 1 which consisted of mainly livestakes and Zone 2 which consisted of native hardwood bareroot seedlings and tublings. Eleven permanent vegetative plots have been established at random locations, which sample both Zones 1 and 2. All vegetative plots are 2,500 square feet in size, vegetative plots 1-4, and 6-11 are all 50 foot by 50 foot squares, while vegetative plot 5 is a 100 foot by 25 foot rectangle due to limited space along UT1. Living woody stems were counted in each plot and analyzed for species diversity and survival. Overall, every plot is fully vegetated with diverse herbaceous and woody species. This is documented by the vegetation photolog (Appendix A). Volunteers were noted, but were not figured into the final stem count. However, at this stage of the project volunteers of the same species included on the original planting list are difficult to tell apart from planted individuals. Year one counts were used to isolate volunteers, but in some cases volunteers of the same species have replaced planted individuals and were therefore counted. Additionally, 90% of the counted individuals in Year 5 are greater than 6 feet in height.

On September 29th and October 6th, 2009 the fifth year-vegetative monitoring was performed on the established vegetative plots.

**Table VIII. Stems Counts for Live, Stressed, and Volunteers species**

| | Plot 1 | Plot 2 | Plot 3 | Plot 4 | Plot 5 | Plot 6 | Plot 7 | Plot 8 | Plot 9 | Plot 10 | Plot 11 | **Total** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Live Planted | 19 | 11 | 15 | 17 | 22 | 17 | 24 | 21 | 33 | 31 | 15 | 225 |
| Volunteers | 16 | 25 | 21 | 6 | 11 | 16 | 1 | 2 | 13 | 6 | 7 | 124 |
| Stems per acre (w/o Vols) | 331 | 192 | 261 | 296 | 383 | 296 | 418 | 366 | 575 | 540 | 261 | 356 |
| Number of Species | 11 | 10 | 9 | 8 | 12 | 8 | 9 | 4 | 7 | 9 | 7 | 17 |
| Number of Planted Species | 6 | 6 | 6 | 5 | 7 | 5 | 8 | 3 | 9 | 7 | 9 | 12 |
| | | | | | | | | | | | | |

**Table IX. Combined Totals for Stem Count**

| **Combined Totals** | |
|---|---|
| **Percent Survival** | **45** |
| **Stems Per Acre w/o volunteers** | **356** |
| **Number of Species Counted** | **17** |
| **Total Planted Species Counted** | **12** |

### 3.1.4 Vegetation Assessment Summary

Vegetation success will be defined as tree survival meeting 260 stems per acre inside the permanent vegetative plots and herbaceous cover evaluated with photos showing 75% coverage.

The community is very diverse and rich with healthy volunteers. The survival of planted stems continues to be very stable, while the number of healthy, desirable volunteers continues to rise. Plot 2 is the only plot with a stem count below 260 stems per acre, at 192 stems per acre, but has held this number of surviving planted individuals for three years consistently. The plot also contains many River Birch, Sycamore, and Black Willow volunteers. All three of these species were on the original planting list. Plot 2 contains 627 stems per acre when volunteers are included. The site as a whole shows an average of 356 planted stems per acre, and demonstrates approximately 45 percent survival of planted stems.

In Appendix A, the vegetative survey data tables show the actual counts of each species found per plot. Volunteer stems are also shown in the survey data. The herbaceous cover plant community has not changed significantly over the last three years and exceeds 75 percent in all Vegetation Plots.

## 3.2 CHANNEL STABILITY ASSESSMENT

### 3.2.1 Cross Sections

There are six permanent cross-sections throughout Pott Creek (four on the upstream side of the bridge at Paint Shop Road and two on the downstream side). Cross-sections on Pott Creek are 50% riffles and 50% pools. There are two permanent cross-sections on Rhodes Mill Creek, one riffle, one pool; and one cross section on each of the unnamed tributaries (1 thru 4). Each permanent cross-section is shown on the as-built plan and will be surveyed each year to monitor changes in the dimension of the restored stream(s), photographic documentation of each cross-section will also be made.

Cross-sections were surveyed on October 30th and 31st, 2009 by Kimley Horn & Associates, assisted by Tommy Cousins and David Horne of the MAM staff. Appendix B contains the cross-section data tables, plots and photos.

**Pott Creek CS1 (Riffle)**
Sand deposition causes slight fluctuations in bed and bank elevations, but does not appear significant. Photos show this area as being well vegetated and stable. The thalweg has stayed left of center in all years except 2006 when the stream bed appeared flat and the max depth of 5.4 was shallower than other survey years.

**Pott Creek CS2 (Riffle)**
There appear to be no significant differences between the year 1 (2005) and year 5 (2009) surveys, however it is evident that deposition has allowed vegetation to take root on the island/ point bar right of center, and that this island continues to evolve. The thalweg has remained right of center for five years. Photos show this area as being well vegetated and stable. Point bars are a natural feature of sandy piedmont streams. For conditions of the riffle see pebble count information in section 3.2.3 and Appendix D.

**Pott Creek CS3 (Pool)**
The depth of the pool fluctuates year to year, but has not decreased significantly since 2006. While still not as deep as the original pool, it is within the range of designed pool depths for the reach. The thalweg also tends to fluctuate and is currently left center. Photos show this area as being well vegetated and stable. This is a dynamic system with much sand being passed through during larger storm events.

**Pott Creek CS4 (Pool)**
Sand fluctuates in and out of this pool area, but the pool depth has remained relatively stable since 2006 and is within the range of designed pool depths for the reach. The thalweg tends to fluctuate from year to year and is currently close to center. Photos show this area as being well vegetated and stable.

**Pott Creek CS5 (Riffle)**
This cross section shows only minor changes since 2005, except for the irregularity of the left bank in 2007. Several low points surveyed in 2007 would appear to be the result of an error in survey equipment or technique, given that the graphs from the two previous and two succeeding years were all virtually identical. The thalweg tends to fluctuate throughout the channel and currently right of center. Photos show this area as being well vegetated and stable.

**Pott Creek CS6 (Pool)**
Pool depth has remained relatively stable since 2005 and is within the range of designed pool depths for the reach. The 2007 survey appeared to show some scour on the left side, but this appears to have stabilized or may be a function of a survey error as noted on CS5. Photos show this area as being well vegetated and stable.

**UT 1 CSa**
UT 1 is the largest of the UTs and shows a trend of shallowing and deepening from year to year. It appeared that some silt deposition and/or deposition of organic material from vegetation growth caused the cross section to become shallower in years 2006 and 2008. Years 2005, 2007 and 2009 all indicate a deeper cross section. The thalweg of UT1 has been left of center every year except 2006, and photos show this area as being well vegetated and stable.

**UT 2 CSb**
There appears to be no significant changes to this cross-section from previous years' surveys. The thalweg of UT2 is relatively centered, and photos show this area as being well vegetated and stable.

**UT 3 CSc**
The stream bed appears to be trending towards a wider, deeper configuration. The thalweg of UT3 trends towards being left of center, and photos show this area as being well vegetated and stable.

**UT 4 CSd**
The left bank appears to fluctuate somewhat due to deposited silt and/or organic material and vegetation. The thalweg of UT4 appears centered, and photos show this area as being well vegetated and stable.

**Rhodes Mill CS1 (Pool)**
The thalweg of this cross section has been left of center all five years. It appears that some sand deposition fluctuates from year to year on the right bank. Past surveys indicate that future storm events may remove deposited sand from this cross section. This is a dynamic system with much sand being passed through during storm events. Photos show this area as being well vegetated and stable.

**Rhodes Mill CS2 (Riffle)**
The thalweg of this cross section tends to fluctuate and is currently right of center. It appears that some sand deposition fluctuates from year to year on both banks, but has remained relatively stable since 2006. Past surveys indicate that future storm events may remove deposited sand from this cross section. This is a dynamic system with much sand being passed through during storm events. Photos show this area as being well vegetated and stable.

### 3.2.2 Bank Full Events

The requirement of two events to be documented in separate monitoring years has been satisfied since Year 3. Frequent over bank events are still evidenced by debris and rack lines visible in the Photo Log.

### 3.2.3 Longitudinal Profiles

Profiles were surveyed on October 30th and 31st, 2009 on approximately 3000 linear feet over the entire project (Pott Creek 1023 lf; Rhodes Mill 500 lf; UT1 630 lf; UT2 340 lf; UT3 380 lf; and UT4 360 lf). Pebble counts were done on all constructed riffles within the profile reach(s). Raw data, data tables, and graphs of the Pebble Count data are available in Appendix C. The following observations were made in each profile section:

**Pott Creek** – 1023 foot profile: No significant erosion problems were noted inside the profile reach. There are two constructed riffles inside profile limits and a pebble count was done on each. There are also several naturally forming riffles, but no significant bed material has accumulated and no pebble counts were done on these riffles. This reach carries a significant bed load of sand and the naturally forming sand riffles appear to be relatively stable. Riffle 1 is located near the beginning of the project where the effects of the sandy bed load are most evident. Riffle 1 showed an increase in sand, particularly very course sand in 2008, but shows no additional increase for 2009. The 2009 sample of Riffle 2 is a well mixed sample resembling all previous years samples including the increase in sand noted in 2008, there has been no additional increase in sand or finer substrates since 2008. Stable sand bars are present in several of the riffles above UT 1, not just within the Profile limits. The significant bed load of sand carried in Pott Creek has the greatest effect on the pool areas. Pools may be shorter in overall length, but deep areas remain stable with excess sand accumulating in the run and glide sections of the stream channel. This is the upper most segment of the project where most sand and silt washes in from upstream of the project during high flow events settles out. With that in mind, this section of the project is in excellent condition.

**Rhodes Mill Creek** – 500 foot Profile: Pebble counts were performed on Riffles 1 and 2 within the profile limits. Riffle 1 shows some fining or embedding of the smaller substrates from 2008, but is similar to counts from Years 1 and 2 and shows no overall increase. The smaller particles from Riffle 1 over the years have settled into Riffle 2, which shows no significant shift towards sand and finer particles, but contains more sand than Riffle 1. Pools within the reach appear to have maintained similar depths to the 2008 survey. The middle of the reach shows the most fluctuation in elevations, but still maintains a similar pattern from year to year.

**UTs** – A single, well formed deep pool seems to have developed along each UT somewhere near the middle of each reach. The beds of the UTs are highly affected by vegetation and organic material, smaller pools which fluctuate in length and depth are also present along with at least one well formed riffle-like area along each reach.

**UT1** – 630 foot Profile: This stream is the largest and most active of all the UT's, but contains no defined substrate other then sand and silt. 2009 observations show the bed to be mostly sand and to have no evidence of any permanent vegetative growth in the stream bed. The profile survey shows little change from 2008 except for a pool around the 475 foot mark appears to have migrated downstream slightly. The pool below the structure at the confluence of Pott Creek appears to have lengthened and deepened, but was observed to be stable during the survey work.

**UT2** – 340 foot Profile: Annual vegetation which grows in the streambed and on the banks and then dies leaving a new layer of organic material has limited bed form diversity in UT2. With some sandy substrate, but a mostly mud/muck bottom, UTs 2 through 4 all exhibit these characteristics. UT2 has at least one pool approximately 3 ft deep and 45 ft long. The profile survey shows no significant changes since the April survey.

**UT3** – 380 foot Profile: Annual vegetation which grows in the streambed and on the banks and then dies leaving a new layer of organic material has limited bed form diversity in UT3. With some sandy substrate, but a mostly mud/muck bottom, UTs 2 through 4 all exhibit these characteristics. UT3 has at least one pool approximately 3 ft deep and 35 ft long. The profile survey shows no significant changes since the April survey.

**UT 4**- 360 foot Profile: Annual vegetation which grows in the streambed and on the banks and then dies leaving a new layer of organic material has limited bed form diversity in UT4. With an all mud/muck bottom, UT4 exhibits similar characteristics to UTs 2 and 3. UT4 has at least one pool approximately 2.5 ft deep and 50 ft long. The profile survey shows no significant changes since the April survey.

### 3.2.4 Channel Stability Problem Areas

All structures marked on the as-built plan were photographed and assessed for structural failures and erosion problems. The entire length of Pott Creek, Rhodes Mill, and all of the UTs were walked and any significant problem areas were photographed and documented. The Photo Log is available in Appendix E. No major problem areas have presented over the last two years and the site is stable and well vegetated. A minor head cut on UT1 was noted during a February 2009 site visit. This area is stable and vegetated and the head cut is not moving.

### 3.2.5 Other Problems

Beaver will continue to be managed until the site is closed. Beaver activity has migrated down the main channel of Pott Creek over the years. This October, a dam was discovered on the final cross vane at the end of the project on Pott Creek at Station 72+00. Another small dam was present on Rhodes Mill in the riffle at Cross Section RM2. These dams were causing only minor water back up and were removed within a week of discovery. Vegetation damage due to beaver activity is also minimal. Photos are also included in Appendix E.

### 3.2.6 Channel Stability Assessment Summary

Overall, the site is in excellent condition and has weathered several severe over bank events well, and is highly stable with a rapidly maturing woody shrub and tree population. The site appears very stable and minor problem areas within the restored reach comprise less than 5% of the overall length of the project.

## 4.0 PROJECT CONCLUSION/ CLOSE OUT

This report is the final monitoring report for this NCDOT Full Delivery Project. When you would like to schedule a final walk-through please contact us to determine the date and time. It is greatly preferred that this be scheduled before April 2010 as the site becomes quite dense with spring vegetative growth. We appreciate the opportunity to restore this significant project.

# APPENDIX A. Vegetation Raw Data

## Vegetation Raw Data
## Vegetation Monitoring Plot Photos

**Pott Creek II Vegetaive Plot Monitoring - 2009**

| Species | Plots | | | | | | | | | | | Initial Totals | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Survival % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | | | | | | | |
| **Shrubs** | | | | | | | | | | | | | | | | | | |
| Sugarberry (*Celtis laevigata* ) | | | | | | | | | | | | 3 | 3 | 2 | | | | **0%** |
| Buttonbush (*Cephalanthus occidentalis* ) | | | | | | | | | | | | 2 | 2 | 1 | 1 | | | **0%** |
| Silky dogwood (*Cornus ammonum* ) | | 1 | 1 | | 1 | 1 | 1 | | 2 | 2 | 3 | 44 | 43 | 33 | 29 | 12 | 12 | **27%** |
| Spicebush (*Lindera benzoin* ) | | | | | | | | | | | | 10 | 8 | 1 | | | | **0%** |
| Elderberry (*Sambucus canadensis* ) | | | 2 | | | | | | | | | 1 | 2 | 3 | 2 | 2 | 2 | **200%** |
| **Trees** | | | | | | | | | | | | | | | | | | |
| River birch (*Betula nigra* ) | 1 | 1 | 1 | 1 | | | 1 | | | | 3 | 14 | 14 | 14 | 14 | 14 | 8 | **57%** |
| Persimmon (*Diospyros virginiana* ) | 2 | | | | | | 1 | | | | | 5 | 5 | 5 | 5 | 3 | 3 | **60%** |
| Green ash (*Fraxinus pennsylvanica* ) | 11 | | 4 | 5 | 10 | 6 | 5 | 4 | 12 | 6 | | 133 | 127 | 103 | 90 | 63 | 63 | **47%** |
| American sycamore (*Platanus occidentalis* ) | 1 | | | | 1 | | 10 | 6 | 1 | 2 | 3 | 27 | 27 | 27 | 27 | 27 | 24 | **89%** |
| Swamp white oak (*Quercus bicolor* ) | 1 | | | | 1 | 3 | 3 | | | | | 31 | 31 | 27 | 12 | 8 | 8 | **26%** |
| Overcup oak (*Quercus lyrata* ) | | | | 8 | 6 | 6 | 1 | 11 | 6 | 9 | 2 | 58 | 58 | 58 | 58 | 49 | 49 | **84%** |
| Water oak (*Quercus nigra* ) | | 1 | | | | | | | 3 | | 1 | 12 | 12 | 5 | 4 | 5 | 5 | **42%** |
| Pin oak (*Quercus palustris* ) | | 5 | 1 | | | | 2 | | | 3 | 1 | 76 | 72 | 46 | 27 | 12 | 12 | **16%** |
| Willow oak (*Quercus phellos* ) | 3 | 2 | | 2 | 2 | | | | 2 | 1 | | 41 | 25 | 10 | 17 | 12 | 12 | **29%** |
| Black Willow (*Salix nigra* ) | | 1 | 6 | 1 | 1 | 1 | | | 7 | 8 | 2 | 41 | 41 | 39 | 41 | 41 | 27 | **66%** |
| Silky willow (*Salix sericiea* ) | | | | | | | | | | | | 1 | 1 | 1 | | | | **0%** |
| **Totals** | **19** | **11** | **15** | **17** | **22** | **17** | **24** | **21** | **33** | **31** | **15** | **499** | **471** | **375** | **327** | **248** | **225** | **45%** |
| **Volunteer Species** | | | | | | | | | | | | | | | | | | |
| River birch (*Betula nigra* ) | 4 | 5 | 9 | 2 | | 2 | | | | 2 | | | 3 | 34 | 8 | 16 | 24 | |
| American sycamore (*Platanus occidentalis* ) | 5 | 12 | 9 | 2 | 3 | 6 | | | 6 | 4 | | | 14 | 36 | 26 | 45 | 47 | |
| Black Willow (*Salix nigra* ) | 5 | 7 | | 2 | 3 | 8 | 1 | 2 | 7 | | | | 2 | | | 38 | 35 | |
| Box Elder (Acer negundo) | | | | | 1 | | | | | | | | | | | | 1 | |
| Cottonwood (Populus deltoides | 1 | 1 | | | | | | | | | | | 2 | 1 | | | 2 | |
| Tag alder (*Alnus serrulata* ) | | | 3 | | 2 | | | | | | 4 | | | 6 | 4 | 9 | 9 | |
| Tulip poplar (*Liriodendron tulipifera)* | 1 | | | | 2 | | | | | | | | 6 | 6 | 6 | 3 | 3 | |
| Sweet gum (*Liquidambar styraciflua* ) | | | | | | | | | | | 3 | | | | 2 | 3 | 3 | |
| **Totals** | **35** | **36** | **36** | **23** | **33** | **33** | **25** | **23** | **46** | **37** | **22** | | **498** | **458** | **373** | **362** | **349** | |

2500 square feet each

$$\frac{\text{Stems in Plot (15)}}{\text{Stems per Acre (261)}} = \frac{2500}{43560}$$

Total 27500
(1 acre = 43560 sq. feet)

| | Plot 1 | Plot 2 | Plot 3 | Plot 4 | Plot 5 | Plot 6 | Plot 7 | Plot 8 | Plot 9 | Plot 10 | Plot 11 | **Total** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Live Planted Species | 19 | 11 | 15 | 17 | 22 | 17 | 24 | 21 | 33 | 31 | 15 | 225 |
| Volunteers | 16 | 25 | 21 | 6 | 11 | 16 | 1 | 2 | 13 | 6 | 7 | 124 |
| | 35 | 36 | 36 | 23 | 33 | 33 | 25 | 23 | 46 | 37 | 22 | 349 |
| Stems per acre | 610 | 627 | 627 | 401 | 575 | 575 | 436 | 401 | 802 | 645 | 383 | 553 |
| Stems per acre w/o Vols | 331 | 192 | 261 | 296 | 383 | 296 | 418 | 366 | 575 | 540 | 261 | 356 |
| Number of Species | 11 | 10 | 9 | 8 | 12 | 8 | 9 | 4 | 7 | 9 | 7 | |
| Number of Planted Species | 6 | 6 | 6 | 5 | 7 | 5 | 8 | 3 | 9 | 7 | 9 | |

