# Dog Bite Stream Restoration Site
# Monitoring Report – MY01
# Mitchell County, NC
## Basin 06010108 - Contract # D06056-A

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# EXECUTIVE SUMMARY

The Dog Bite Site (DBS) is located in the Blue Ridge physiographic province in central Mitchell County, North Carolina. The project will provide mitigation for stream impacts within the 8-digit hydrologic cataloging unit 06010108 in the French Broad River Basin by restoring and enhancing 3,707 linear feet on the DBS, generating 3,335 stream mitigation units (SMU's.) The goals of the project include restoring the stream's riparian buffer and creating a stable stream system. In order to reach these goals, the project objectives included planting a functional Montane Alluvial Forest community along with Montane Oak-Hickory Forest to create an effective riparian buffer, removing livestock from the riparian areas with fencing, stopping bank erosion by developing the appropriate channel dimension, arresting bed elevation lowering, creating in-stream habitat by restoring a profile with defined pools and adding woody debris habitat structures, and removing a livestock waste pond previously adjacent to the stream. This report describes the results from the findings of the first year of monitoring that took place in 2010.

The project generally flows from east to west and has a contributing drainage area of approximately 0.54 square mile. The project is made up of the headwaters of White Oak Creek, including the main stem of White Oak Creek (WOC) and two tributaries (UT1 and UT2). The project watershed is rural and faces low development pressure from the surrounding area. The stream design and the restoration plan were completed in July 2008 and construction began in August 2009 and ended in September 2009.

The site was planted with bare root trees and shrubs and live stakes in December 2009. A total of 19 different species were planted at the site. Seven vegetation monitoring plots were established during the as-built survey. The riparian vegetation must meet a minimum survival success rate of 260 stems/acre after five years. The plots were monitored following the CVS-EEP monitoring protocol and the first-year monitoring counted an average of 416 stems/ acre. Isolated invasive species, most notably multiflora rose (*Rosa multiflora*), were noted in the restored stream buffer and will be controlled over the course of the monitoring period. The first-year monitoring found the vegetation component of the project to be on track to meeting the success criterion.

The stream restoration included eight separate reaches, which have each been enhanced or restored based on a combination of Priority 2 and 3 approaches. Log cross vanes, log step pools, and log j-hooks were used to control grade and create feature diversity throughout the profile. The streams were restored to a B/C3, stream type. The first year of monitoring found the majority of the project to be functioning as designed. One area of streambed degradation has been noted in this report, but there are no systematic problems that indicate that the project streams are unstable. Without any large rain events in 2010, the stream came close to bankfull on several occasions, but did not have a bankfull event.

# 1.0 PROJECT BACKGROUND

## 1.1 Project Location

The Dog Bite Site is located at the end of Wilson Dairy Road in central Mitchell County, North Carolina (Figure 1). The project is centered at approximately 35.9956 degrees north and –82.1302 degrees west (WGS84). To reach the site from Raleigh, begin by proceeding west on I-40 for approximately 200 miles. Then take Exit 86 for NC-226 toward Shelby/Marion. Take a right onto NC-226, traveling north. Follow NC-226 through Marion and Spruce Pine. Just before reaching Bakersville, make a right onto White Oak Road. Follow White Oak Road for approximately 1.5 miles and then make a left onto Wilson Dairy Road. The road will dead end at the Wilson property and the site is on the left. Due to the close proximity of the landowner's residence to the property, the landowner has asked to be contacted before any site visits are made.

## 1.2 Project Goals and Objectives

*Restoration Goals:*

- Restore the stream's riparian buffer.
- Create a stable network of headwater streams.