**Combined Totals**

| | |
|---|---|
| Percent Survival | 45% |
| Stems Per Acre | 553 |
| Stems Per Acre w/o vols | 356 |
| Number of Species | 17 |
| Total Planted Species | 12 |

| | **Initial** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** |
|---|---|---|---|---|---|---|
| **Plot 1** | 436 | 365 | 314 | 435 | 418 | 331 |
| **Plot 2** | 436 | 400 | 261 | 191 | 192 | 192 |
| **Plot 3** | 558 | 540 | 436 | 400 | 401 | 261 |
| **Plot 4** | 854 | 801 | 610 | 470 | 453 | 296 |
| **Plot 5** | 453 | 453 | 401 | 348 | 314 | 383 |
| **Plot 6** | 627 | 487 | 453 | 505 | 488 | 296 |
| **Plot 7** | 575 | 522 | 662 | 365 | 470 | 418 |
| **Plot 8** | 1917 | 1620 | 1237 | 1010 | 401 | 366 |
| **Plot 9** | 1446 | 1359 | 993 | 592 | 505 | 575 |
| **Plot 10** | 941 | 923 | 819 | 592 | 592 | 540 |
| **Plot 11** | 558 | 453 | 488 | 278 | 279 | 261 |
| **Total** | 800 | 720 | 607 | 471 | 410 | 356 |

# Vegetation Plot Photo Log

Veg Plot 1

Veg Plot 2

Veg Plot 3

Veg Plot 4

Veg Plot 5

Veg Plot 6

Veg Plot 7

Veg Plot 8


Veg Plot 9


Veg Plot 10


Veg Plot 11

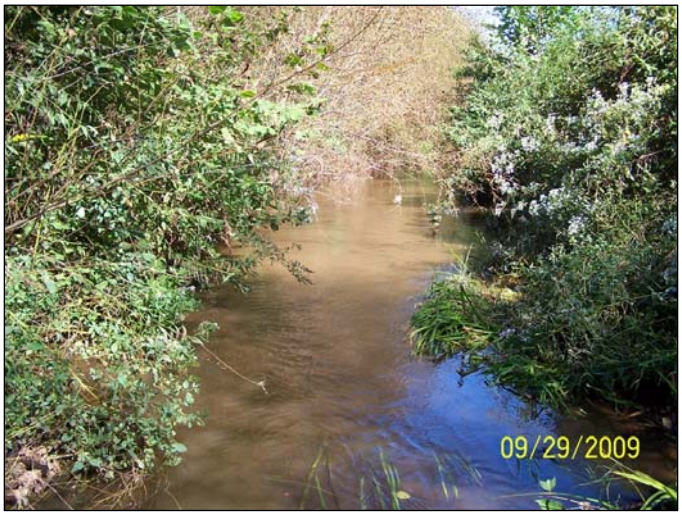
# APPENDIX B. Cross Sections

## Data Plots and Tables
## Photos

# Cross Section Photo Log


CS 1 facing upstream


CS 1 facing downstream




CS 2 facing upstream


CS 2 facing downstream


CS 3 facing upstream


CS 3 facing downstream


CS 4 facing upstream


CS 4 facing downstream


CS 5 facing upstream


CS 5 facing downstream


CS 6 facing upstream


CS 6 facing downstream


CS RM1 facing upstream


CS RM1 facing downstream


CS RM2 facing upstream


CS RM2 facing downstream


CS UT1 facing upstream


CS UT1 facing downstream


CS UT2 facing upstream


CS UT2 facing downstream

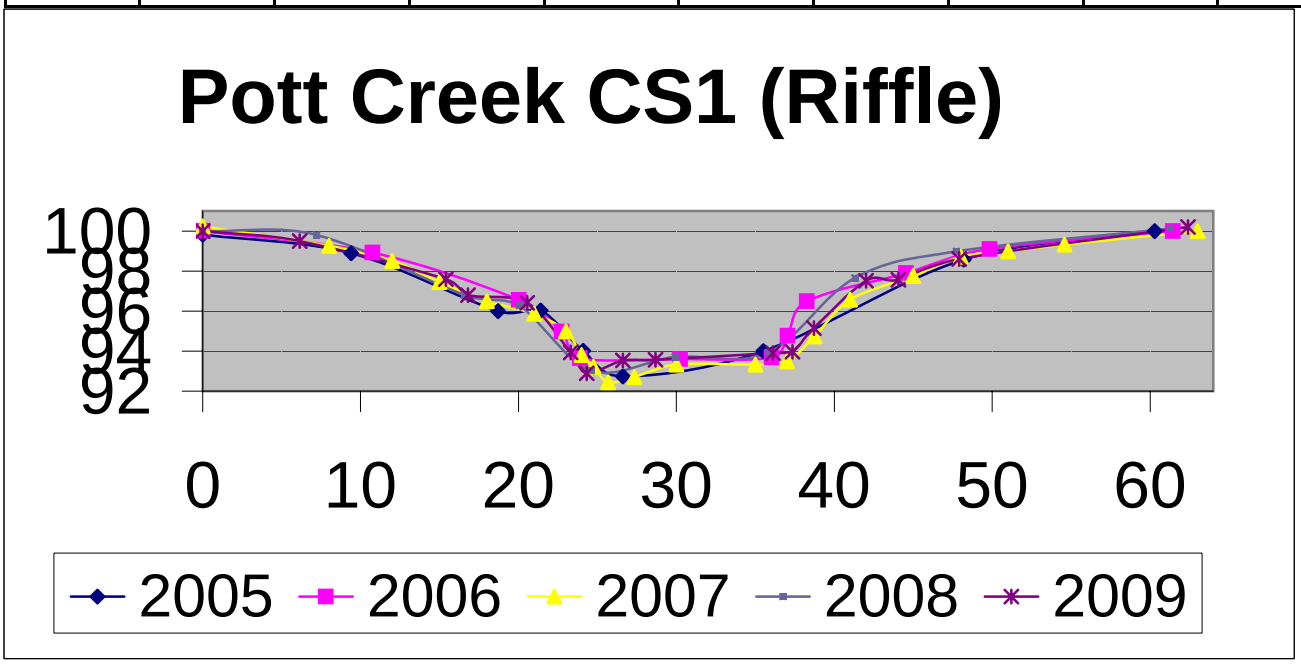

CS UT3 facing upstream


CS UT3 facing downstream

| Mean of PCCS 1-6 Summary Data Table | As-built Mean | M1 2005 | M2 2006 | M3 2007 | M4 2008 | M5 2009 |
|---|---|---|---|---|---|---|
| Bankfull Cross Sectional Area: Range 105 -13 | 141 | 178 | 163 | 175 | 176 | 170 |
| Bankfull Width: Range 33.3 - 41.2 | 37 | 38 | 37 | 39 | 39 | 39 |
| Bankfull Max Depth: Range 4.5 - 5.1 | 4.8 | 6.0 | 5.6 | 5.8 | 5.8 | 5.6 |
| Entrenchment Ratio: Range 7.2 - 9.0 | 8 | 8 | 8 | 8 | 8 | 8 |

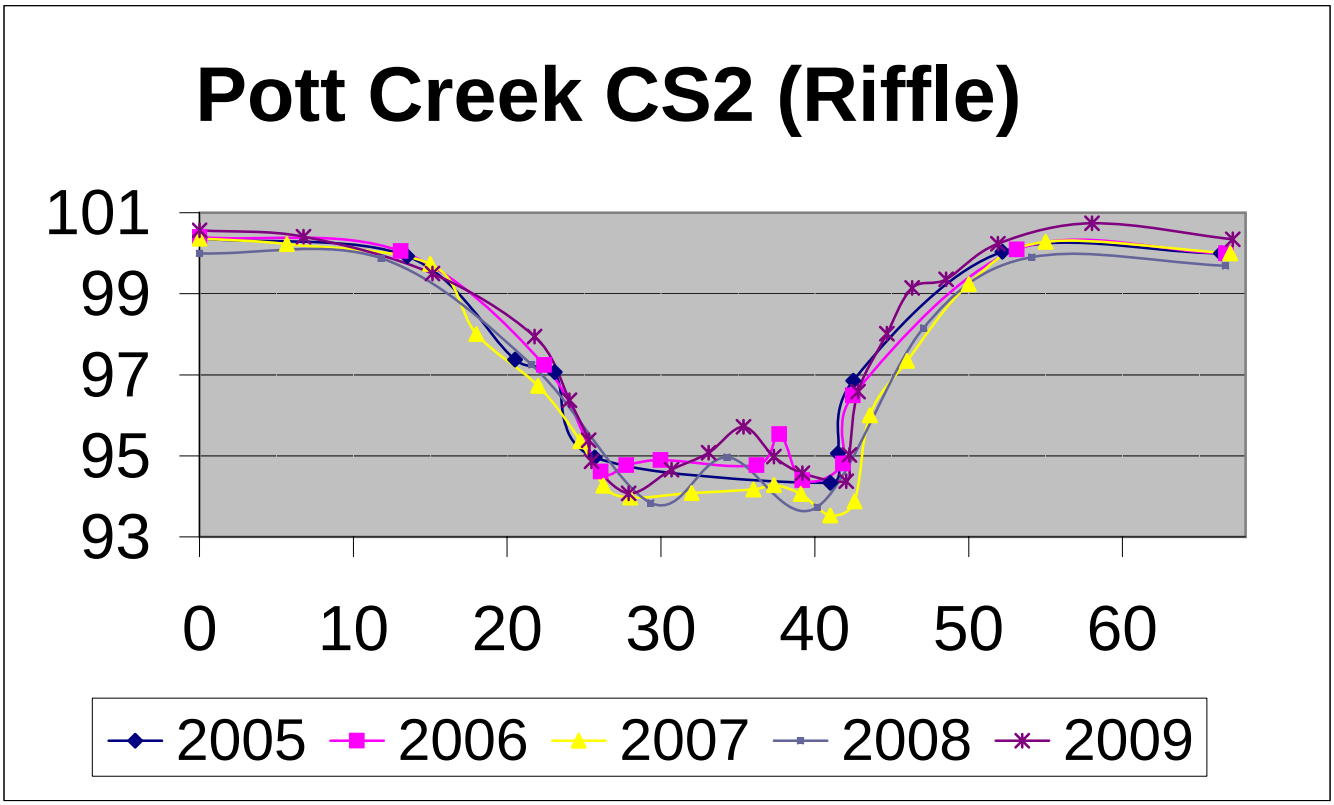
| PC1 Summary Data Table | M1 2005 | M2 2006 | M3 2007 | M4 2008 | M5 2009 |
|---|---|---|---|---|---|
| Bankfull Cross Sectional Area: Range 105 -136 | 191 | 166 | 198 | 190 | 200 |
| Bankfull Width: Range 33.3 - 41.2 | 39 | 39 | 40 | 41 | 42 |
| Bankfull Max Depth: Range 4.5 - 5.1 | 6.3 | 5.4 | 6.3 | 6.0 | 6.1 |
| Entrenchment Ratio: Range 7.2 - 9.0 | 8 | 8 | 8 | 7 | 7 |
| Average Width of Flood Prone Area = 300 | Average bkf = 99.04 | | | | |

| Survey Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year 1 2005 | | Year 2 2006 | | Year 3 2007 | | Year 4 2008 | | Year 5 2009 | |
| Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation |
| 0.0 | 99.8 | 0.0 | 100.0 | 0.0 | 100.2 | 0.0 | 100.0 | 0.0 | 100.0 |
| 9.4 | 98.9 | 10.8 | 98.9 | 8.0 | 99.3 | 7.2 | 99.8 | 6.2 | 99.5 |
| 18.7 | 96.0 | 20.0 | 96.6 | 12.0 | 98.5 | 16.6 | 96.8 | 15.4 | 97.6 |
| 21.4 | 96.0 | 22.7 | 95.0 | 15.0 | 97.5 | 20.0 | 96.3 | 16.8 | 96.8 |
| 24.1 | 94.0 | 23.9 | 93.6 | 18.0 | 96.5 | 24.6 | 93.0 | 20.6 | 96.4 |
| 26.6 | 92.7 | 30.2 | 93.6 | 21.0 | 95.9 | 29.9 | 93.7 | 23.3 | 93.9 |
| 35.5 | 94.0 | 36.0 | 93.7 | 23.0 | 95.0 | 35.8 | 93.9 | 24.3 | 92.9 |
| 48.2 | 98.6 | 37.1 | 94.8 | 24.0 | 93.8 | 41.3 | 97.7 | 26.6 | 93.5 |
| 60.3 | 100.0 | 38.3 | 96.5 | 24.8 | 93.2 | 47.7 | 99.0 | 28.7 | 93.6 |
| | | 44.6 | 97.9 | 25.7 | 92.4 | 61.3 | 100.1 | 36.1 | 93.9 |
| | | 49.8 | 99.1 | 27.3 | 92.7 | | | 37.4 | 94.0 |
| | | 61.5 | 100.0 | 30.0 | 93.3 | | | 38.7 | 95.2 |
| | | | | 35.0 | 93.3 | | | 42.0 | 97.5 |
| | | | | 37.0 | 93.5 | | | 44.1 | 97.6 |
| | | | | 38.8 | 94.7 | | | 47.9 | 98.6 |
| | | | | 41.0 | 96.6 | | | 62.4 | 100.2 |
| | | | | 45.0 | 97.8 | | | | |
| | | | | 48.0 | 98.7 | | | | |
| | | | | 51.0 | 99.0 | | | | |
| | | | | 54.6 | 99.3 | | | | |
| | | | | 63.0 | 100.0 | | | | |



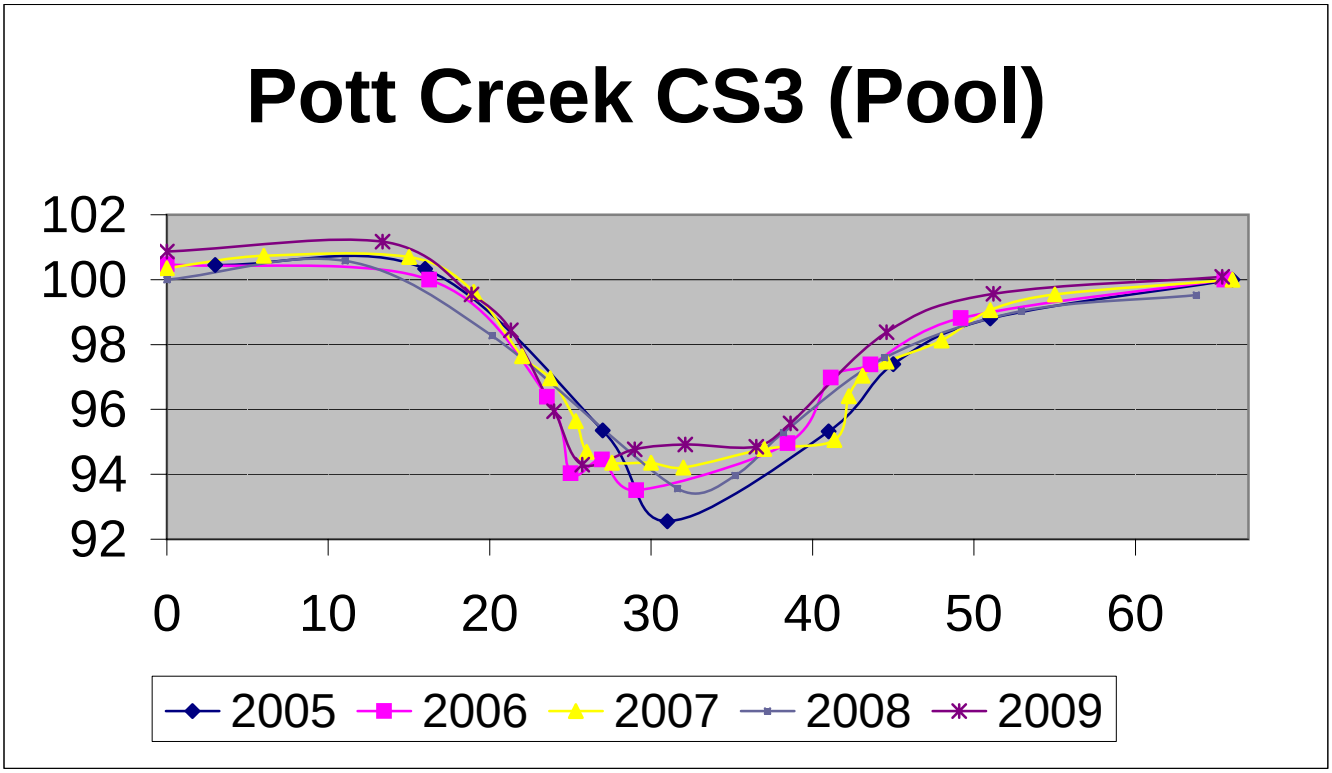
| PC 2 Summary Data Table | M1 2005 | M2 2006 | M3 2007 | M4 2008 | M5 2009 |
|---|---|---|---|---|---|
| Bankfull Cross Sectional Area: Range 105 -136 | 172 | 176 | 203 | 208 | 209 |
| Bankfull Width: Range 33.3 - 41.2 | 39 | 40 | 40 | 42 | 45 |
| Bankfull Max Depth: Range 4.5 - 5.1 | 5.7 | 5.6 | 6.5 | 6.3 | 5.9 |
| Entrenchment Ratio: Range 7.2 - 9.0 | 8 | 7 | 8 | 7 | 7 |
| Average Width of Flood Prone Area = 300 | Average bkf = 100.05 | | | | |

| Survey Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year 1 2005 | | Year 2 2006 | | Year 3 2007 | | Year 4 2008 | | Year 5 2009 | |
| Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation |
| 0.0 | 100.4 | 0.0 | 100.4 | 0.0 | 100.4 | 0.0 | 100.0 | 0.0 | 100.6 |
| 13.5 | 99.9 | 13.1 | 100.1 | 5.7 | 100.2 | 11.8 | 99.9 | 6.8 | 100.4 |
| 20.5 | 97.4 | 22.4 | 97.2 | 15.0 | 99.7 | 21.6 | 97.2 | 15.2 | 99.5 |
| 23.1 | 97.1 | 26.1 | 94.6 | 18.0 | 98.0 | 29.3 | 93.8 | 21.8 | 97.9 |
| 25.7 | 95.0 | 27.7 | 94.8 | 22.0 | 96.7 | 34.3 | 95.0 | 24.1 | 96.4 |
| 41.0 | 94.3 | 30.0 | 94.9 | 24.8 | 95.4 | 40.2 | 93.7 | 25.3 | 95.4 |
| 41.5 | 95.1 | 36.2 | 94.8 | 26.3 | 94.3 | 47.1 | 98.2 | 25.5 | 94.9 |
| 42.5 | 96.9 | 37.7 | 95.5 | 28.0 | 94.0 | 54.1 | 99.9 | 27.9 | 94.1 |
| 52.2 | 100.0 | 39.2 | 94.4 | 32.0 | 94.1 | 66.7 | 99.7 | 30.7 | 94.7 |
| 66.4 | 100.0 | 41.8 | 94.8 | 36.0 | 94.2 | | | 33.1 | 95.1 |
| | | 42.5 | 96.5 | 37.3 | 94.3 | | | 35.4 | 95.7 |
| | | 53.1 | 100.1 | 39.1 | 94.1 | | | 37.3 | 95.0 |
| | | 66.7 | 100.0 | 41.0 | 93.5 | | | 39.2 | 94.6 |
| | | | | 42.6 | 93.9 | | | 42.0 | 94.4 |
| | | | | 43.6 | 96.0 | | | 42.2 | 95.0 |
| | | | | 46.0 | 97.3 | | | 42.8 | 96.6 |
| | | | | 50.0 | 99.2 | | | 44.7 | 98.0 |
| | | | | 55.0 | 100.3 | | | 46.3 | 99.1 |
| | | | | 67.0 | 100.0 | | | 48.5 | 99.4 |
| | | | | | | | | 51.9 | 100.2 |
| | | | | | | | | 58.0 | 100.7 |
| | | | | | | | | 67.2 | 100.3 |