*Restoration Objectives:*

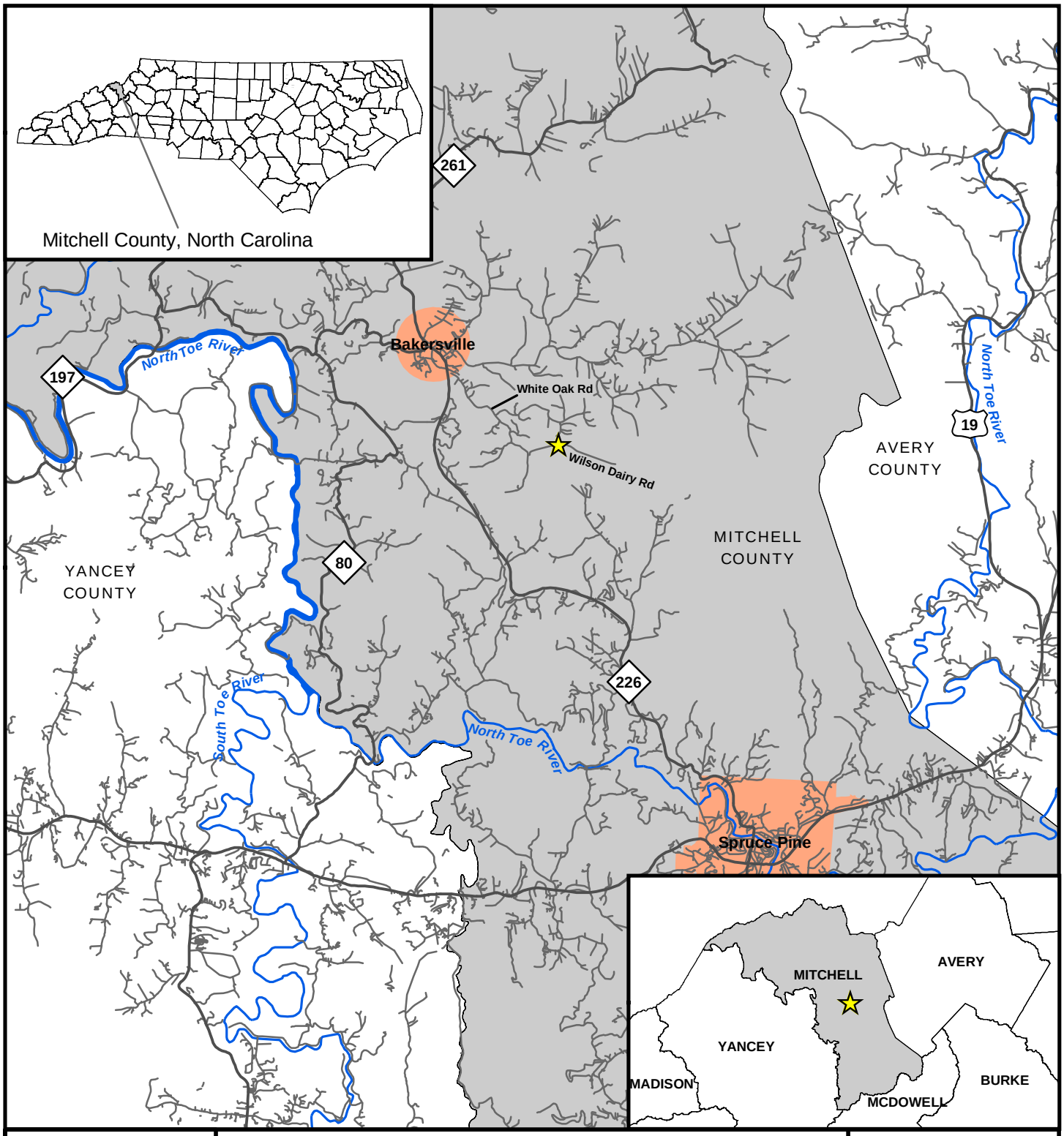
- Plant a functional Montane Alluvial Forest community along with a Montane Oak-Hickory Forest to create an effective riparian buffer.
- Arrest bed elevation lowering and stream widening.
- Create in-stream habitat by restoring a profile with defined pools and adding woody debris habitat structures.
- Stop bank erosion by developing the appropriate channel dimension and by stabilizing with vegetation.
- Remove the livestock waste pond adjacent to the stream.
- Exclude livestock from the riparian areas with fencing.