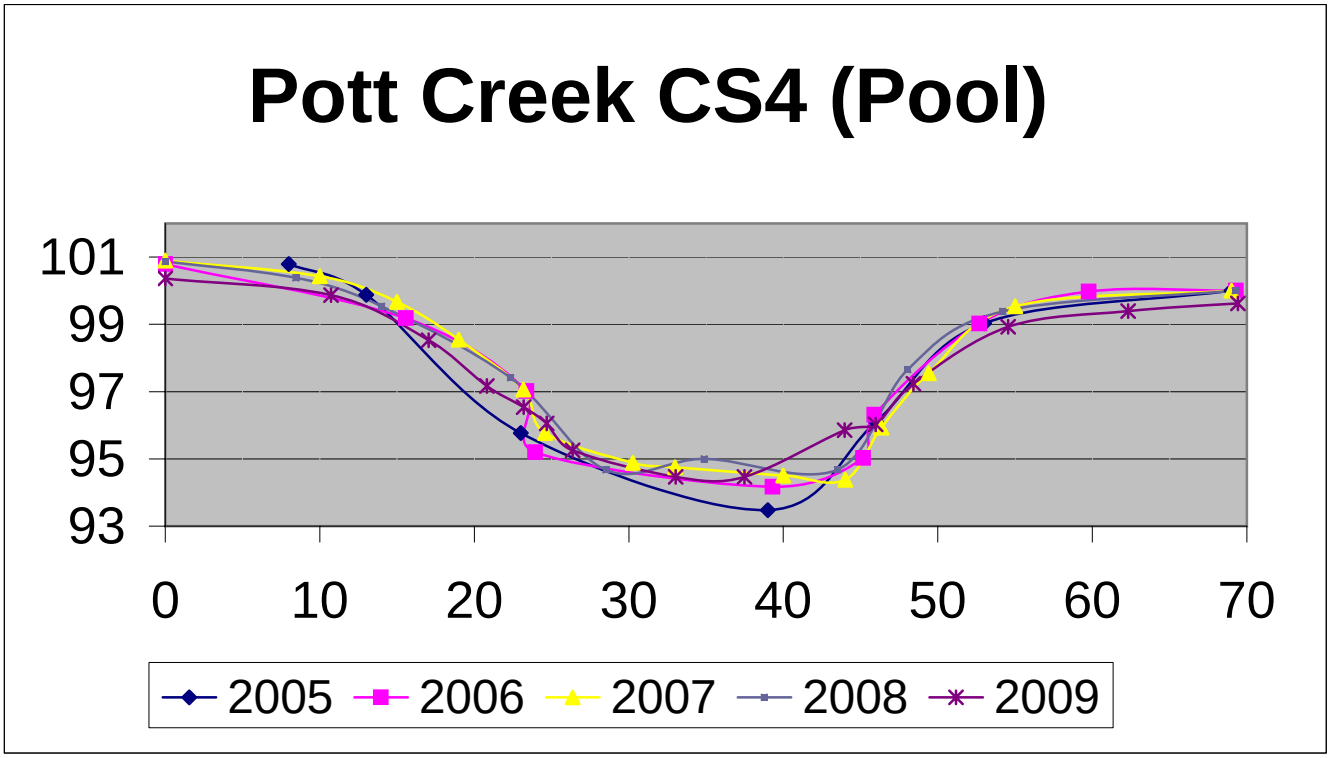
| PC 3 Summary Data Table | M1 2005 | M2 2006 | M3 2007 | M4 2008 | M5 2009 |
|---|---|---|---|---|---|
| Bankfull Cross Sectional Area: Range 105 -136 | 177 | 142 | 135 | 140 | 119 |
| Bankfull Width: Range 33.3 - 41.2 | 35 | 33 | 36 | 33 | 32 |
| Bankfull Max Depth: Range 4.5 - 5.1 | 6.4 | 5.5 | 4.8 | 5.4 | 4.7 |
| Entrenchment Ratio: Range 7.2 - 9.0 | 9 | 9 | 8 | 9 | 9 |
| Average Width of Flood Prone Area = 300 | Average bkf = 99.34 | | | | |

| Survey Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year 1 2005 | | Year 2 2006 | | Year 3 2007 | | Year 4 2008 | | Year 5 2009 | |
| Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation |
| 3.0 | 100.4 | 0.0 | 100.5 | 0.0 | 100.4 | 0.0 | 100.0 | 0.0 | 100.9 |
| 16.0 | 100.3 | 16.3 | 100.0 | 6.0 | 100.7 | 11.0 | 100.6 | 13.4 | 101.2 |
| 27.0 | 95.4 | 23.6 | 96.4 | 15.0 | 100.7 | 20.1 | 98.3 | 18.9 | 99.5 |
| 31.0 | 92.6 | 25.0 | 94.0 | 19.0 | 99.6 | 31.6 | 93.6 | 21.3 | 98.4 |
| 41.0 | 95.3 | 27.0 | 94.5 | 22.0 | 97.6 | 35.2 | 94.0 | 24.0 | 95.9 |
| 45.0 | 97.4 | 29.1 | 93.5 | 23.8 | 97.0 | 38.2 | 95.3 | 25.7 | 94.3 |
| 51.0 | 98.8 | 38.5 | 95.0 | 25.3 | 95.6 | 44.5 | 97.6 | 29.0 | 94.8 |
| 66.0 | 100.0 | 41.1 | 97.0 | 26.0 | 94.7 | 52.9 | 99.0 | 32.1 | 94.9 |
| | | 43.6 | 97.4 | 27.6 | 94.4 | 63.8 | 99.5 | 36.5 | 94.8 |
| | | 49.2 | 98.8 | 30.0 | 94.4 | | | 38.6 | 95.6 |
| | | 65.5 | 100.0 | 32.0 | 94.2 | | | 44.6 | 98.4 |
| | | | | 37.0 | 94.8 | | | 51.2 | 99.6 |
| | | | | 41.3 | 95.1 | | | 65.4 | 100.1 |
| | | | | 42.3 | 96.4 | | | | |
| | | | | 43.1 | 97.0 | | | | |
| | | | | 44.6 | 97.5 | | | | |
| | | | | 48.0 | 98.1 | | | | |
| | | | | 51.0 | 99.1 | | | | |
| | | | | 55.0 | 99.5 | | | | |
| | | | | 66.0 | 100.0 | | | | |

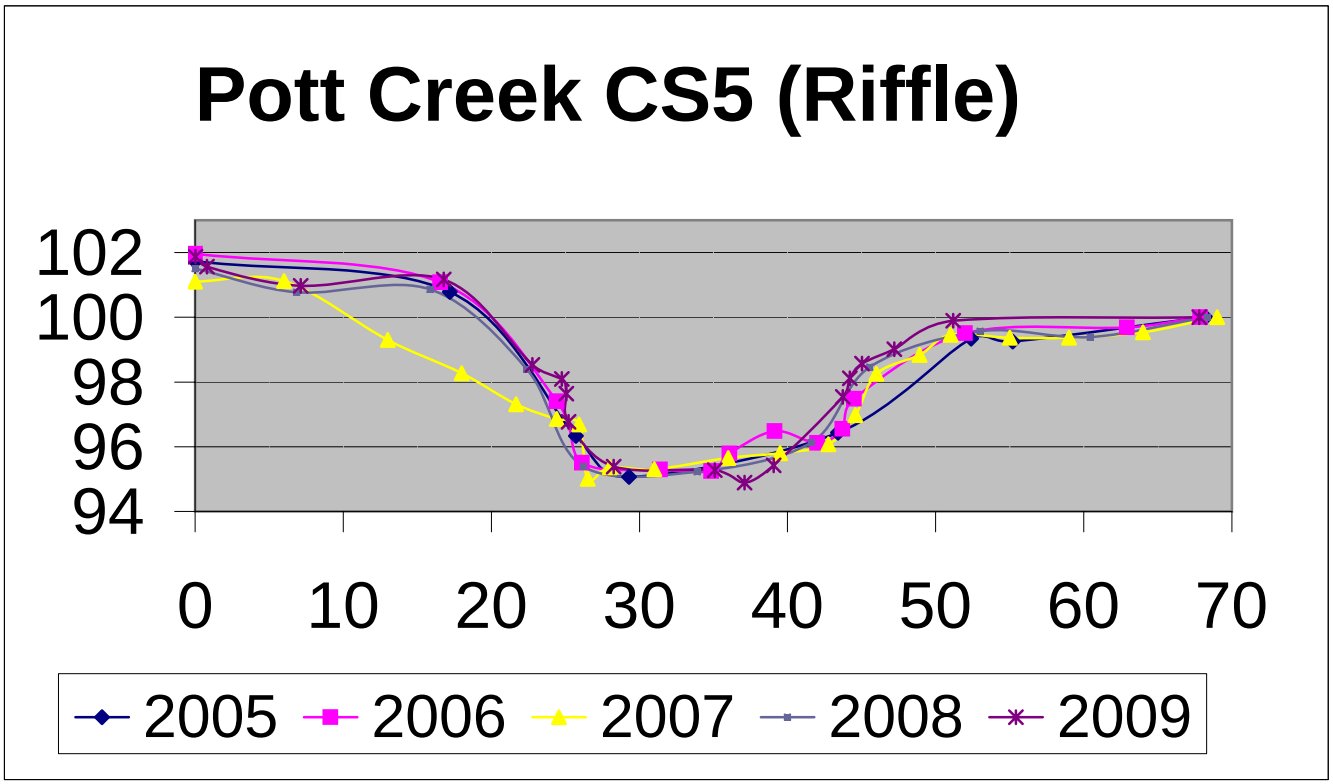


| PC 4 Summary Data Table | M1 2005 | M2 2006 | M3 2007 | M4 2008 | M5 2009 |
|---|---|---|---|---|---|
| Bankfull Cross Sectional Area: Range 105 -136 | 173 | 141 | 145 | 137 | 132 |
| Bankfull Width: Range 33.3 - 41.2 | 40 | 37 | 40 | 40 | 38 |
| Bankfull Max Depth: Range 4.5 - 5.1 | 5.5 | 4.8 | 4.6 | 4.3 | 4.5 |
| Entrenchment Ratio: Range 7.2 - 9.0 | 8 | 8 | 8 | 7 | 8 |
| Average Width of Flood Prone Area = 300 | Average bkf = 99.26 | | | | |

| Survey Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year 1 2005 | | Year 2 2006 | | Year 3 2007 | | Year 4 2008 | | Year 5 2009 | |
| Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation |
| 8.0 | 100.8 | 0.0 | 100.8 | 0.0 | 100.9 | 0.0 | 100.9 | 0.0 | 100.4 |
| 13.0 | 99.9 | 15.6 | 99.2 | 10.0 | 100.4 | 8.5 | 100.4 | 10.7 | 99.9 |
| 23.0 | 95.8 | 23.4 | 97.0 | 15.0 | 99.7 | 14.0 | 99.5 | 17.0 | 98.5 |
| 39.0 | 93.5 | 24.0 | 95.2 | 19.0 | 98.6 | 22.3 | 97.4 | 20.8 | 97.2 |
| 46.0 | 96.1 | 39.3 | 94.2 | 23.2 | 97.1 | 28.5 | 94.7 | 23.2 | 96.5 |
| 53.0 | 99.0 | 45.2 | 95.0 | 24.6 | 95.8 | 34.9 | 95.0 | 24.7 | 96.1 |
| 69.0 | 100.0 | 45.9 | 96.3 | 30.3 | 94.9 | 43.5 | 94.7 | 26.4 | 95.3 |
| | | 52.7 | 99.0 | 33.0 | 94.8 | 48.0 | 97.7 | 33.0 | 94.5 |
| | | 59.8 | 100.0 | 40.0 | 94.5 | 54.2 | 99.4 | 37.5 | 94.5 |
| | | 69.3 | 100.0 | 44.0 | 94.4 | 69.3 | 100.0 | 44.0 | 95.9 |
| | | | | 46.3 | 95.9 | | | 46.0 | 96.0 |
| | | | | 49.4 | 97.6 | | | 48.4 | 97.2 |
| | | | | 55.0 | 99.5 | | | 54.5 | 98.9 |
| | | | | 69.0 | 100.0 | | | 62.3 | 99.4 |
| | | | | | | | | 69.4 | 99.6 |

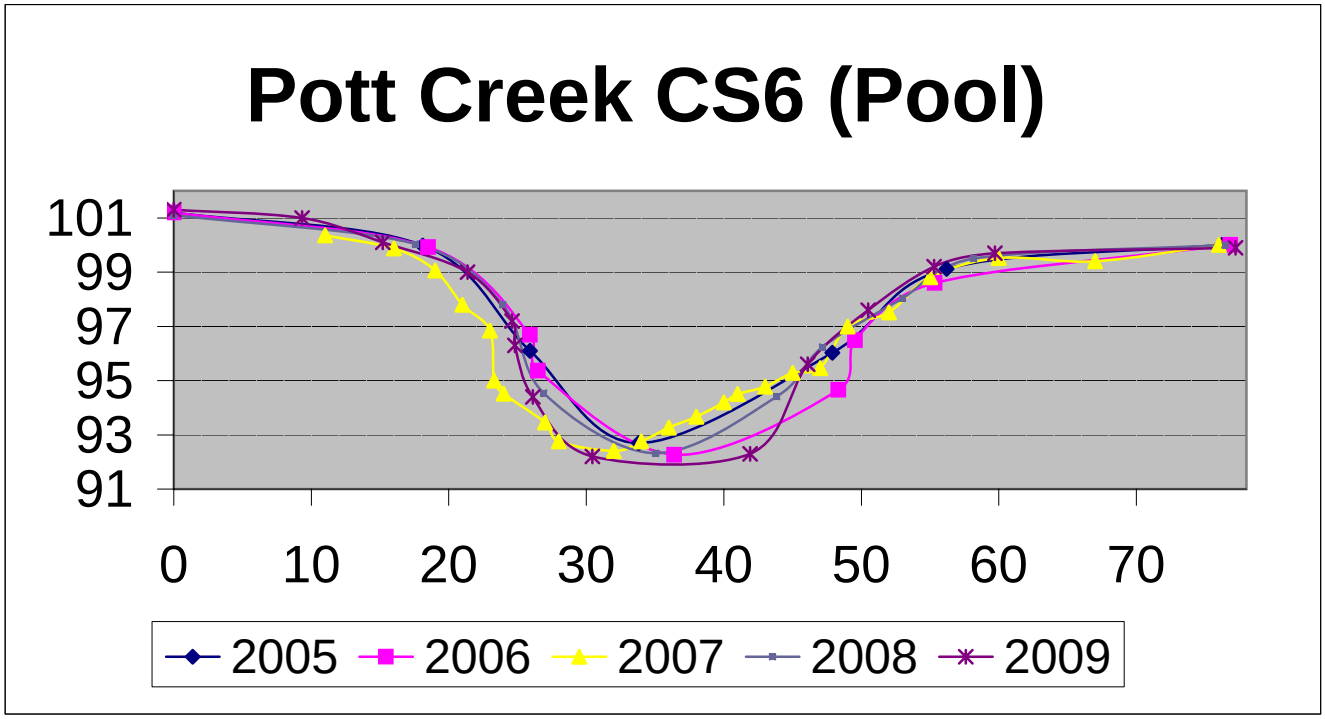


| Survey Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year 1 2005 | | Year 2 2006 | | Year 3 2007 | | Year 4 2008 | | Year 5 2009 | |
| Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation |
| 0.0 | 101.7 | 0.0 | 102.0 | 0.0 | 101.1 | 0.0 | 101.5 | 0.0 | 101.9 |
| 17.2 | 100.8 | 16.6 | 101.1 | 6.0 | 101.1 | 6.8 | 100.8 | 0.8 | 101.6 |
| 25.7 | 96.3 | 24.4 | 97.4 | 13.0 | 99.3 | 15.9 | 100.9 | 7.1 | 101.0 |
| 29.3 | 95.1 | 26.1 | 95.5 | 18.0 | 98.3 | 22.4 | 98.4 | 16.8 | 101.2 |
| 43.4 | 96.4 | 31.4 | 95.3 | 21.7 | 97.3 | 26.2 | 95.4 | 22.8 | 98.5 |
| 52.4 | 99.3 | 34.8 | 95.2 | 24.4 | 96.9 | 33.9 | 95.2 | 24.8 | 98.1 |
| 55.2 | 99.3 | 36.1 | 95.8 | 25.9 | 96.7 | 41.6 | 96.1 | 25.1 | 97.6 |
| 68.2 | 100.0 | 39.1 | 96.5 | 26.5 | 95.0 | 45.6 | 98.5 | 25.2 | 96.8 |
| | | 42.0 | 96.1 | 28.0 | 95.4 | 53.0 | 99.6 | 28.3 | 95.4 |
| | | 43.7 | 96.6 | 31.0 | 95.3 | 60.4 | 99.4 | 35.1 | 95.3 |
| | | 44.5 | 97.5 | 36.0 | 95.7 | 68.3 | 100.0 | 37.1 | 94.9 |
| | | 52.0 | 99.5 | 39.5 | 95.8 | | | 39.1 | 95.4 |
| | | 62.9 | 99.7 | 42.8 | 96.1 | | | 43.7 | 97.5 |
| | | 67.9 | 100.0 | 44.6 | 97.0 | | | 44.2 | 98.1 |
| | | | | 46.0 | 98.3 | | | 45.0 | 98.6 |
| | | | | 48.9 | 98.8 | | | 47.2 | 99.0 |
| | | | | 51.0 | 99.5 | | | 51.2 | 99.9 |
| | | | | 55.0 | 99.4 | | | 67.8 | 100.0 |
| | | | | 59.0 | 99.4 | | | | |
| | | | | 64.0 | 99.5 | | | | |
| | | | | 69.0 | 100.0 | | | | |