## 1.3 Project Structure, Restoration Type, and Approach

The project streams had become degraded primarily through poor grazing management, vegetation removal, and channelization. Historically, the site was cleared and converted into pasture except for isolated, narrow strips of riparian vegetation along the streams. White Oak Creek (WOC) was also channelized to go around two ponds. Prior to restoration, many of the project streams were experiencing severe bank erosion and bed degradation. Restoration and enhancement of 3,707 linear feet of channel was accomplished utilizing a combination of Priority 2 and 3 approaches (Table 1). WOC-1 (Station 10+00 to 12+54) was enhanced by grading back the existing eroding banks, narrowing over-widened portions of the channel, building a bankfull bench, and developing distinct riffles and pools with step pool structures. Many of the existing trees on the left bank of this reach were left intact. The restoration of WOC-2 (Station 12+70 to 19+50) established stable riffle and pool features with in-stream structures and created a new stable planform, moving the stream away from the constructed pond berm. WOC-3 (Station 19+50 to 22+69) was enhanced by grading back the existing eroding banks, narrowing over-widened portions of the channel, building a bankfull bench, and developing distinct riffle and pools with step pool structures. Many of the existing trees in the middle portion of this reach were left intact. The restoration of WOC-4 (Station 22+85 to 36+35) established stable riffle and pool features with in-stream structures and created a new stable planform. This reach was also moved away from a constructed pond berm (a dairy holding pond closed as a part of this project in May 2009) on the left bank of the top portion of this reach. The reach receives drainage from barns

that support a small number of livestock. A water detention structure was built to receive this drainage and hold it before it flows into WOC. WOC-5 (Station 36+35 to 40+82) is the last reach of WOC and was enhanced by grading back the existing eroding banks, narrowing over-widened portions of the channel, building a bankfull bench, and developing distinct riffles and pools with step pool and log vane structures. Throughout most of this reach, one of the two stream banks was left intact where there were mature trees.

The two tributaries to WOC were also restored or enhanced. UT1 is divided into two reaches. Reach UT1-1 (Station 50+00 to 50+97) was enhanced by grading back the existing eroding banks, building a bankfull bench, and developing distinct riffles and pools with a step pool for grade control. Mature trees surround this reach until the beginning of UT1-2 (Station 50+97 to 54+45). The restoration of UT1-2 returned the stream to its natural valley position and established stable riffle and pool features with in-stream structures and created a new stable planform. The last project reach is the second tributary, UT2 (Station 60+00 to 62+45), an intermittent stream that had been historically straightened. This reach was restored by developing stable riffle and pool features with step pool structures and creating a new stable planform.




# Figure 1. Vicinity Map

- Project Site Location
- Major Roads
- Other Roads
- Major Rivers
- Cities and Towns