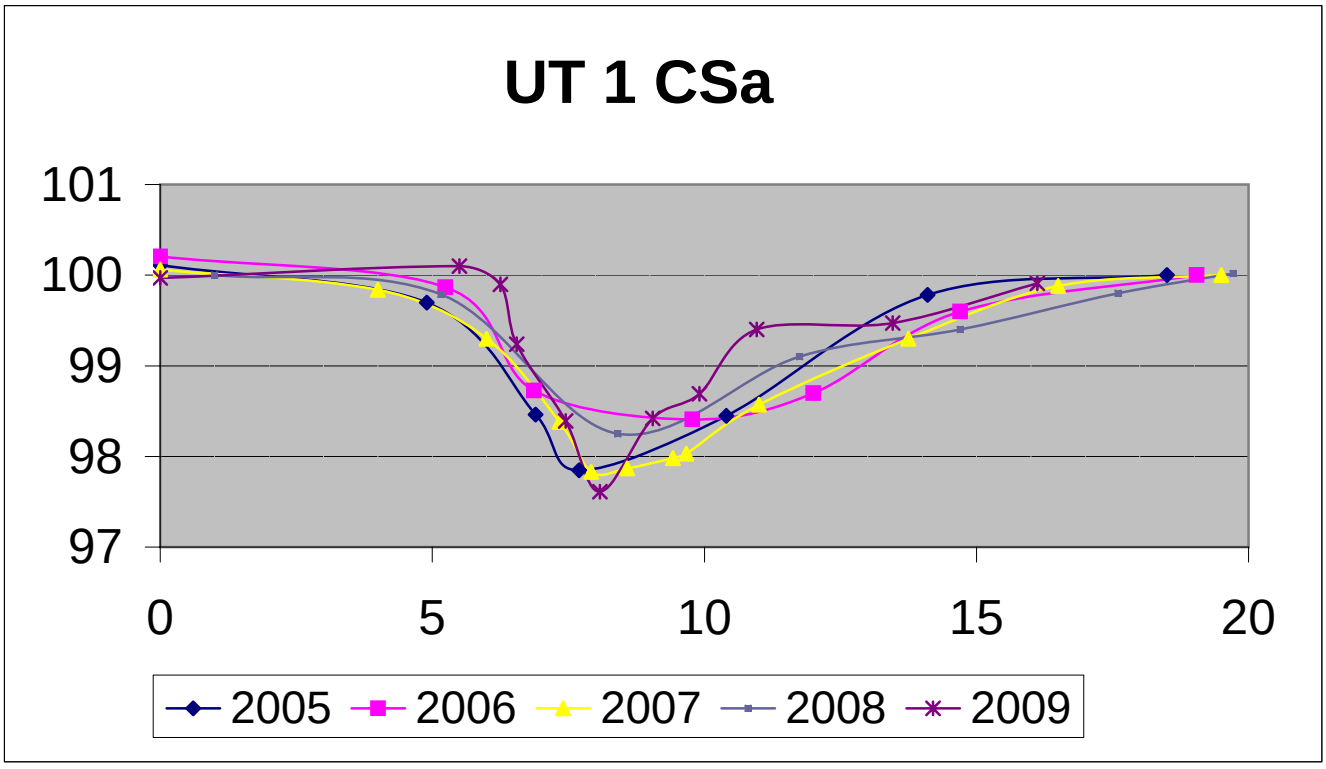
| PC 6 Summary Data Table | M1 2005 | M2 2006 | M3 2007 | M4 2008 | M5 2009 |
|---|---|---|---|---|---|
| Bankfull Cross Sectional Area: Range 105 -136 | 218 | 224 | 233 | 245 | 246 |
| Bankfull Width: Range 33.3 - 41.2 | 38 | 37 | 39 | 41 | 40 |
| Bankfull Max Depth: Range 4.5 - 5.1 | 7.3 | 7.7 | 7.6 | 7.7 | 7.8 |
| Entrenchment Ratio: Range 7.2 - 9.0 | 8 | 8 | 8 | 7 | 7 |
| Average Width of Flood Prone Area = 300 | Average bkf = 99.51 | | | | |

| Survey Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year 1 2005 | | Year 2 2006 | | Year 3 2007 | | Year 4 2008 | | Year 5 2009 | |
| Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation |
| 0.0 | 101.2 | 0.0 | 101.2 | 12.0 | 100.4 | 0.0 | 101.1 | 0.0 | 101.3 |
| 18.1 | 100.0 | 18.5 | 99.9 | 17.0 | 99.9 | 17.6 | 100.0 | 9.3 | 101.0 |
| 25.9 | 96.1 | 25.9 | 96.7 | 20.0 | 99.1 | 23.9 | 97.8 | 15.2 | 100.1 |
| 33.8 | 92.7 | 26.5 | 95.4 | 22.0 | 97.8 | 26.9 | 94.5 | 21.4 | 99.0 |
| 47.9 | 96.0 | 36.4 | 92.3 | 24.0 | 96.8 | 35.0 | 92.3 | 24.6 | 97.2 |
| 56.2 | 99.1 | 48.3 | 94.7 | 24.3 | 95.0 | 43.8 | 94.4 | 24.8 | 96.3 |
| 76.2 | 100.0 | 49.6 | 96.5 | 25.0 | 94.5 | 47.2 | 96.2 | 26.1 | 94.4 |
| | | 55.3 | 98.6 | 28.0 | 93.5 | 53.0 | 98.0 | 30.4 | 92.2 |
| | | 76.8 | 100.0 | 29.0 | 92.8 | 58.2 | 99.5 | 41.9 | 92.3 |
| | | | | 33.0 | 92.4 | 76.4 | 100.0 | 46.1 | 95.6 |
| | | | | 35.0 | 92.8 | | | 50.5 | 97.6 |
| | | | | 37.0 | 93.3 | | | 55.3 | 99.2 |
| | | | | 39.0 | 93.7 | | | 59.7 | 99.7 |
| | | | | 41.0 | 94.2 | | | 77.2 | 99.9 |
| | | | | 42.0 | 94.5 | | | | |
| | | | | 44.0 | 94.8 | | | | |
| | | | | 46.0 | 95.3 | | | | |
| | | | | 48.0 | 95.5 | | | | |
| | | | | 50.0 | 97.0 | | | | |
| | | | | 53.0 | 97.5 | | | | |
| | | | | 56.0 | 98.8 | | | | |
| | | | | 61.0 | 99.5 | | | | |
| | | | | 68.0 | 99.4 | | | | |
| | | | | 77.0 | 100.0 | | | | |



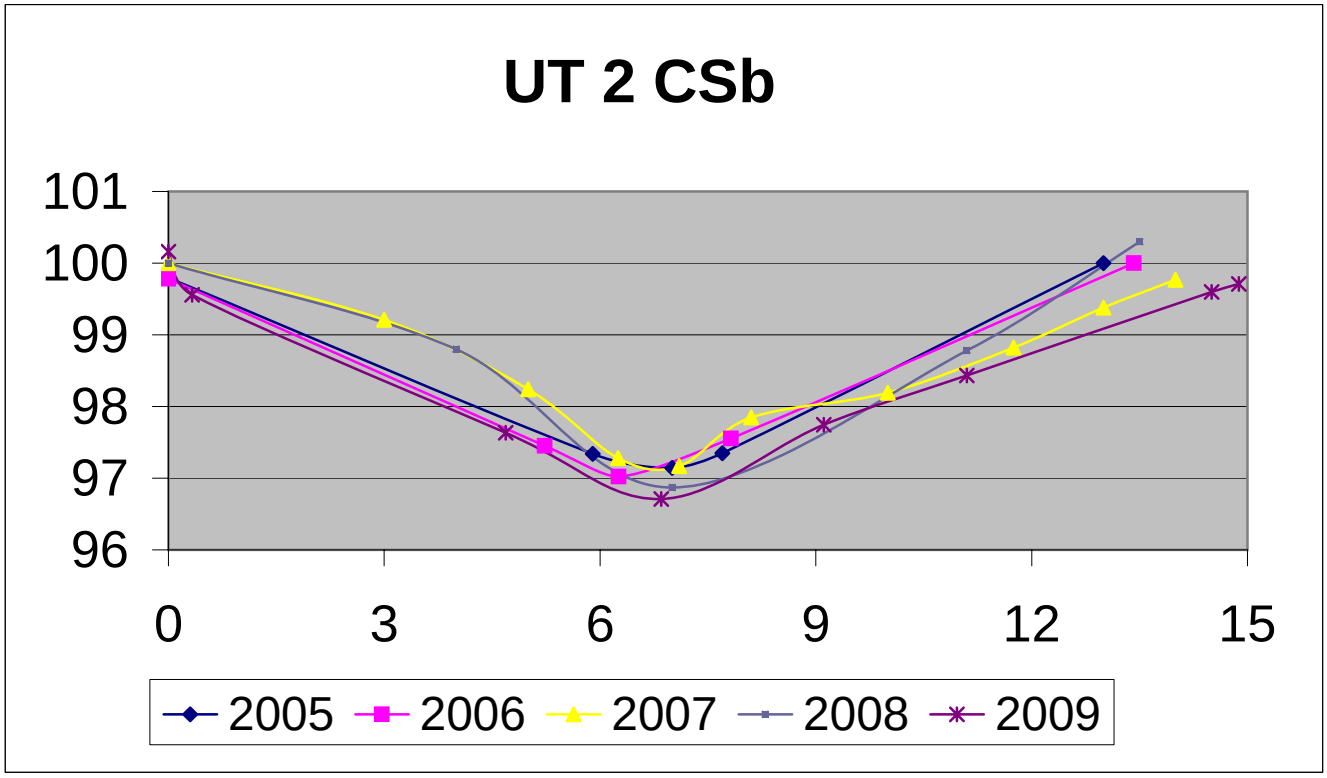
| UT 1 Summary Data Table | As-built Mean | M1 2005 | M2 2006 | M3 2007 | M4 2008 | M5 2009 |
|---|---|---|---|---|---|---|
| Bankfull Cross Sectional Area | 16 | 16 | 12 | 17 | 13 | 19 |
| Bankfull Width | 11 | 9 | 9 | 10 | 10 | 10 |
| Bankfull Max Depth | 1.9 | 2.2 | 1.6 | 2.2 | 1.8 | 2.4 |
| Entrenchment Ratio | 17 | 19 | 18 | 18 | 18 | 18 |
| Average Width of Flood Prone Area = 175 | Average bkf = 99.71 | | | | | |

| Survey Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year 1 2005 | | Year 2 2006 | | Year 3 2007 | | Year 4 2008 | | Year 5 2009 | |
| Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation |
| 0.0 | 100.1 | 0.0 | 100.2 | 0.0 | 100.1 | 1.0 | 100.0 | 0.0 | 100.0 |
| 4.9 | 99.7 | 5.2 | 99.9 | 4.0 | 99.8 | 5.2 | 99.8 | 5.5 | 100.1 |
| 6.9 | 98.5 | 6.9 | 98.7 | 6.0 | 99.3 | 8.4 | 98.3 | 6.3 | 99.9 |
| 7.7 | 97.8 | 9.8 | 98.4 | 7.3 | 98.4 | 11.8 | 99.1 | 6.6 | 99.2 |
| 10.4 | 98.4 | 12.0 | 98.7 | 7.9 | 97.8 | 14.7 | 99.4 | 7.5 | 98.4 |
| 14.1 | 99.8 | 14.7 | 99.6 | 8.6 | 97.9 | 17.6 | 99.8 | 8.1 | 97.6 |
| 18.5 | 100.0 | 19.1 | 100.0 | 9.4 | 98.0 | 19.7 | 100.0 | 9.1 | 98.4 |
| | | | | 9.7 | 98.0 | | | 9.9 | 98.7 |
| | | | | 11.0 | 98.6 | | | 11.0 | 99.4 |
| | | | | 13.8 | 99.3 | | | 13.5 | 99.5 |
| | | | | 16.5 | 99.9 | | | 16.1 | 99.9 |
| | | | | 19.5 | 100.0 | | | | |



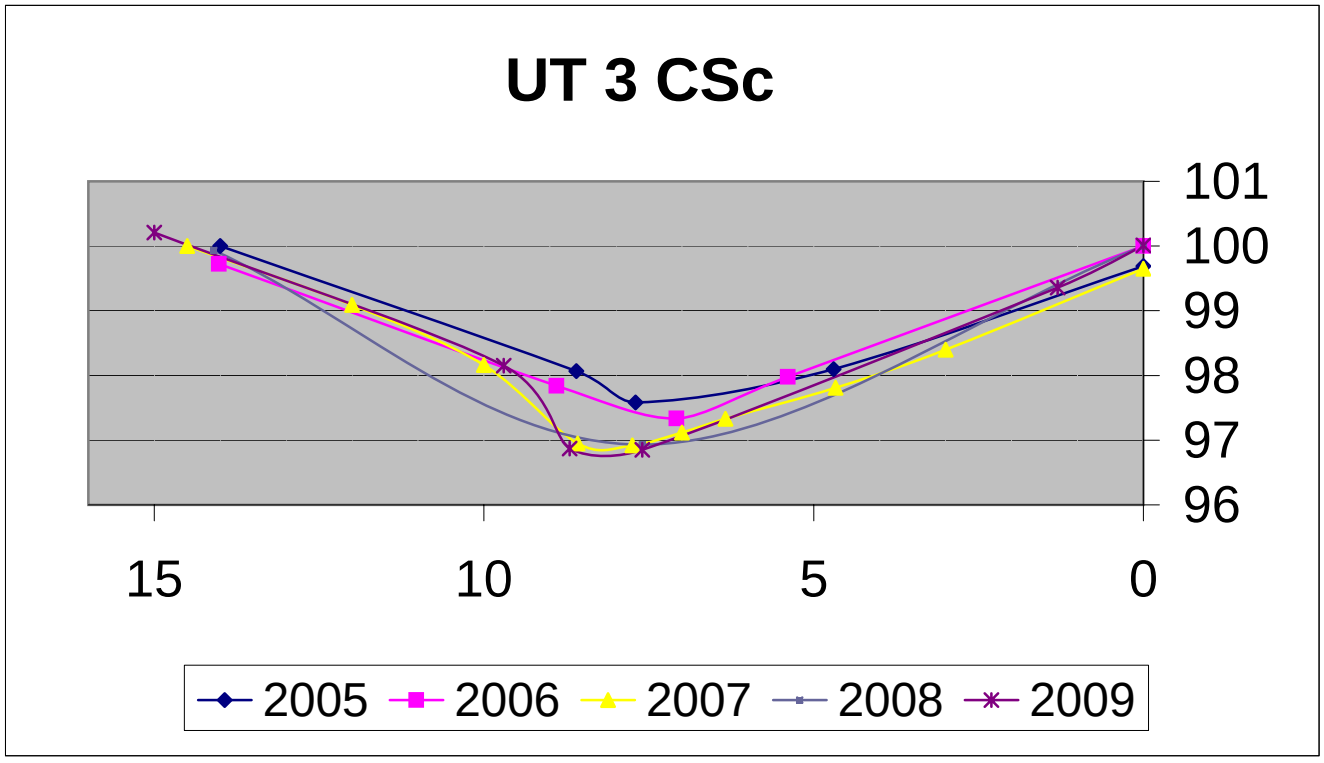
| UT 2 Summary Data Table | As-built Mean | M1 2005 | M2 2006 | M3 2007 | M4 2008 | M5 2009 |
|---|---|---|---|---|---|---|
| Bankfull Cross Sectional Area | 30 | 29 | 31 | 29 | 33 | 37 |
| Bankfull Width | 14 | 13 | 13 | 13 | 14 | 14 |
| Bankfull Max Depth | 2.8 | 2.9 | 3.0 | 2.8 | 3.1 | 3.3 |
| Entrenchment Ratio | 6 | 6 | 6 | 6 | 6 | 6 |
| Average Width of Flood Prone Area = 80 | Average bkf = 99.85 | | | | | |

| Survey Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year 1 2005 | | Year 2 2006 | | Year 3 2007 | | Year 4 2008 | | Year 5 2009 | |
| Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation |
| 0.0 | 99.8 | 0.0 | 99.8 | 0.0 | 100.0 | 0.0 | 100.0 | 0.0 | 100.2 |
| 5.9 | 97.3 | 5.2 | 97.5 | 3.0 | 99.2 | 4.0 | 98.8 | 0.3 | 99.6 |
| 7.0 | 97.1 | 6.3 | 97.0 | 5.0 | 98.2 | 7.0 | 96.9 | 4.7 | 97.6 |
| 7.7 | 97.3 | 7.8 | 97.6 | 6.3 | 97.3 | 11.1 | 98.8 | 6.9 | 96.7 |
| 13.0 | 100.0 | 13.4 | 100.0 | 7.1 | 97.2 | 13.5 | 100.3 | 9.1 | 97.7 |
| | | | | 8.1 | 97.9 | | | 11.1 | 98.4 |
| | | | | 10.0 | 98.2 | | | 14.5 | 99.6 |
| | | | | 11.8 | 98.8 | | | 14.9 | 99.7 |
| | | | | 13.0 | 99.4 | | | | |
| | | | | 14.0 | 99.8 | | | | |



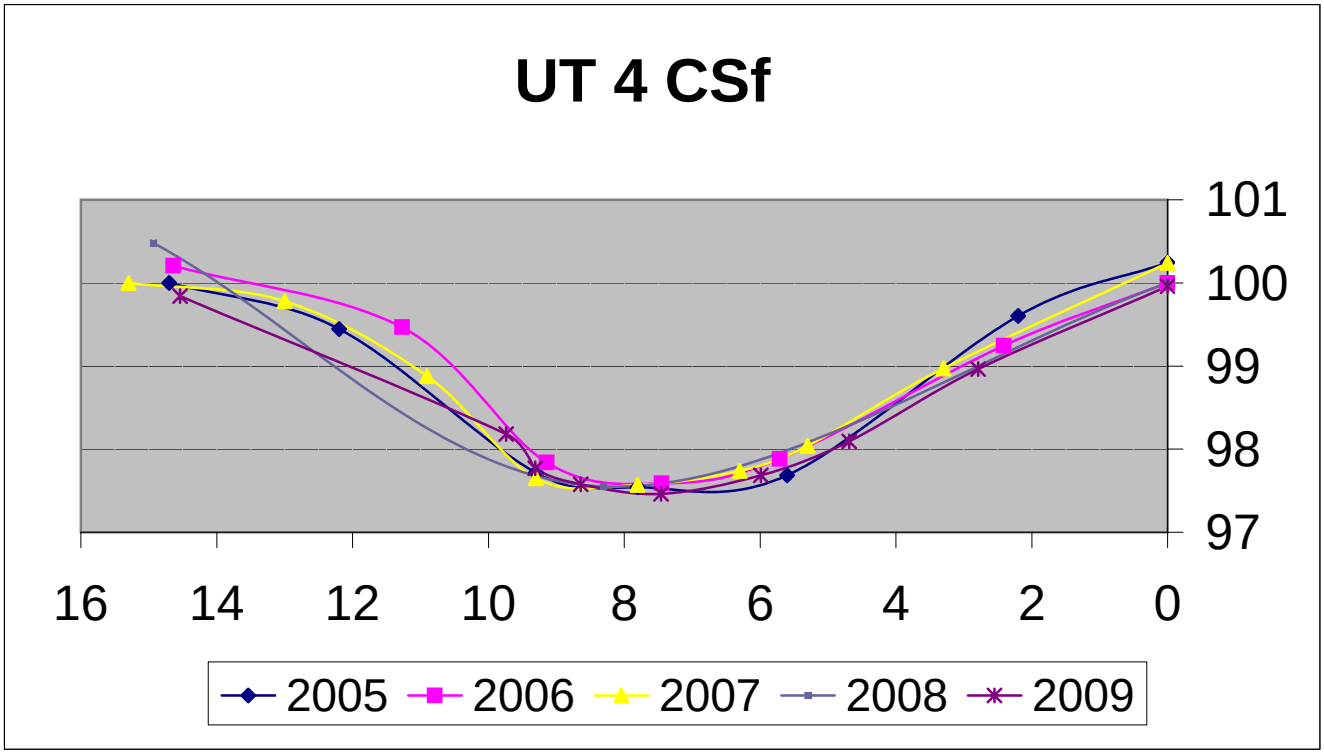
| UT 3 Summary Data Table | As-built Mean | M1 2005 | M2 2006 | M3 2007 | M4 2008 | M5 2009 |
|---|---|---|---|---|---|---|
| Bankfull Cross Sectional Area | 29 | 27 | 29 | 35 | 34 | 37 |
| Bankfull Width | 14 | 14 | 14 | 15 | 14 | 15 |
| Bankfull Max Depth | 2.7 | 2.4 | 2.7 | 3.1 | 3.1 | 3.2 |
| Entrenchment Ratio | 18 | 18 | 18 | 17 | 18 | 17 |
| Average Width of Flood Prone Area = 250 | Average bkf = 99.92 | | | | | |

| Survey Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year 1 2005 | | Year 2 2006 | | Year 3 2007 | | Year 4 2008 | | Year 5 2009 | |
| Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation |
| 0.0 | 99.7 | 0.0 | 100.0 | 0.0 | 99.7 | 0.0 | 100.0 | 0 | 100.01 |
| 4.7 | 98.1 | 5.4 | 98.0 | 3.0 | 98.4 | 7.6 | 96.9 | 1.3 | 99.36 |
| 7.7 | 97.6 | 7.1 | 97.3 | 4.7 | 97.8 | 14.1 | 99.9 | 7.6 | 96.85 |
| 8.6 | 98.1 | 8.9 | 97.8 | 6.3 | 97.3 | | | 8.7 | 96.87 |
| 14.0 | 100.0 | 14.0 | 99.7 | 7.0 | 97.1 | | | 9.7 | 98.15 |
| | | | | 7.8 | 96.9 | | | 15 | 100.21 |
| | | | | 8.6 | 97.0 | | | | |
| | | | | 10.0 | 98.2 | | | | |
| | | | | 12.0 | 99.1 | | | | |
| | | | | 14.5 | 100.0 | | | | |



| UT 4 Summary Data Table | As-built Mean | M1 2005 | M2 2006 | M3 2007 | M4 2008 | M5 2009 |
|---|---|---|---|---|---|---|
| Bankfull Cross Sectional Area | 25 | 28 | 28 | 29 | 29 | 28 |
| Bankfull Width | 13 | 15 | 15 | 15 | 15 | 15 |
| Bankfull Max Depth | 2.4 | 2.5 | 2.4 | 2.4 | 2.5 | 2.5 |
| Entrenchment Ratio | 9 | 8 | 8 | 8 | 8 | 8 |
| Average Width of Flood Prone Area = 115 | Average bkf = 100.09 | | | | | |