1:126,720
1 inch = 2 miles

2 1 0 2 Miles

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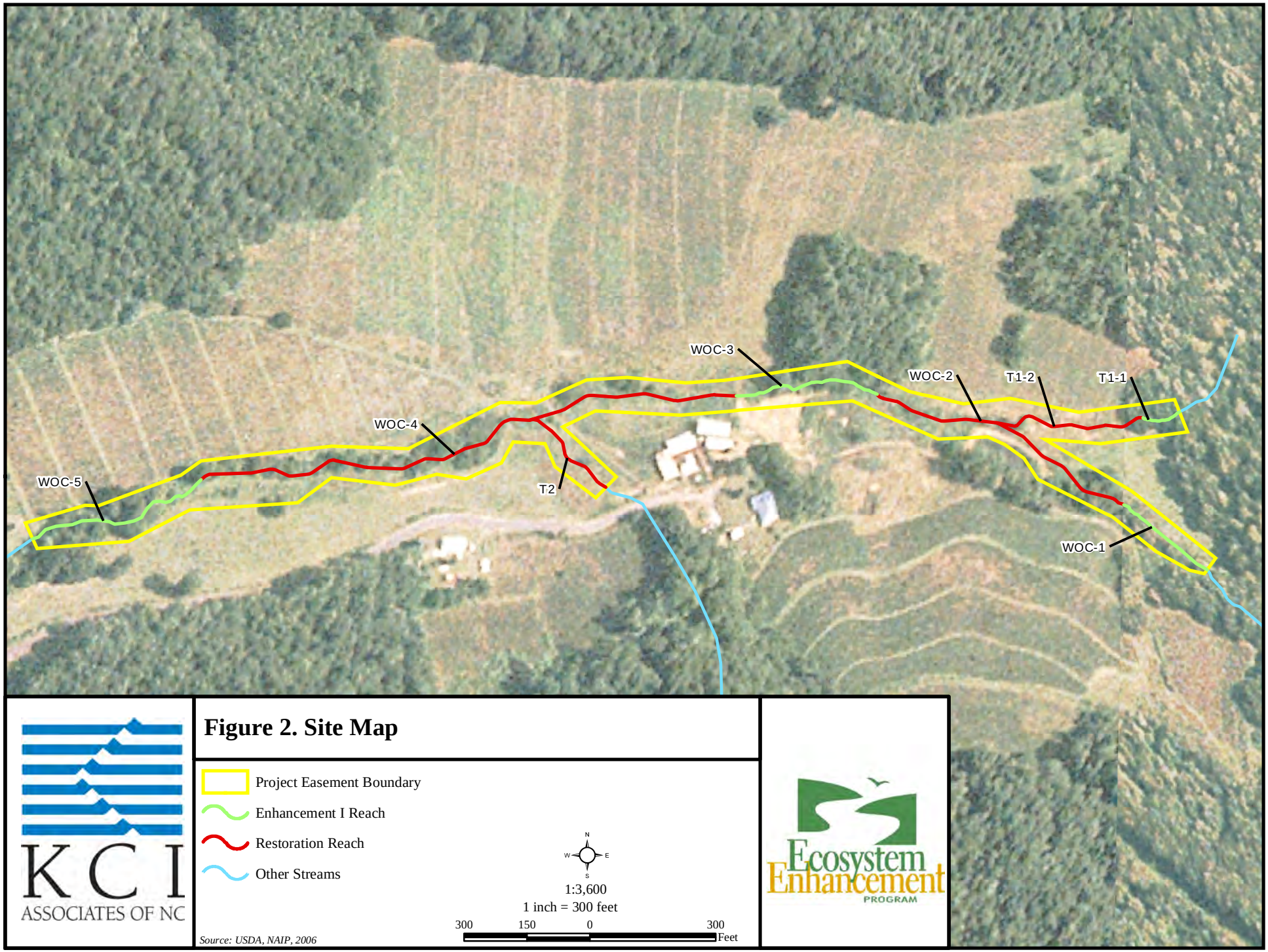
**Table 1. Project Components**
**Dog Bite Stream Restoration Site**

| Project Component or Reach ID | Existing Feet | Restoration Level | Approach | Restored / Enhanced Footage | Stationing | Mitigation Ratio | Mitigation Units | BMP Elements | Comment |
|---|---|---|---|---|---|---|---|---|---|
| WOC-1 | 254 | EI | - | 253 | 10+00 - 12+53 | 1.5 : 1 | 169 | - | Regraded eroding banks and created bankfull benches, created distinct riffles and pools, and installed in-stream grade control and habitat structures. |
| WOC-2 | 633 | R | P2/3 | 663 | 12+70 - 19+50 | 1 : 1 | 663 | - | Adjusted planform, created stable cross-section with bankfull bench and a profile with distinct riffles and pools, and installed in-stream structures. A 15' easement exception in the middle of the reach has been excluded from the project length. |
| WOC-3 | 349 | EI | - | 317 | 19+51 - 22+68 | 1.5 : 1 | 211 | - | Regraded eroding banks and created bankfull benches, created distinct riffles and pools, and installed in-stream grade control and habitat structures. |
| WOC-4 | 1,374 | R | P2/3 | 1,332 | 22+85 - 36+34 | 1 : 1 | 1,332 | Water Quality Detention Structure | Adjusted planform, created stable cross-section with bankfull bench and a profile with distinct riffles and pools, and installed in-stream structures. A 15' easement exception in the middle of the reach has been excluded from the project length. |
| WOC-5 | 458 | EI | - | 447 | 36+35 - 40+82 | 1.5 : 1 | 298 | - | Regraded eroding banks and created bankfull benches, created distinct riffles and pools, and installed in-stream grade control and habitat structures. |
| T1-1 | 95 | EI | - | 96 | 50+00 - 50+96 | 1.5 : 1 | 64 | - | Regraded eroding banks and created bankfull benches, created distinct riffles and pools, and installed in-stream grade control and habitat structures. |
| T1-2 | 336 | R | P2/3 | 331 | 50+97 - 54+45 | 1 : 1 | 331 | - | Adjusted planform, created stable cross-section with bankfull bench and a profile with distinct riffles and pools, and installed in-stream structures. A 15' easement exception in the middle of the reach has been excluded from the project length. |
| T2 | 219 | R | P2/3 | 245 | 60+00 - 62+45 | 1 : 1 | 245 | - | Adjusted planform, created stable cross-section with bankfull bench and a profile with distinct riffles and pools and installed in-stream structures |
| Totals | 3,718 | | | 3,684 | | | 3,313 | | Note: The discrepancy between the existing and project footage is due to a highly detailed existing conditions survey of an unstable thalweg. |

EI = Enhancement I P2/3 = Combination of Priority 2 and 3

R = Restoration

Note: 15'-wide easement exceptions on WOC-2, WOC-4, and T2 have been excluded from the restored/enhanced footage and mitigation unit calculations.




# Figure 2. Site Map

Project Easement Boundary

Enhancement I Reach

Restoration Reach

Other Streams

1:3,600

1 inch = 300 feet

300 150 0 300 Feet

*Source: USDA, NAIP, 2006*

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| Table 2. Project Activity and Reporting History<br>Dog Bite Stream Restoration Site | | |
|---|---|---|
| **Activity or Report** | **Data Collection Complete** | **Completion or Delivery** |
| Restoration Plan | 2007/2008 | Jul 08 |
| Final Design | - | Feb 09 |
| Construction | - | Sep 09 |
| Planting | - | Dec 09 |
| As-Built / Baseline Monitoring (Year 0) | Oct 09 / Mar 10 | Apr 10 |
| First Year Monitoring | Oct 10 | Dec 10 |

| Table 3. Project Contact Table<br>Dog Bite Stream Restoration Site | |
|---|---|
| **Design Firm** | KCI Associates of NC, PA<br>Landmark Center II, Suite 220<br>4601 Six Forks Rd.<br>Raleigh, NC 27609<br>Contact: Mr. Adam Spiller<br>Phone: (919) 783-9214<br>Fax: (919) 783-9266 |
| **Construction Contractors** | Land Mechanics, Inc.<br>126 Circle G Lane<br>Willow Springs, NC 27592<br>Contact: Mr. Lloyd Glover<br>Phone: (919) 639-6132<br>Fax: (919) 639-7079 |
| **Planting Contractor** | Bruton Nurseries & Landscapes<br>150 Black Creek Rd.<br>Fremont, NC 27830<br>Contact: Charles Bruton<br>Phone: (919) 242-6555 |
| **Monitoring Performers** | |
| **MY-00 - MY-05** | KCI Associates of NC, PA<br>Landmark Center II, Suite 220<br>4601 Six Forks Rd.<br>Raleigh, NC 27609<br>Contact: Mr. Adam Spiller<br>Phone: (919) 278-2514<br>Fax: (919) 783-9266 |