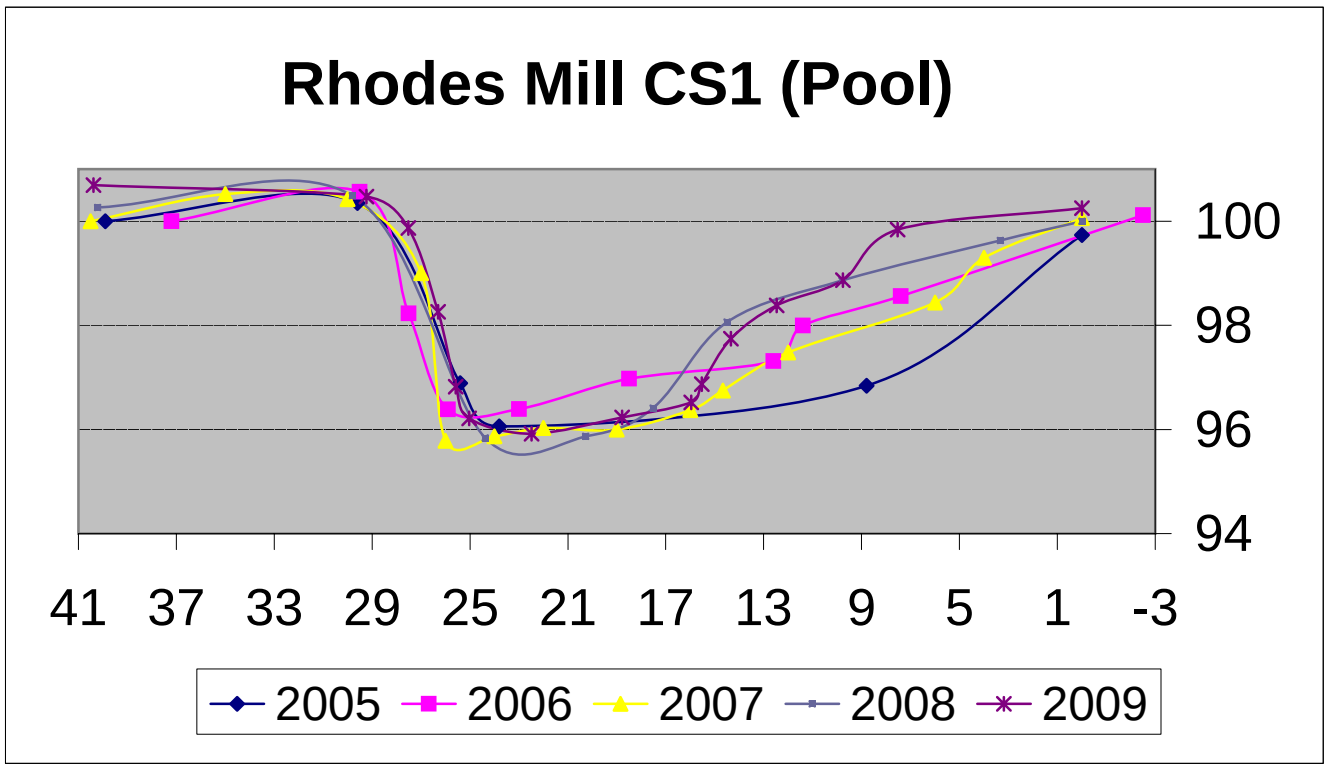
| Survey Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year 1 2005 | | Year 2 2006 | | Year 3 2007 | | Year 4 2008 | | Year 5 2009 | |
| Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation |
| 0.0 | 100.2 | 0.0 | 100.0 | 0.0 | 100.2 | 0.0 | 100.0 | 0.0 | 100.0 |
| 2.2 | 99.6 | 2.4 | 99.3 | 3.3 | 99.0 | 8.3 | 97.6 | 2.8 | 99.0 |
| 5.6 | 97.7 | 5.7 | 97.9 | 5.3 | 98.0 | 14.9 | 100.5 | 4.7 | 98.1 |
| 7.8 | 97.5 | 7.5 | 97.6 | 6.3 | 97.7 | | | 6.0 | 97.7 |
| 9.3 | 97.7 | 9.1 | 97.8 | 7.8 | 97.6 | | | 7.5 | 97.5 |
| 12.2 | 99.4 | 11.3 | 99.5 | 9.3 | 97.7 | | | 8.6 | 97.6 |
| 14.7 | 100.0 | 14.6 | 100.2 | 10.9 | 98.9 | | | 9.3 | 97.8 |
| | | | | 13.0 | 99.8 | | | 9.7 | 98.2 |
| | | | | 15.3 | 100.0 | | | 14.5 | 99.8 |
| | | | | | | | | | |



| Mean of RMCS 1 & 2 Summary Data Table | As-built Mean | M1 2005 | M2 2006 | M3 2007 | M4 2008 | M5 2009 |
|---|---|---|---|---|---|---|
| Bankfull Cross Sectional Area | 79 | 122 | 116 | 128 | 132 | 123 |
| Bankfull Width | 32 | 37 | 37 | 38 | 37 | 37 |
| Bankfull Max Depth | 3.2 | 4.2 | 4.1 | 4.4 | 4.6 | 4.3 |
| Entrenchment Ratio | 9 | 9 | 9 | 9 | 9 | 9 |

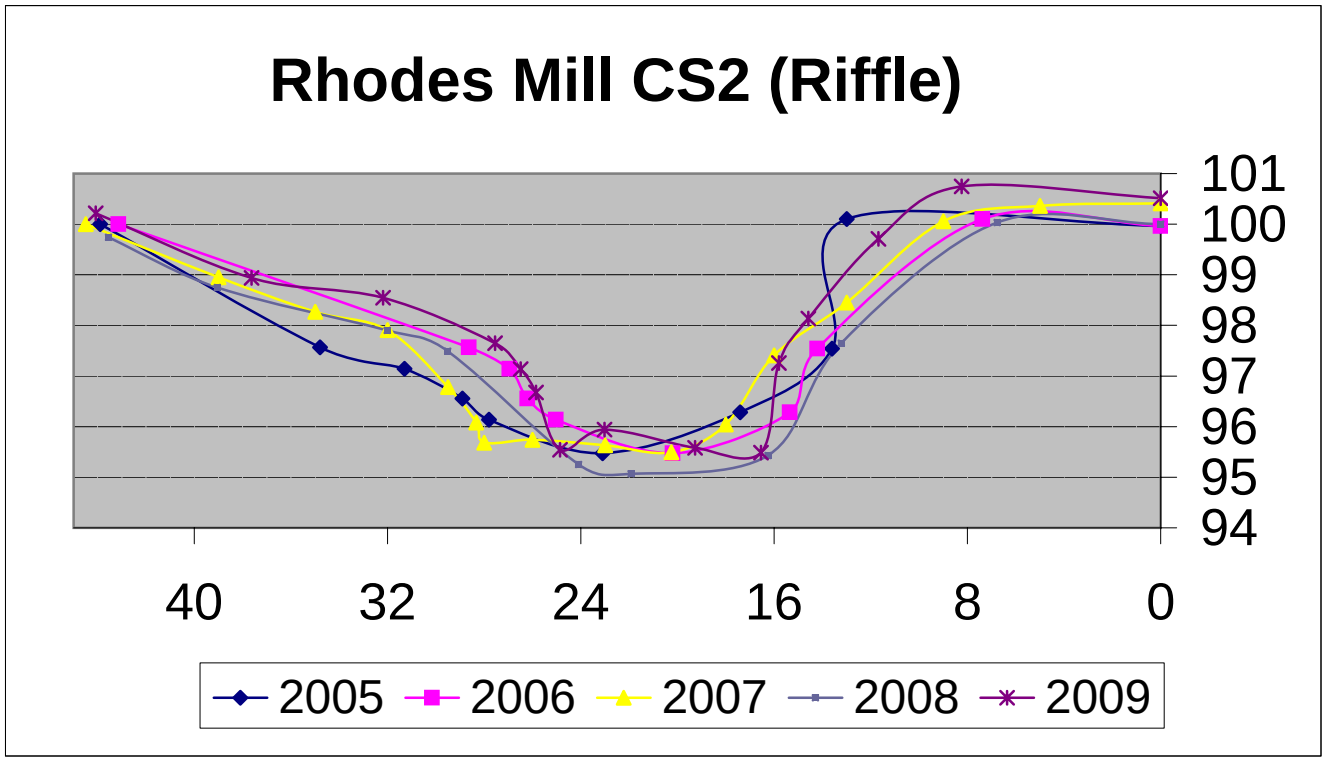
| RM 1 Summary Data Table | M1 2005 | M2 2006 | M3 2007 | M4 2008 | M5 2009 |
|---|---|---|---|---|---|
| Bankfull Cross Sectional Area | 92 | 84 | 99 | 97 | 94 |
| Bankfull Width | 30 | 30 | 30 | 30 | 29 |
| Bankfull Max Depth | 3.9 | 3.6 | 4.2 | 4.2 | 4.1 |
| Entrenchment Ratio | 10 | 10 | 10 | 10 | 10 |
| Average Width of Flood Prone Area = 300 | Average bkf = 100.27 | | | | |

| Survey Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year 1 2005 | | Year 2 2006 | | Year 3 2007 | | Year 4 2008 | | Year 5 2009 | |
| Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation |
| 0.0 | 99.7 | -2.5 | 100.1 | 0.0 | 100.1 | 0.0 | 100.0 | 0.0 | 100.3 |
| 8.8 | 96.8 | 7.4 | 98.6 | 4.0 | 99.3 | 3.3 | 99.6 | 7.5 | 99.8 |
| 23.8 | 96.1 | 11.4 | 98.0 | 6.0 | 98.4 | 9.8 | 98.9 | 9.8 | 98.9 |
| 25.4 | 96.9 | 12.6 | 97.3 | 12.0 | 97.5 | 14.5 | 98.1 | 12.5 | 98.4 |
| 29.6 | 100.4 | 18.5 | 97.0 | 14.7 | 96.8 | 17.5 | 96.4 | 14.3 | 97.7 |
| 39.9 | 100.0 | 23.0 | 96.4 | 16.0 | 96.4 | 20.3 | 95.9 | 15.5 | 96.9 |
| | | 25.9 | 96.4 | 19.0 | 96.0 | 24.4 | 95.8 | 16.0 | 96.5 |
| | | 27.5 | 98.2 | 22.0 | 96.0 | 29.8 | 100.5 | 18.8 | 96.2 |
| | | 29.5 | 100.6 | 24.0 | 95.9 | 40.2 | 100.3 | 22.5 | 95.9 |
| | | 37.2 | 100.0 | 26.0 | 95.8 | | | 25.0 | 96.2 |
| | | | | 27.0 | 99.0 | | | 25.6 | 96.8 |
| | | | | 30.0 | 100.4 | | | 26.3 | 98.3 |
| | | | | 35.0 | 100.5 | | | 27.5 | 99.9 |
| | | | | 40.5 | 100.0 | | | 29.2 | 100.5 |
| | | | | | | | | 40.4 | 100.7 |



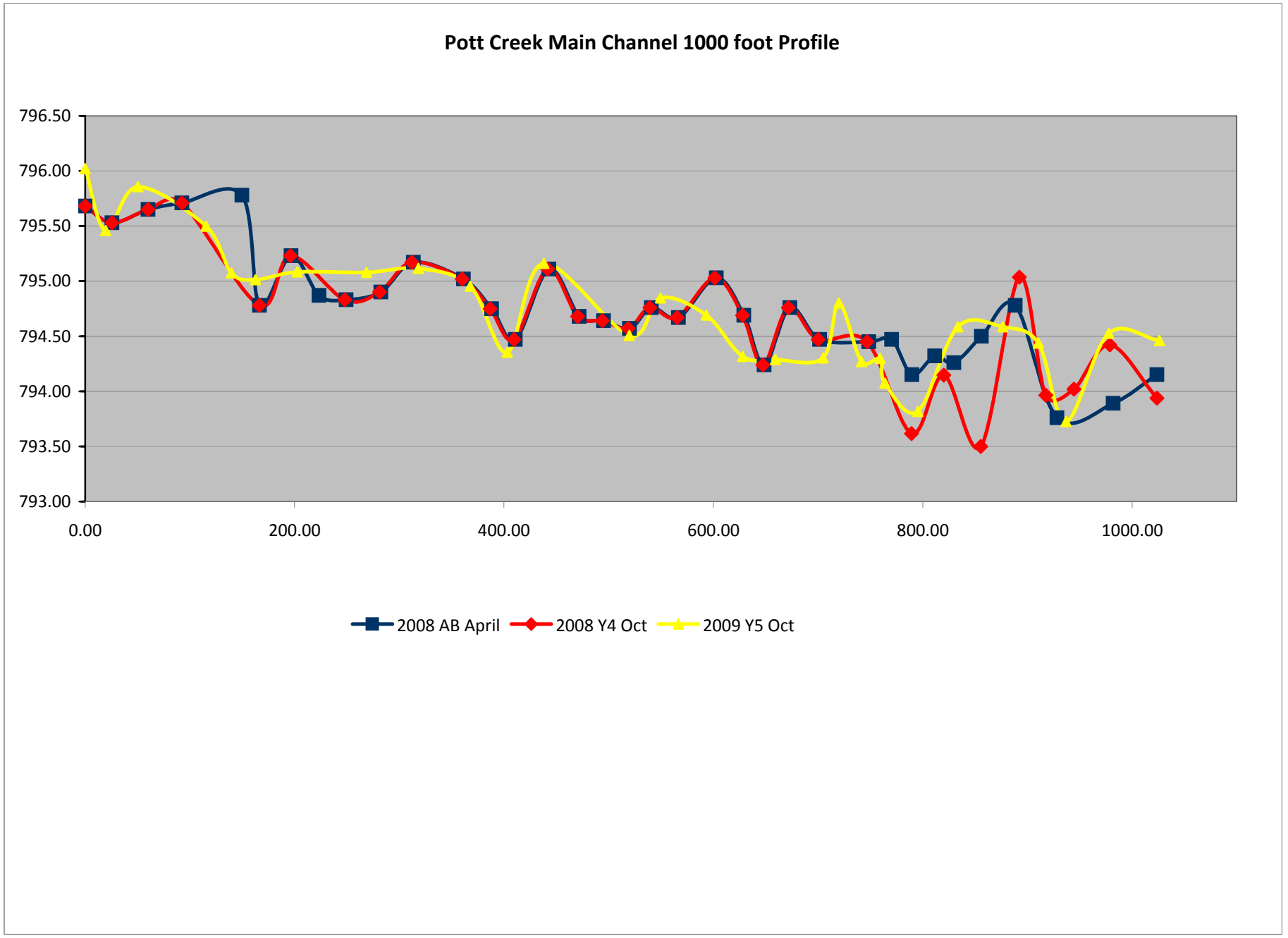
| RM 2 Summary Data Table | M1 2005 | M2 2006 | M3 2007 | M4 2008 | M5 2009 |
|---|---|---|---|---|---|
| Bankfull Cross Sectional Area | 156 | 154 | 158 | 169 | 156 |
| Bankfull Width | 44 | 43 | 45 | 44 | 44 |
| Bankfull Max Depth | 4.5 | 4.5 | 4.5 | 4.9 | 4.5 |
| Entrenchment Ratio | 7 | 7 | 7 | 7 | 7 |
| Average Width of Flood Prone Area = 300 | Average bkf = 100.08 | | | | |