| Table 4. Project Background Table<br>Dog Bite Stream Restoration Site | |
|---|---|
| Project County | Mitchell County |
| Physiographic Region | Mountains |
| Ecoregion | Southern Crystalline Ridges and Mountains |
| Project River Basin | French Broad |
| USGS HUC for Project and Reference | 06010108040010 (WOC) |
| | 03040101090010 (UT Fisher River - reference) |
| NCDWQ Sub-basin for Project and Reference | 04-03-06 (WOC) |
| | 03-07-02 (UT Fisher River - reference) |
| Drainage Area | 0.54 sq. mi. |
| Stream Order | First Order |
| Watershed Type (Rural, Urban, Developing, etc.) | Rural |
| Watershed LULC Distribution Urban | <1% |
| Ag-Row Crop | 2% |
| Ag-Livestock | 17% |
| Forested | 80% |
| Water/Wetlands | <1% |
| Watershed impervious cover (%) | <1% |
| Rosgen Classification of As-built (Stream) | C3b (WOC, T1, T2) |
| NCDWQ Classification for Project | Class C (WOC) |
| Within EEP Watershed Plan? | No |
| Any portion of the project segment upstream of a 303d listed segment? | No |
| Reasons for 303d Listing or Stressor | N/A |
| Total project acreage of easement | 7.0 Acres |
| Total planted acreage | 5.8 Acres |
| WRC Class (Warm, Cool, Cold) | Cool, Trout Waters |
| Species of concern, endangered etc. | None |
| Pre-construction Beaver activity? | No |
| Dominant Soil Types | Banadana, Dellwood-Reddies, and Thunder-Saunook |
| % of Project Easement Fenced | 100% |

# 2.0 PROJECT CONDITIONS AND MONITORING RESULTS

## 2.1 Vegetation Assessment

The planted vegetation on the site is growing well. Due to the baseline vegetation monitoring occurring while the plants had not yet leafed out, some of the plants could not be identified initially and they were recorded as unknown. During the first year of monitoring, most of these plants were identified. Some of the previously unknown plants were dead, damaged, or missing and could still not be identified. These plants were again recorded as unknown.

The bankfull bench, stream banks, and riparian buffer have isolated areas with sparse vegetation, but overall they are well vegetated. Some scattered populations of invasive species have been identified in the floodplain and surrounding areas. Multiflora rose (*Rosa multiflora*) is the most prominent of these. Spraying to control multiflora rose was conducted in the fall of 2010. There will be additional spraying to control invasive species over the course of the monitoring period.

The seven monitored vegetation plots were monitored using the Level 1 CVS-EEP vegetation monitoring protocol, which revealed an average planted stem density of 416 stems/acre. There are three monitoring plots (Plots 4, 6, and 7) that have a calculated planted stem density less than 260 stems/acre. These parts of the site may receive supplemental planting in the winter of 2010/2011. Any supplemental planting will be reported in next year's monitoring report. Given the mature trees that still exist on the site, there is a high potential for desirable volunteers to become established across the site. Like natural vegetative communities, some areas will have slightly higher densities than others, but the data from the vegetation monitoring plots reveal that the site has an adequate average stem density. In the second year of monitoring, KCI will use the Level 2 CVS-EEP vegetation monitoring protocol to quantify the number of volunteer woody stems. The vegetation assessment found the site to be on track to meeting the vegetative success criteria. The vegetative monitoring results are displayed in Appendix A.

## 2.2 Stream Assessment

During the 2010 growing season, the project streams have been functioning as designed. Since construction there have been some changes to the profile, with some pools filling in with small gravels and sand and bed lowering at one riffle. These types of adjustment are not problematic and are typical of stream restoration projects immediately following construction. These changes will be monitored by the annual cross-section and profile surveys. The onsite stream gauges did not record any bankfull events in 2010.

The stream assessment found the stream to be stable overall. The surveyed profiles and cross-sections reveal few changes from the baseline monitoring. The structures are performing well and as designed.

Additional stream assessment data can be found in Appendix B and the Current Condition Plan View in Appendix C.