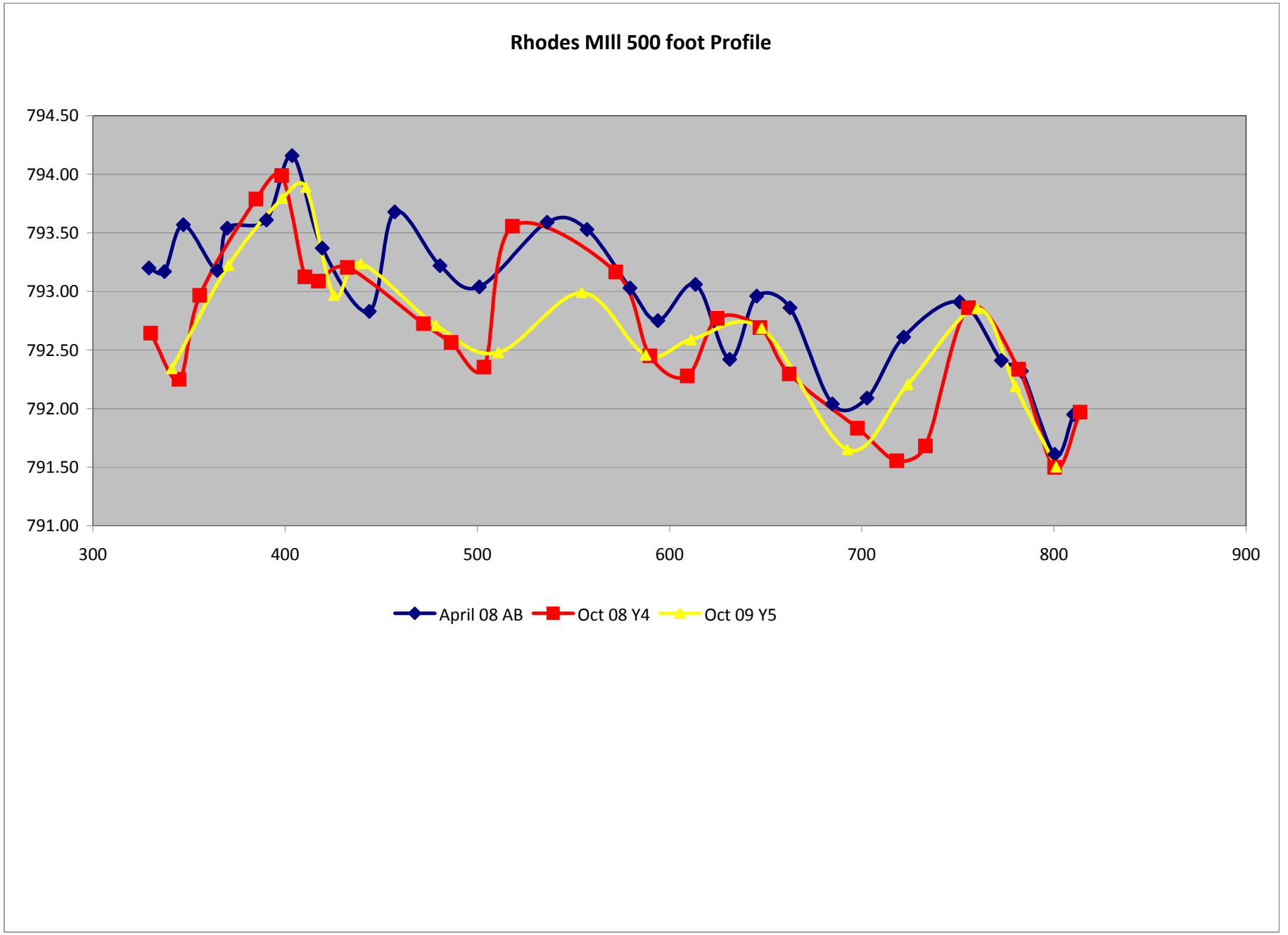
| Survey Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year 1 2005 | | Year 2 2006 | | Year 3 2007 | | Year 4 2008 | | Year 5 2009 | |
| Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation | Station | Elevation |
| 0.0 | 100.0 | 0.0 | 100.0 | 0.0 | 100.4 | 0.0 | 100.0 | 0.0 | 10.5 |
| 13.0 | 100.1 | 7.4 | 100.1 | 5.0 | 100.4 | 6.8 | 100.0 | 8.2 | 100.7 |
| 13.6 | 97.5 | 14.2 | 97.5 | 9.0 | 100.1 | 13.2 | 97.7 | 11.7 | 99.7 |
| 17.4 | 96.3 | 15.4 | 96.3 | 13.0 | 98.5 | 16.3 | 95.4 | 14.6 | 98.1 |
| 23.1 | 95.5 | 20.2 | 95.5 | 16.0 | 97.4 | 21.9 | 95.1 | 15.8 | 97.3 |
| 27.8 | 96.1 | 25.0 | 96.1 | 18.0 | 96.0 | 24.1 | 95.3 | 16.6 | 95.5 |
| 28.9 | 96.6 | 26.2 | 96.6 | 20.3 | 95.5 | 29.5 | 97.5 | 19.3 | 95.6 |
| 31.3 | 97.1 | 27.0 | 97.1 | 23.0 | 95.6 | 32.0 | 97.9 | 23.0 | 95.9 |
| 34.8 | 97.6 | 28.6 | 97.6 | 26.0 | 95.7 | 39.1 | 98.8 | 24.9 | 95.5 |
| 43.9 | 100.0 | 43.2 | 100.0 | 28.0 | 95.7 | 43.6 | 99.7 | 25.9 | 96.7 |
| | | | | 28.3 | 96.1 | | | 26.5 | 97.1 |
| | | | | 29.5 | 96.8 | | | 27.6 | 97.6 |
| | | | | 32.0 | 97.9 | | | 32.2 | 98.5 |
| | | | | 35.0 | 98.3 | | | 37.6 | 98.9 |
| | | | | 39.0 | 99.0 | | | 44.1 | 100.2 |
| | | | | 44.5 | 100.0 | | | | |

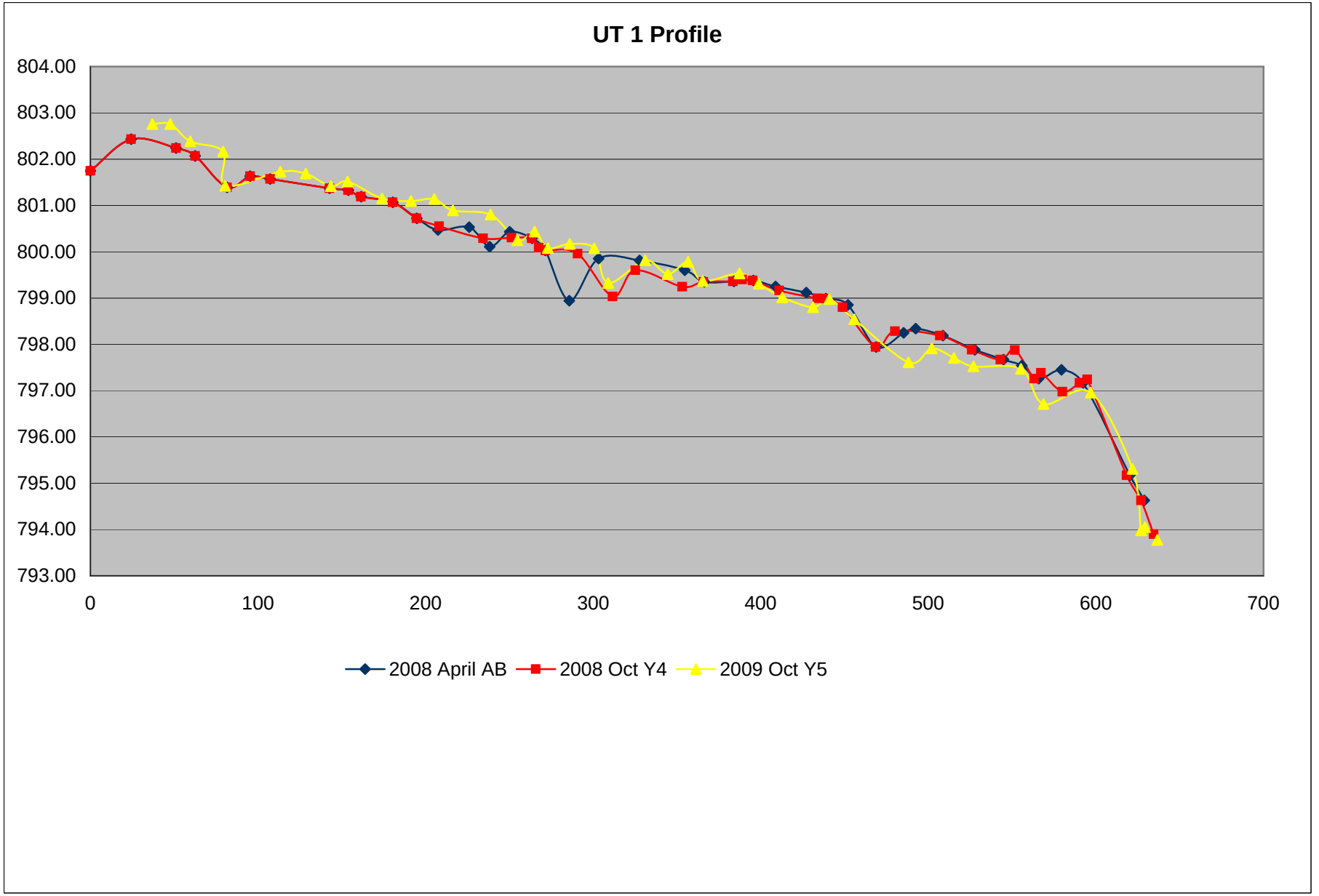


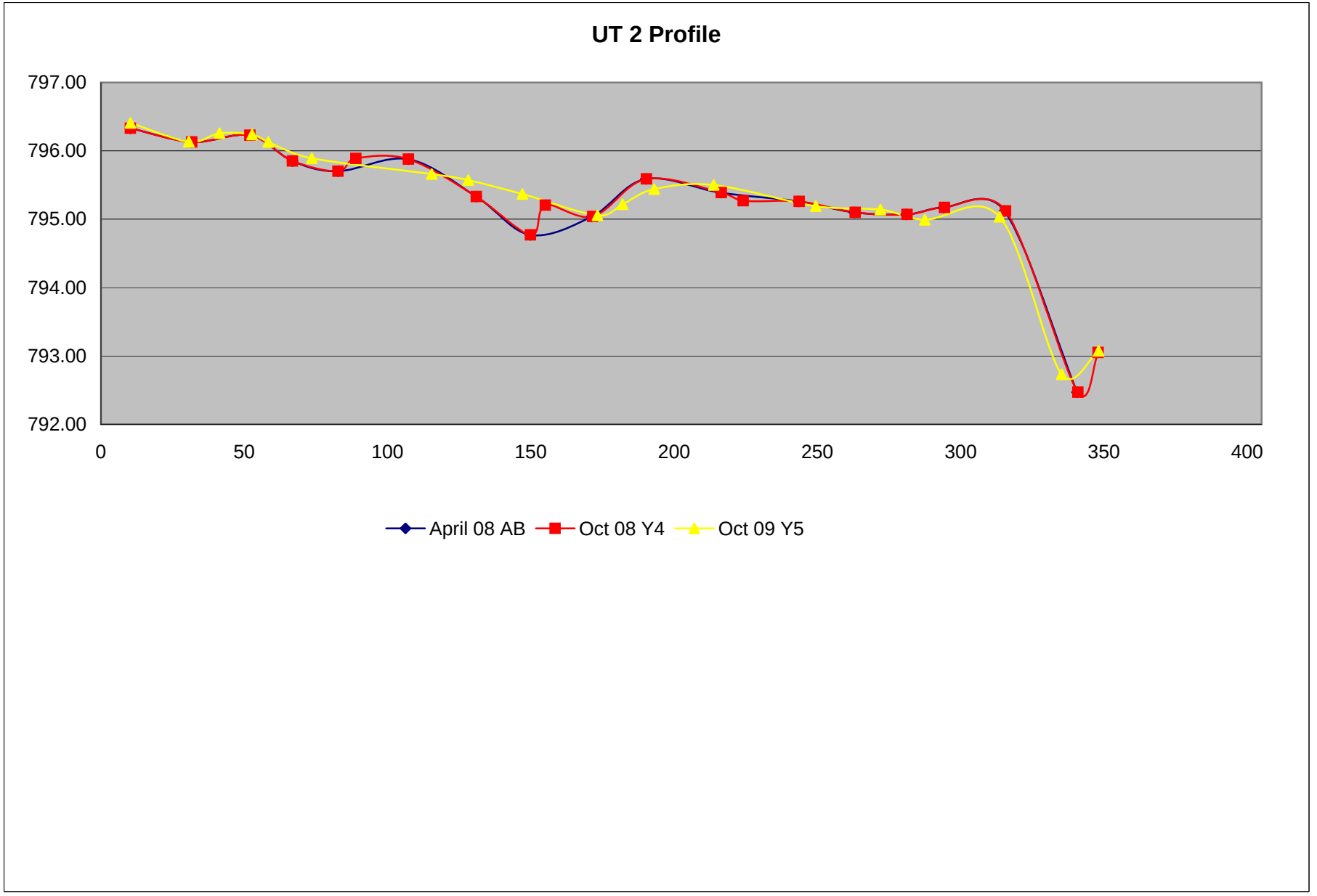
# APPENDIX C. Profile Raw Data

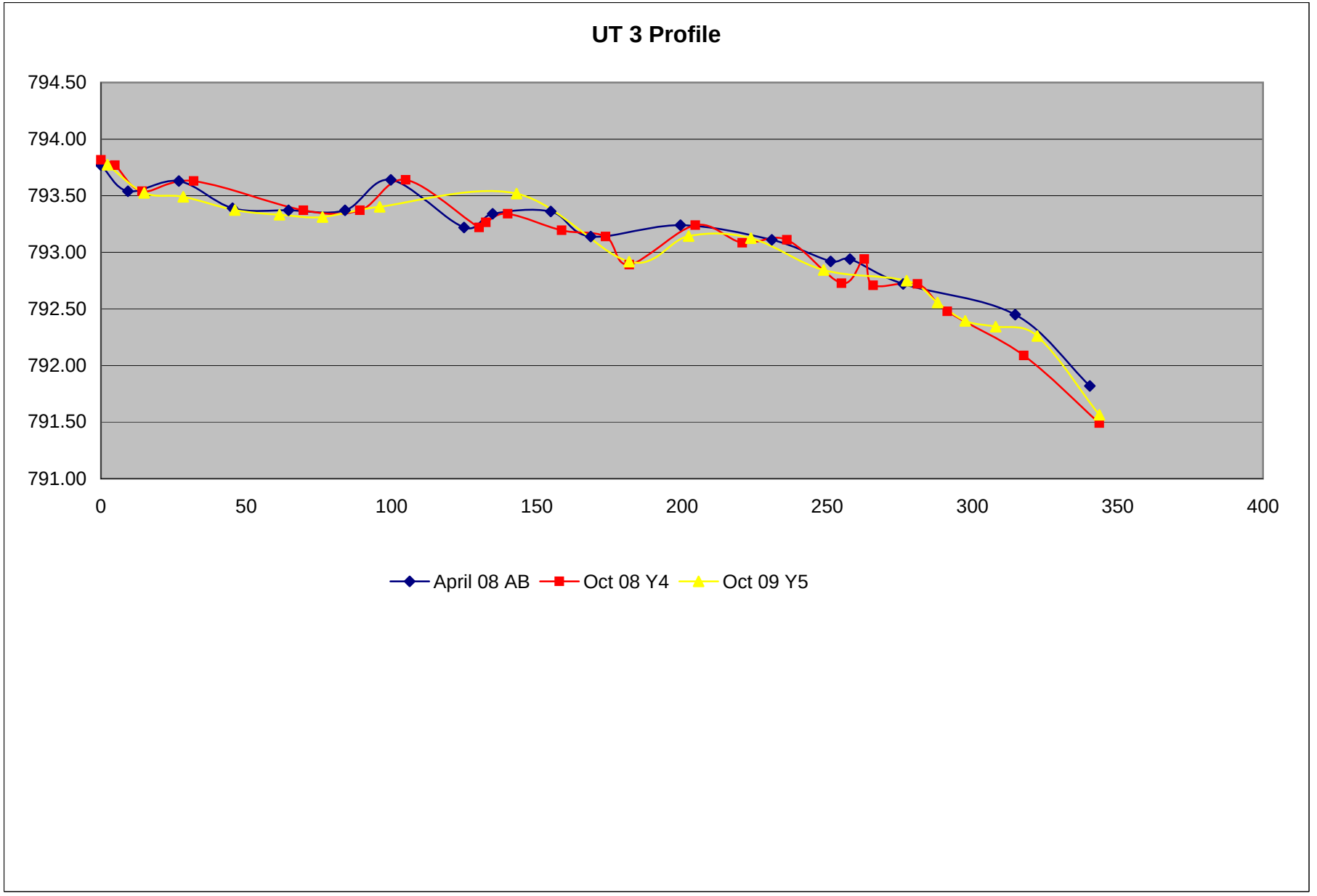
## Data Tables
## Pebble Count Graphs

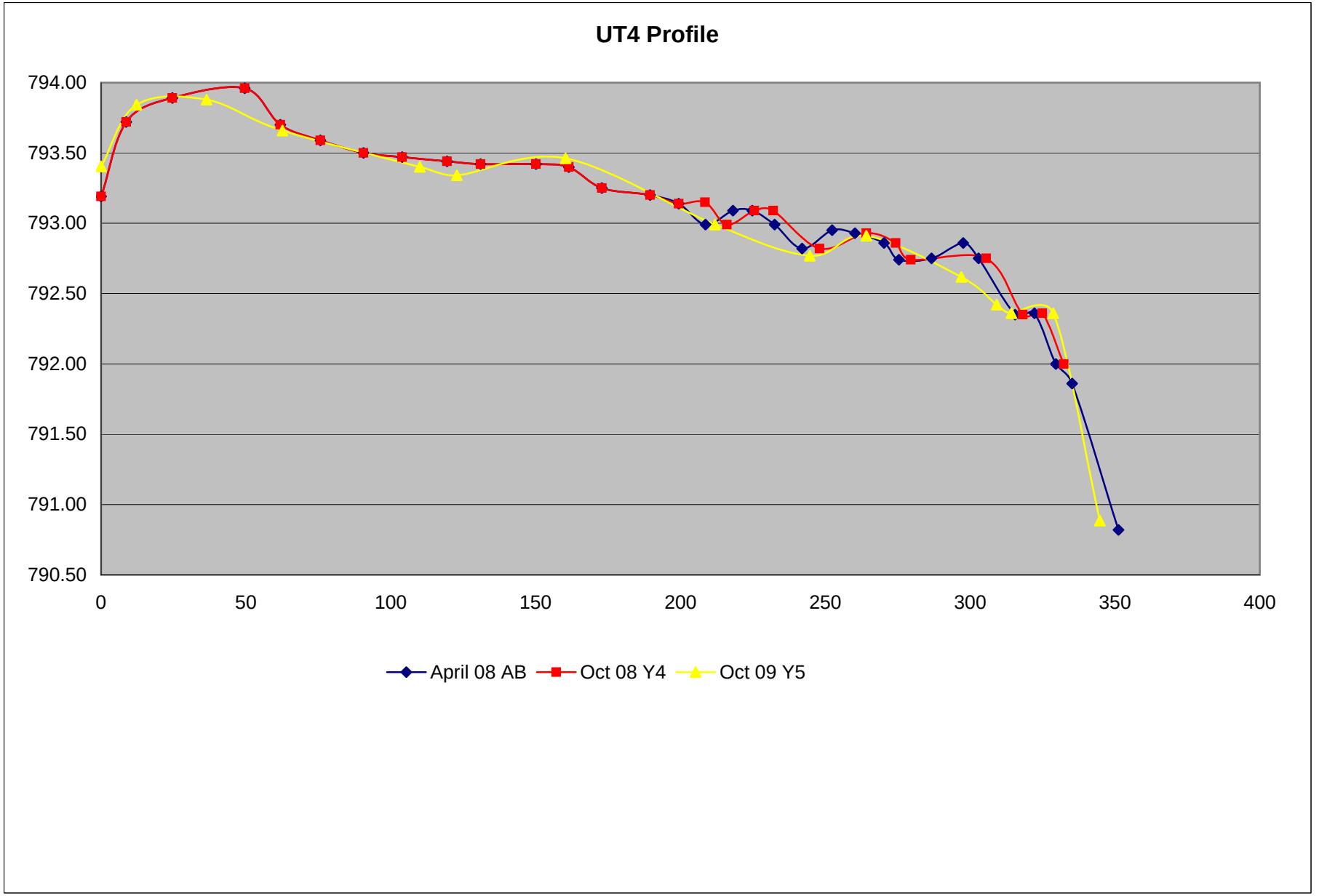

Pott Creek Main Channel 1000 foot Profile
796.50
796.00
795.50
795.00
794.50
794.00
793.50
793.00
0.00
200.00
400.00
600.00
800.00
1000.00
2008 AB April
2008 Y4 Oct
2009 Y5 Oct


Rhodes MIll 500 foot Profile
794.50
794.00
793.50
793.00
792.50
792.00
791.50
791.00
300
400
500
600
700
800
900
April 08 AB
Oct 08 Y4
Oct 09 Y5


UT 1 Profile
804.00
803.00
802.00
801.00
800.00
799.00
798.00
797.00
796.00
795.00
794.00
793.00
0
100
200
300
400
500
600
700
2008 April AB
2008 Oct Y4
2009 Oct Y5