### 2.2.1 Bankfull Events

**Table 5. Verification of Bankfull Events**
**Dog Bite Stream Restoration Site**

| Date of Data Collection | Date of Occurrence | Method | Photo Number |
|---|---|---|---|
| **None in 2010** | | | |

## 2.2.2 Quantitative Measures Summary Tables

**Table 6a. WOC-2 Baseline Stream Summary**
**Dog Bite Stream Restoration Site**

| Parameter | Pre-Existing Condition | | | | | Reference Reach(es) Data | | | | | Design | | As-built | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dimension - Riffle** | Min | Mean | Med | Max | n | Min | Mean | Med | Max | n | Min | Max | Min | Mean | Max | n |
| Bankfull Width (ft) | 5.0 | 6.9 | 7.3 | 8.3 | 3 | 9.0 | 9.5 | | 10.0 | 2 | 8.6 | | 6.8 | 7.1 | 7.4 | 2 |
| Floodprone Width (ft) | 9 | 10 | 10 | 11 | 3 | 13 | 17 | | 20 | 2 | 19 | | 21 | 24 | 26 | 2 |
| Bankfull Mean Depth (ft) | 0.6 | 0.8 | 0.9 | 0.9 | 3 | 1.1 | 1.2 | | 1.2 | 2 | 0.7 | | 0.7 | 0.7 | 0.7 | 2 |
| Bankfull Max Depth (ft) | 0.8 | 1.2 | 1.3 | 1.4 | 3 | 1.3 | 1.4 | | 1.5 | 2 | 0.9 | | 1.0 | 1.1 | 1.2 | 2 |
| Bankfull Cross-Sectional Area ($ft^2$) | 4.6 | 5.4 | 5.0 | 6.7 | 3 | 10.4 | 10.6 | | 10.7 | 2 | 6.3 | | 4.8 | 5.2 | 5.5 | 2 |
| Width/Depth Ratio | 5.4 | 9.1 | 8.0 | 13.8 | 3 | 8.0 | 9.0 | | 10.0 | 2 | 12.3 | | 9.6 | 9.8 | 10.0 | 2 |
| Entrenchment Ratio | 1.2 | 1.5 | 1.3 | 2.1 | 3 | 1.3 | 1.8 | | 2.3 | 2 | 2.2 | | 2.8 | 3.3 | 3.8 | 2 |
| Bank Height Ratio | 1.6 | 2.1 | 2.0 | 2.6 | 3 | | | 1.0 | | 2 | 1.0 | | 1.0 | 1.0 | 1.0 | 2 |
| **Pattern** | | | | | | | | | | | | | | | | |
| Channel Beltwidth (ft) | | 21 | | | | | | 45 | | | 80 | 140 | 80 | | 140 | |
| Radius of Curvature (ft) | 8 | | | 15 | | 13 | | | 42 | | 15 | 30 | 15 | 25 | 30 | 11 |
| Rc:Bankfull width (ft/ft) | 1 | | | 3 | | 1.3 | | | 4.4 | | 1.7 | 3.5 | 2.1 | 3.5 | 4.2 | |
| Meander Wavelength (ft) | 32 | | | 45 | | 93 | | | 136 | | 80 | 140 | 80 | 125 | 140 | 7 |
| Meander Width Ratio | 2.5 | | | 4.2 | | 4.5 | | | 5.0 | | 9.3 | 16.3 | 11.3 | | 19.7 | |
| **Profile** | | | | | | | | | | | | | | | | |
| Riffle Length (ft) | | | | | | | | | | | | | 19 | 37 | 58 | 13 |
| Riffle Slope (ft/ft) | 0.0301 | | | 0.0898 | | 0.013 | | | 0.028 | | 0.043 | 0.074 | 0.041 | 0.063 | 0.098 | 13 |
| Pool Length (ft) | | | | | | 3 | | | 25 | | 5 | 8 | 5 | 11 | 20 | 12 |
| Pool Spacing (ft) | | | | | | 30 | | | 59 | | 25 | 78 | 33 | 53 | 77 | 12 |
| **Substrate and Transport Parameters** | | | | | | | | | | | | | | | | |
| SC% / Sa% / G% / C% / B% / Be% | 4% / 26% / 56% / 13% / 1% / 0% | | | | | 0% / 15% / 78% / 7% / 0% / 0% | | | | | | | 0% / 3% / 46% / 50% / 1% / 0% | | | |
| d16 / d35 / d50 / d84 / d95 (mm) | 0.6 / 6.2 / 12 / 60 / 150 | | | | | 2.0 / 4.2 / 6.9 / 30 / 70 | | | | | | | 32 / 44 / 65 / 130 / 170 | | | |
| **Additional Reach Parameters** | | | | | | | | | | | | | | | | |
| Channel length (ft) | 633 | | | | | 297 | | | | | 639 | | 663 | | | |
| Drainage Area (SM) | 0.36 | | | | | 0.38 | | | | | 0.36 | | 0.36 | | | |
| Rosgen Classification | E/B4a | | | | | B4c | | | | | B4a | | C3b | | | |
| Sinuosity | 1.00 | | | | | 1.20 | | | | | 1.00 | | 1.00 | | | |
| Water Surface Slope (ft/ft) | 0.0617 | | | | | 0.0130 | | | | | 0.0593 | | 0.0631 | | | |