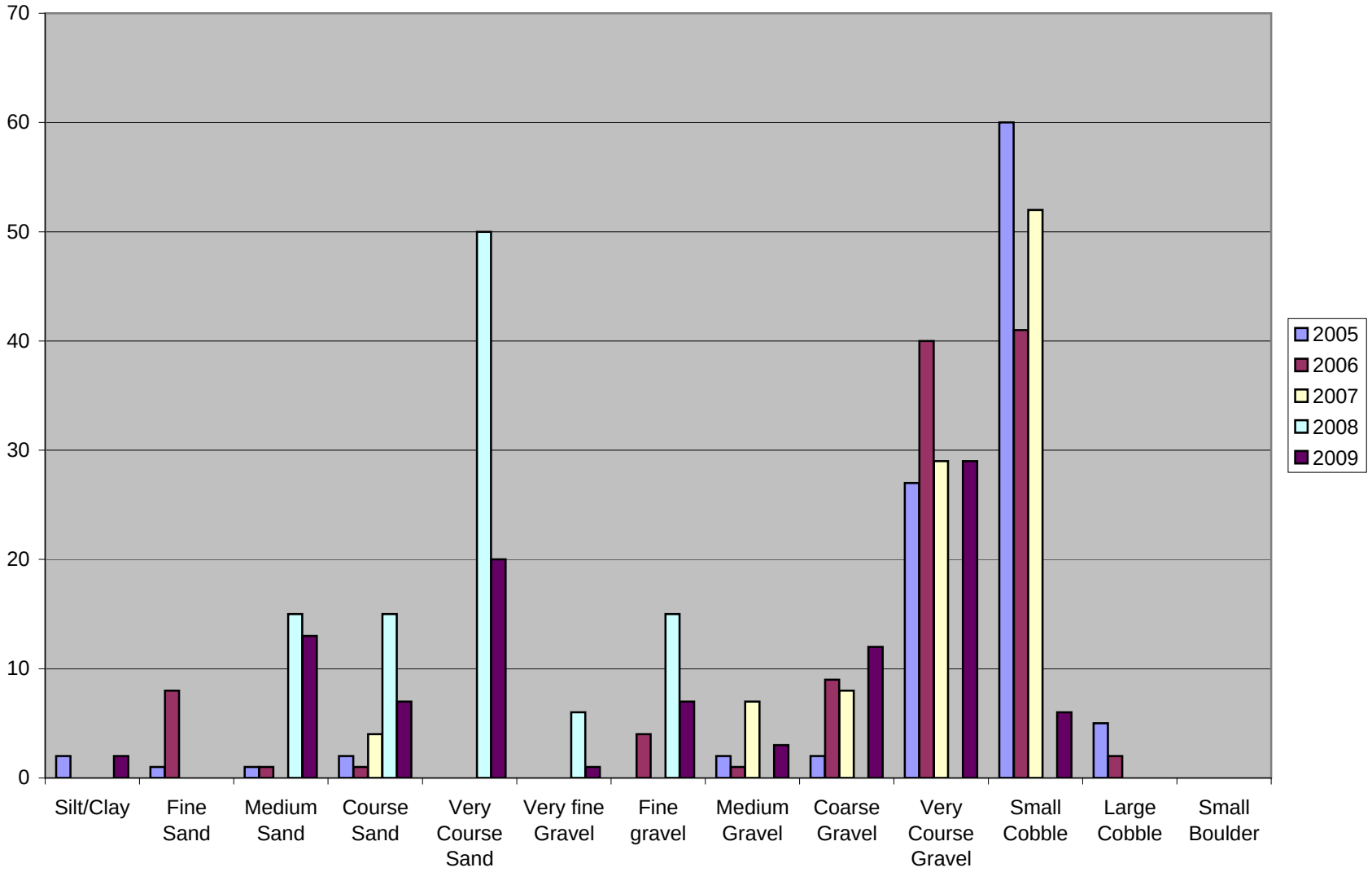

UT 2 Profile
797.00
796.00
795.00
794.00
793.00
792.00
0
50
100
150
200
250
300
350
400
April 08 AB
Oct 08 Y4
Oct 09 Y5


UT 3 Profile
794.50
794.00
793.50
793.00
792.50
792.00
791.50
791.00
0
50
100
150
200
250
300
350
400
April 08 AB
Oct 08 Y4
Oct 09 Y5


UT4 Profile
794.00
793.50
793.00
792.50
792.00
791.50
791.00
790.50
0
50
100
150
200
250
300
350
400
April 08 AB
Oct 08 Y4
Oct 09 Y5

Pott Creek

| | Riffle 1 | | | | | Riffle 2 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 | 2005 | 2006 | 2007 | 2008 | 2009 |
| Silt/Clay | 2 | | | | 2 | 1 | 1 | | | 1 |
| Fine Sand | 1 | 8 | | | | 3 | | | | 5 |
| Medium Sand | 1 | 1 | | 15 | 13 | 1 | | | | |
| Course Sand | 2 | 1 | 4 | 15 | 7 | 4 | 3 | 9 | | 4 |
| Very Course Sand | | | | 50 | 20 | | | | | |
| Very fine Gravel | | | | 6 | 1 | | | | 30 | 23 |
| Fine gravel | | 4 | | 15 | 7 | | 1 | | 22 | 4 |
| Medium Gravel | 2 | 1 | 7 | | 3 | 1 | 5 | | 12 | 6 |
| Coarse Gravel | 2 | 9 | 8 | | 12 | 6 | 1 | | 5 | 20 |
| Very Course Gravel | 27 | 40 | 29 | | 29 | 58 | 43 | 50 | 30 | 36 |
| Small Cobble | 60 | 41 | 52 | | 6 | 28 | 47 | 42 | 8 | |
| Large Cobble | 5 | 2 | | | | 1 | | | | |
| Small Boulder | | | | | | | | | | |
| | 102 | 107 | 100 | 101 | 100 | 103 | 101 | 101 | 107 | 99 |


Pott Creek Riffle 1 Peeble Count
70
60
50
40
30
20
10
0
Silt/Clay
Fine Sand
Medium Sand
Course Sand
Very Course Sand
Very fine Gravel
Fine gravel
Medium Gravel
Coarse Gravel
Very Course Gravel
Small Cobble
Large Cobble
Small Boulder
2005
2006
2007
2008
2009

Pott Creek II Pebble Count

10/6/2009

**Riffle Pebble Count**

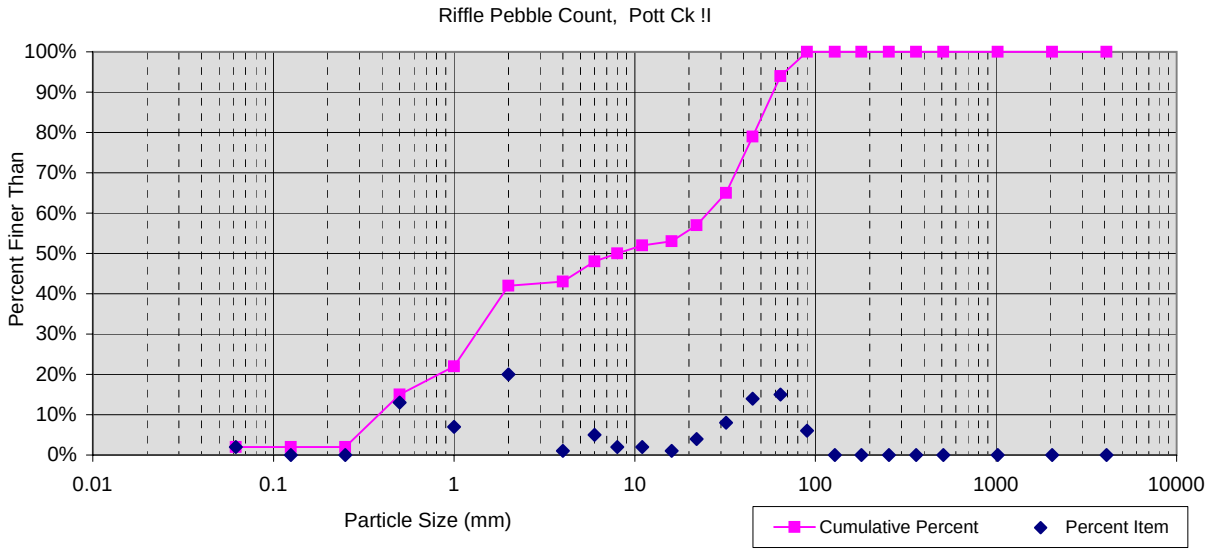
| Material | Size Range (mm) | | Count |
|---|---|---|---|
| silt/clay | 0 | 0.062 | 2 |
| very fine sand | 0.062 | 0.13 | |
| fine sand | 0.13 | 0.25 | |
| medium sand | 0.25 | 0.5 | 13 |
| coarse sand | 0.5 | 1 | 7 |
| very coarse sand | 1 | 2 | 20 |
| very fine gravel | 2 | 4 | 1 |
| fine gravel | 4 | 6 | 5 |
| fine gravel | 6 | 8 | 2 |
| medium gravel | 8 | 11 | 2 |
| medium gravel | 11 | 16 | 1 |
| coarse gravel | 16 | 22 | 4 |
| coarse gravel | 22 | 32 | 8 |
| very coarse gravel | 32 | 45 | 14 |
| very coarse gravel | 45 | 64 | 15 |
| small cobble | 64 | 90 | 6 |
| medium cobble | 90 | 128 | |
| large cobble | 128 | 180 | |
| very large cobble | 180 | 256 | |
| small boulder | 256 | 362 | |
| small boulder | 362 | 512 | |
| medium boulder | 512 | 1024 | |
| large boulder | 1024 | 2048 | |
| very large boulder | 2048 | 4096 | |
| bedrock | | | |
| Total Particle Count: | | | 100 |

Pott Creek II

Pott Creek Riffle 1

Linclonton, NC

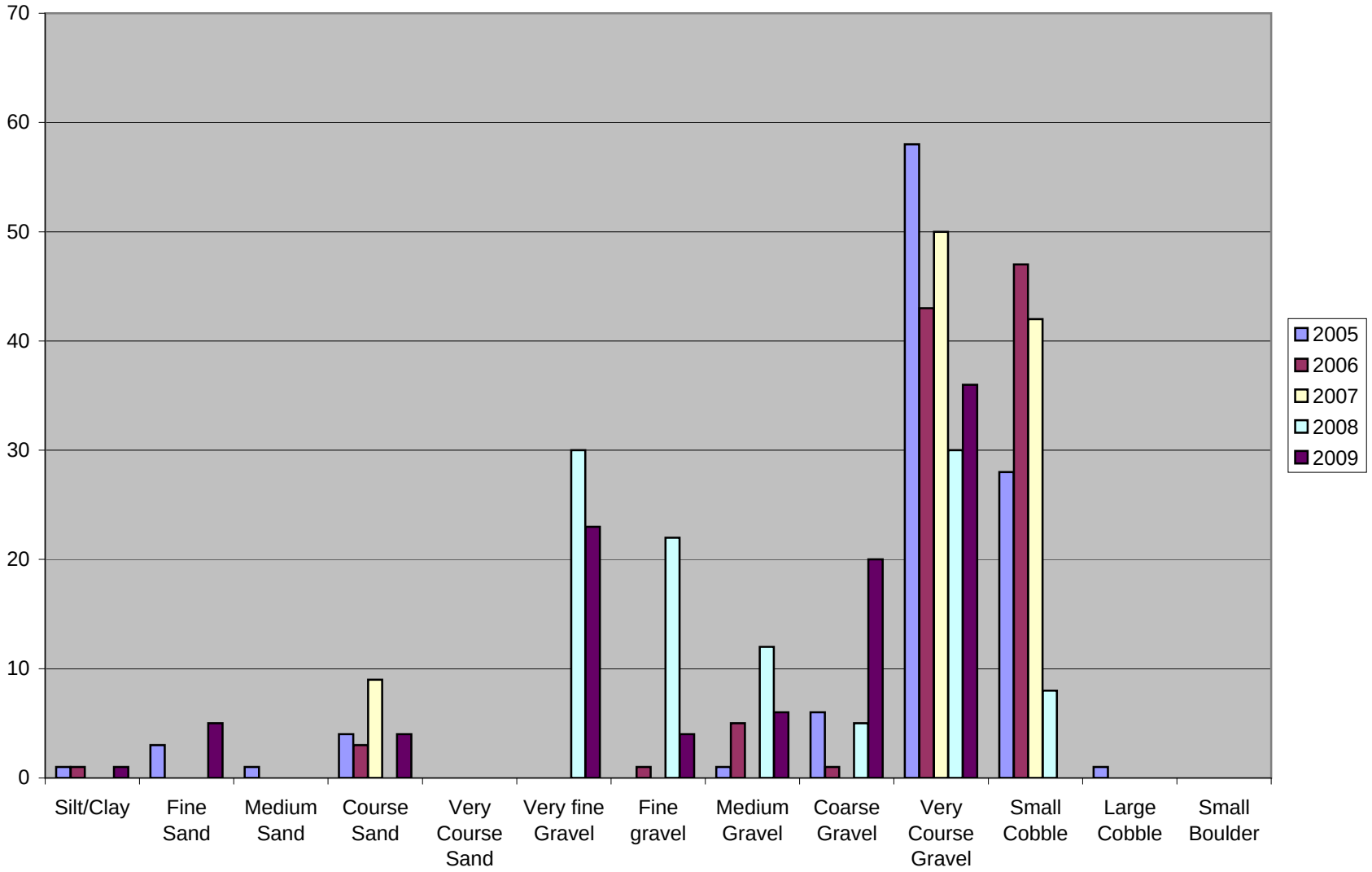
Note: **(adjacent to PCJH5)**




| Size percent less than (mm) | | | | |
|---|---|---|---|---|
| D16 | D35 | D50 | D84 | D95 |
| 0.552 | 1.57 | 8.0 | 51 | 68 |

| Percent by substrate type | | | | | |
|---|---|---|---|---|---|
| silt/clay | sand | gravel | cobble | boulder | bedrock |
| 2% | 40% | 52% | 6% | 0% | 0% |

## Pott Creek Riffle 2 Peeble Count



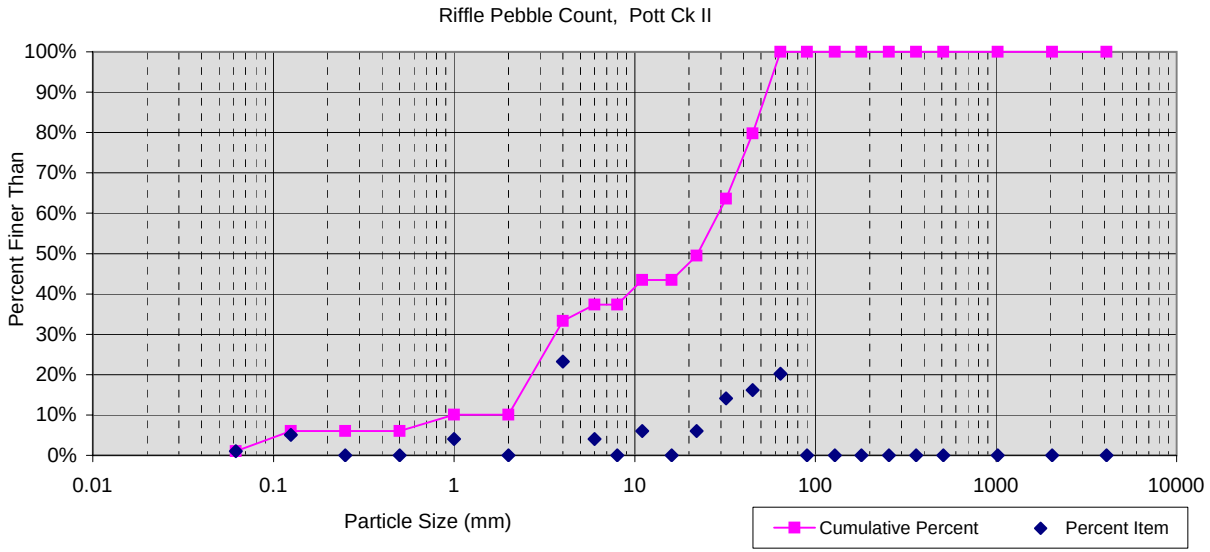
Pott Creek II Pebble Count

10/6/2009

**Riffle Pebble Count**

| Material | Size Range (mm) | | Count |
|---|---|---|---|
| silt/clay | 0 | 0.062 | 1 |
| very fine sand | 0.062 | 0.13 | 5 |
| fine sand | 0.13 | 0.25 | |
| medium sand | 0.25 | 0.5 | |
| coarse sand | 0.5 | 1 | 4 |
| very coarse sand | 1 | 2 | |
| very fine gravel | 2 | 4 | 23 |
| fine gravel | 4 | 6 | 4 |
| fine gravel | 6 | 8 | |
| medium gravel | 8 | 11 | 6 |
| medium gravel | 11 | 16 | |
| coarse gravel | 16 | 22 | 6 |
| coarse gravel | 22 | 32 | 14 |
| very coarse gravel | 32 | 45 | 16 |
| very coarse gravel | 45 | 64 | 20 |
| small cobble | 64 | 90 | |
| medium cobble | 90 | 128 | |
| large cobble | 128 | 180 | |
| very large cobble | 180 | 256 | |
| small boulder | 256 | 362 | |
| small boulder | 362 | 512 | |
| medium boulder | 512 | 1024 | |
| large boulder | 1024 | 2048 | |
| very large boulder | 2048 | 4096 | |
| bedrock | | | |
| Total Particle Count: | | | 99 |

Pott Creek II
Pott Creek Riffle 2
Linclonton, NC
Note: **(adjacent to PCLS3)**



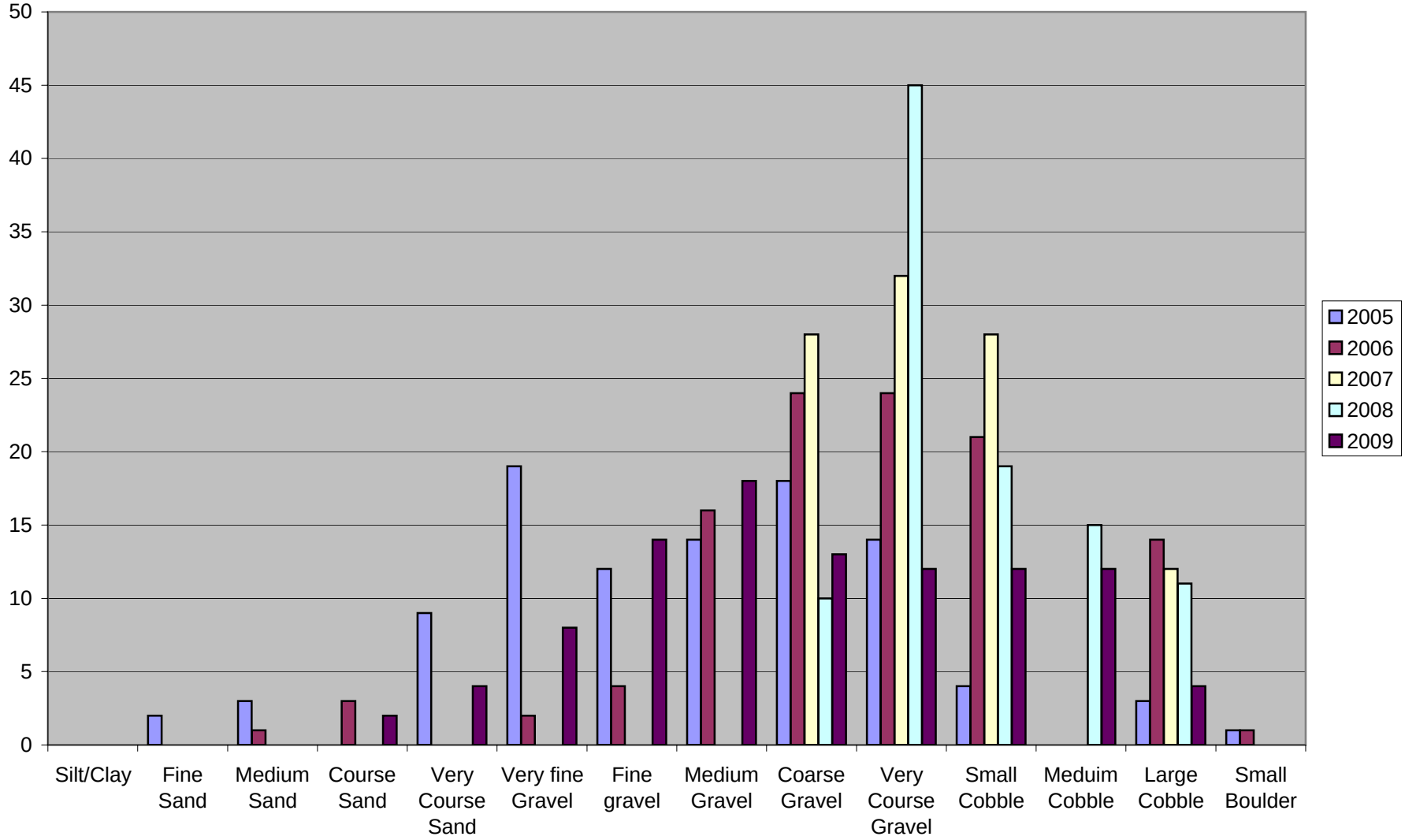

| Size percent less than (mm) | | | | |
|---|---|---|---|---|
| D16 | D35 | D50 | D84 | D95 |
| 2.385 | 4.73 | 22.3 | 48 | 59 |

| Percent by substrate type | | | | | |
|---|---|---|---|---|---|
| silt/clay | sand | gravel | cobble | boulder | bedrock |
| 1% | 9% | 90% | 0% | 0% | 0% |

Rhodes Mill

| | Riffle 1 | | | | | Riffle 2 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 | 2005 | 2006 | 2007 | 2008 | 2009 |
| Silt/Clay | | | | | | 1 | | | | 1 |
| Fine Sand | 2 | | | | | | | | | |
| Medium Sand | 3 | 1 | | | | 1 | 2 | | | |
| Course Sand | | 3 | | | 2 | 2 | 8 | 9 | | 18 |
| Very Course Sand | 9 | | | | 4 | 6 | | 10 | 6 | |
| Very fine Gravel | 19 | 2 | | | 8 | 3 | 3 | 8 | 26 | |
| Fine gravel | 12 | 4 | | | 14 | 10 | 12 | | 42 | 8 |
| Medium Gravel | 14 | 16 | | | 18 | 10 | 28 | 24 | 36 | 20 |
| Coarse Gravel | 18 | 24 | 28 | 10 | 13 | 32 | 26 | 19 | 1 | 8 |
| Very Course Gravel | 14 | 24 | 32 | 45 | 12 | 25 | 19 | 30 | 1 | 24 |
| Small Cobble | 4 | 21 | 28 | 19 | 12 | 9 | 2 | 4 | | 10 |
| Meduim Cobble | | | | 15 | 12 | | | | | 11 |
| Large Cobble | 3 | 14 | 12 | 11 | 4 | 2 | | | | 5 |
| Small Boulder | 1 | 1 | | | | | | | | |
| | 99 | 110 | 100 | 100 | 99 | 101 | 100 | 104 | 112 | 105 |

## Rhodes Mill Riffle 1 Peeble Count



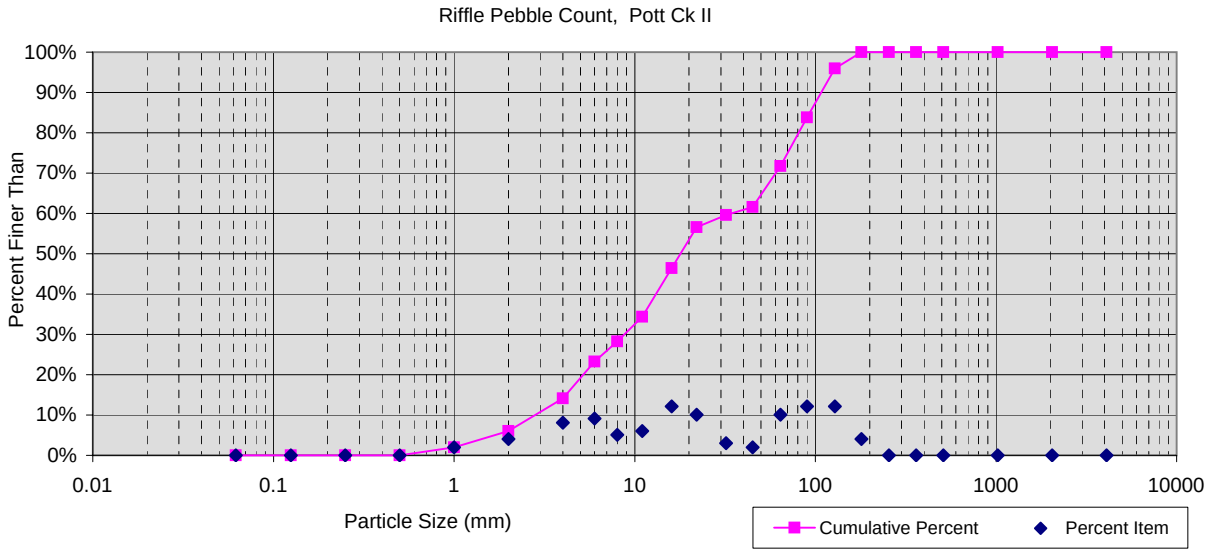
Pott Creek II Pebble Count

10/6/2009

## Riffle Pebble Count

| Material | Size Range (mm) | | Count |
|---|---|---|---|
| silt/clay | 0 | 0.062 | |
| very fine sand | 0.062 | 0.13 | |
| fine sand | 0.13 | 0.25 | |
| medium sand | 0.25 | 0.5 | |
| coarse sand | 0.5 | 1 | 2 |
| very coarse sand | 1 | 2 | 4 |
| very fine gravel | 2 | 4 | 8 |
| fine gravel | 4 | 6 | 9 |
| fine gravel | 6 | 8 | 5 |
| medium gravel | 8 | 11 | 6 |
| medium gravel | 11 | 16 | 12 |
| coarse gravel | 16 | 22 | 10 |
| coarse gravel | 22 | 32 | 3 |
| very coarse gravel | 32 | 45 | 2 |
| very coarse gravel | 45 | 64 | 10 |
| small cobble | 64 | 90 | 12 |
| medium cobble | 90 | 128 | 12 |
| large cobble | 128 | 180 | 4 |
| very large cobble | 180 | 256 | |
| small boulder | 256 | 362 | |
| small boulder | 362 | 512 | |
| medium boulder | 512 | 1024 | |
| large boulder | 1024 | 2048 | |
| very large boulder | 2048 | 4096 | |
| bedrock | | | |
| Total Particle Count: | | | 99 |

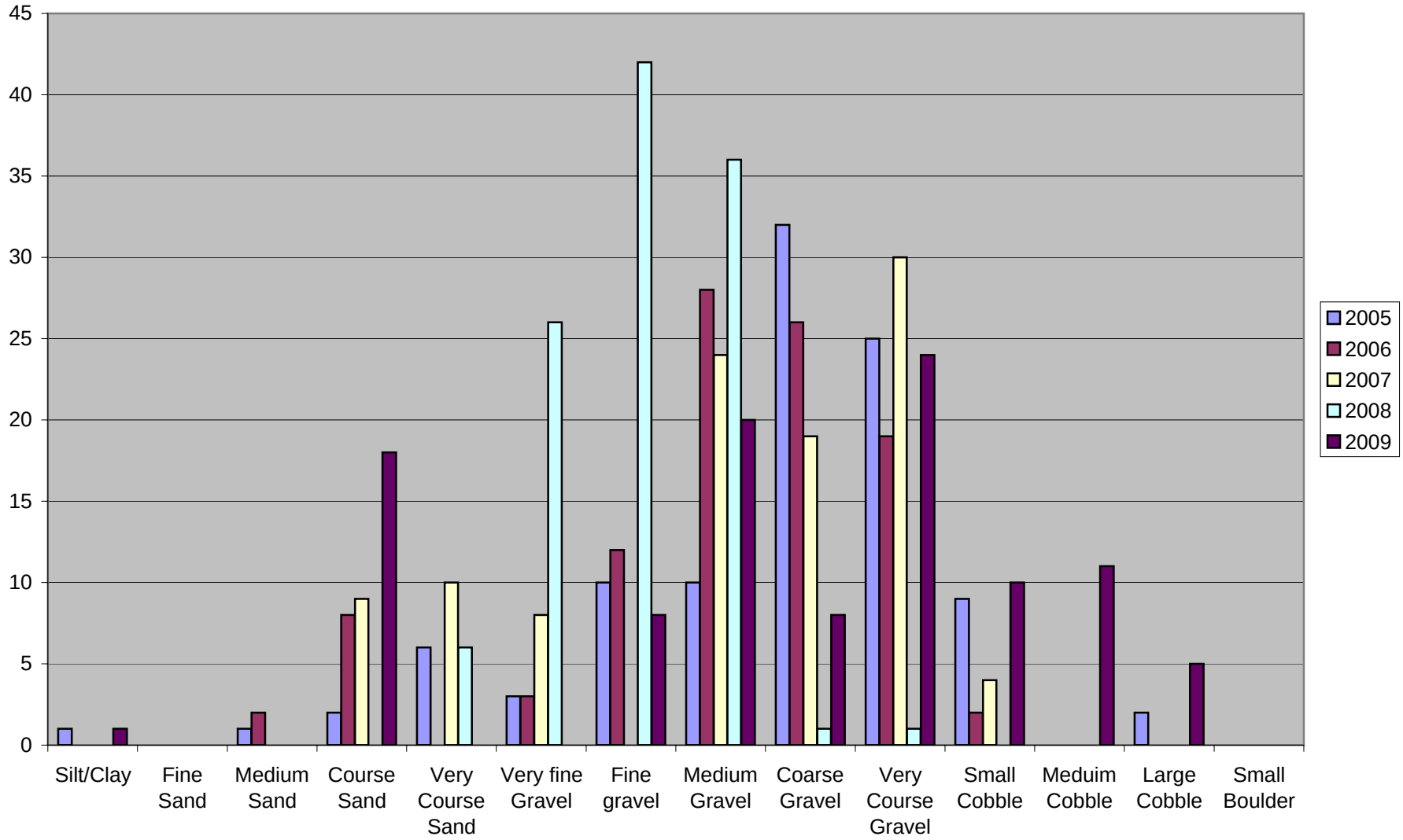
| | |
|---|---|
| | Pott Creek II |
| | Rhodes Mill Creek Riffle 1 |
| | Linclonton, NC |
| Note: | |




| Size percent less than (mm) | | | | |
|---|---|---|---|---|
| D16 | D35 | D50 | D84 | D95 |
| 4.346 | 11.23 | 17.9 | 90 | 124 |

| Percent by substrate type | | | | | |
|---|---|---|---|---|---|
| silt/clay | sand | gravel | cobble | boulder | bedrock |
| 0% | 6% | 66% | 28% | 0% | 0% |

## Rhodes Mill Riffle 2 Peeble Count



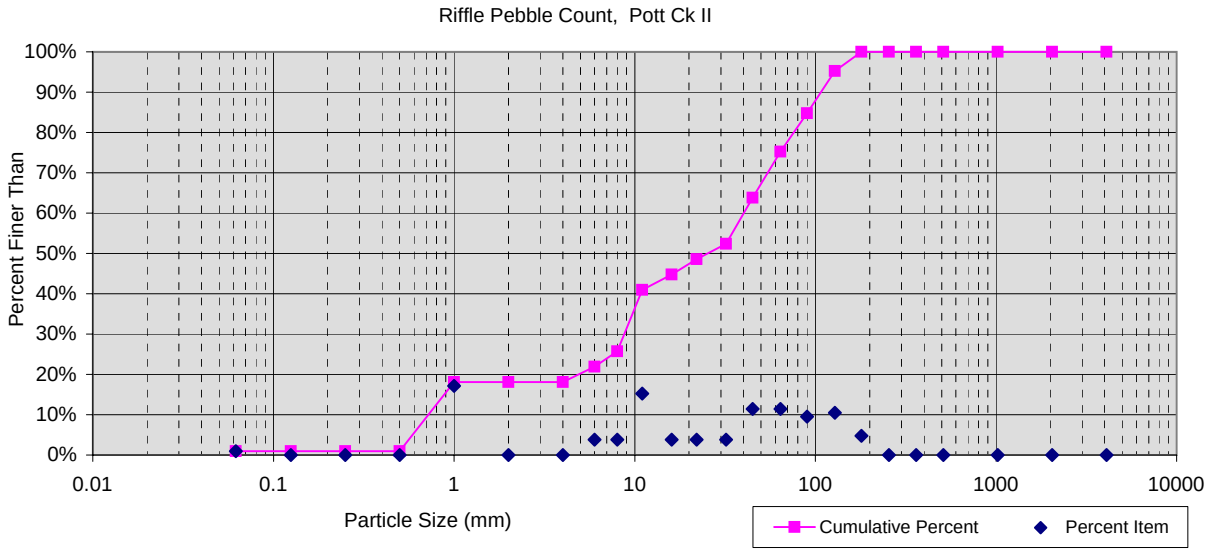
Pott Creek II Pebble Count

10/6/2009

**Riffle Pebble Count**

| Material | Size Range (mm) | | Count |
|---|---|---|---|
| silt/clay | 0 | 0.062 | 1 |
| very fine sand | 0.062 | 0.13 | |
| fine sand | 0.13 | 0.25 | |
| medium sand | 0.25 | 0.5 | |
| coarse sand | 0.5 | 1 | 18 |
| very coarse sand | 1 | 2 | |
| very fine gravel | 2 | 4 | |
| fine gravel | 4 | 6 | 4 |
| fine gravel | 6 | 8 | 4 |
| medium gravel | 8 | 11 | 16 |
| medium gravel | 11 | 16 | 4 |
| coarse gravel | 16 | 22 | 4 |
| coarse gravel | 22 | 32 | 4 |
| very coarse gravel | 32 | 45 | 12 |
| very coarse gravel | 45 | 64 | 12 |
| small cobble | 64 | 90 | 10 |
| medium cobble | 90 | 128 | 11 |
| large cobble | 128 | 180 | 5 |
| very large cobble | 180 | 256 | |
| small boulder | 256 | 362 | |
| small boulder | 362 | 512 | |
| medium boulder | 512 | 1024 | |
| large boulder | 1024 | 2048 | |
| very large boulder | 2048 | 4096 | |
| bedrock | | | |
| Total Particle Count: | | | 105 |

| | |
|---|---|
| | Pott Creek II |
| | Rhodes Mill Creek Riffle 2 |
| | Linclonton, NC |
| Note: | |




| Size percent less than (mm) | | | | |
|---|---|---|---|---|
| D16 | D35 | D50 | D84 | D95 |
| 0.919 | 9.71 | 25.3 | 88 | 127 |

| Percent by substrate type | | | | | |
|---|---|---|---|---|---|
| silt/clay | sand | gravel | cobble | boulder | bedrock |
| 1% | 17% | 57% | 25% | 0% | 0% |

# APPENDIX D. Structures and Problem Areas

## Photo Log

# Structure Photo Log


PCCV(cross vane)1U(upstream) facing upstream


PCCV1U facing downstream


PCCV2U facing upstream


PCCV2U facing downstream


PCCV3U facing upstream


PCCV3U facing downstream


PCCV4U facing upstream


PCCV4U facing downstream

PCCV5D(downstream) facing upstream


PCCV5D facing downstream


PCJH(J hook)1U facing upstream


PCJH1U facing downstream


PCJH2U facing upstream


PCJH2U facing downstream


PCJH3U facing upstream


PCJH3U facing downstream


PCJH4U facing upstream


PCJH4U facing downstream


PCJH5U facing upstream


PCJH5U facing downstream


PCJH6U facing upstream


PCJH6U facing downstream


PCJH7U facing upstream


PCJH7U facing downstream


PCJH8U facing upstream

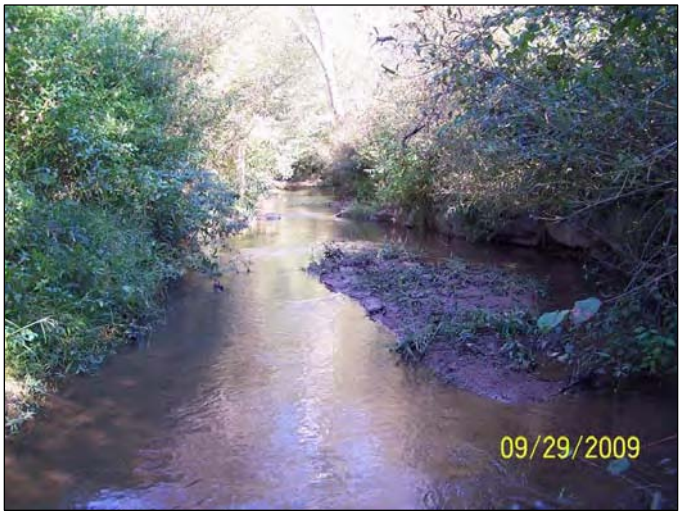

PCJH8U facing downstream


PCJH9D facing upstream


PCJH9D facing downstream


PCJH10D facing upstream


PCJH10D facing downstream




PCRV(rock vane)1U facing upstream


PCRV1U facing downstream


PCRV2U facing upstream

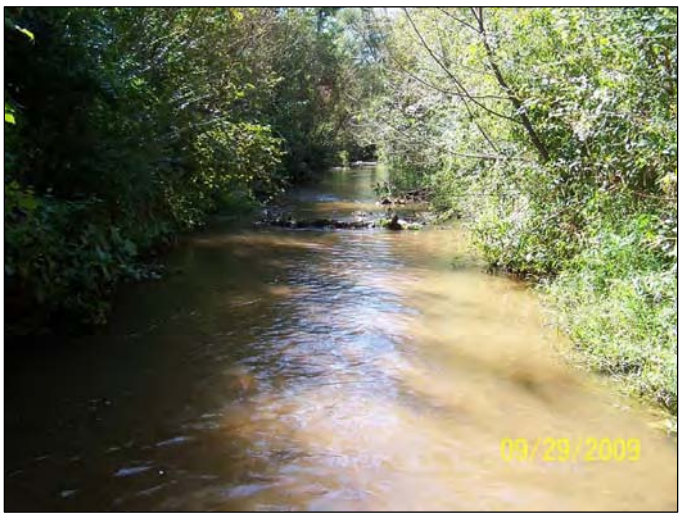

PCRV2U facing downstream


PCRV3U facing upstream


PCRV3U facing downstream


PCRV4U facing upstream


PCRV4U facing downstream




PCRV5U facing upstream


PCRV5U facing downstream


PCRV6D facing upstream


PCRV6D facing downstream


PCRV7D facing upstream


PCRV7D facing downstream


PCRV8D facing upstream


PCRV8D facing downstream


RM(Rhodes Mill)CV facing upstream


RMCV facing downstream


RMJH1 facing upstream


RMJH1 facing downstream


RMJH2 facing upstream


RMJH2 facing downstream


RMJH3 facing upstream


RMJH3 facing downstream


RMRV facing upstream


RMRV facing downstream


UT1CV1


UT1CV2


UT1RV