**Table 6b. WOC-4 Baseline Stream Summary**
**Dog Bite Stream Restoration Site**

| Parameter | Pre-Existing Condition | | | | | Reference Reach(es) Data | | | | | Design | | As-built | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dimension - Riffle** | Min | Mean | Med | Max | n | Min | Mean | Med | Max | n | Min | Max | Min | Mean | Max | n |
| Bankfull Width (ft) | 9.2 | 10.0 | 10.2 | 10.6 | 4 | 9.0 | 9.5 | | 10.0 | 2 | 9.8 | | 8.6 | 8.9 | 9.1 | 3 |
| Floodprone Width (ft) | 12 | 16 | 15 | 21 | 4 | 13 | 17 | | 20 | 1 | 20 | | 26 | 27 | 28 | 3 |
| Bankfull Mean Depth (ft) | 0.6 | 0.7 | 0.7 | 0.9 | 4 | 1.1 | 1.2 | | 1.2 | 2 | 0.8 | | 0.7 | 0.8 | 0.9 | 3 |
| Bankfull Max Depth (ft) | 0.9 | 1.2 | 1.2 | 1.3 | 4 | 1.3 | 1.4 | | 1.5 | 2 | 1.0 | | 1.2 | 1.3 | 1.3 | 3 |
| Bankfull Cross-Sectional Area ($ft^2$) | 6.4 | 6.9 | 6.7 | 7.9 | 4 | 10.4 | 10.6 | | 10.7 | 2 | 7.7 | | 6.2 | 7.3 | 8.1 | 3 |
| Width/Depth Ratio | 10.7 | 14.8 | 15.7 | 17.2 | 4 | 8.0 | 9.0 | | 10.0 | 2 | 12.5 | | 9.7 | 11.0 | 13.4 | 3 |
| Entrenchment Ratio | 1.1 | 1.6 | 1.6 | 2.0 | 4 | 1.3 | 1.8 | | 2.3 | 1 | 2.0 | | 2.8 | 3.0 | 3.3 | 3 |
| Bank Height Ratio | 1.8 | 2.8 | 2.8 | 3.7 | 4 | | | 1.0 | | 2 | 1.0 | | 1.0 | 1.0 | 1.0 | 3 |
| **Pattern** | | | | | | | | | | | | | | | | |
| Channel Beltwidth (ft) | 31 | | | 80 | | | | 45 | | | 15 | 40 | 15 | | 40 | |
| Radius of Curvature (ft) | 14 | | | 52 | | 13 | | | 42 | | 20 | 40 | 20 | 29 | 40 | 20 |
| Rc:Bankfull width (ft/ft) | 1.3 | | | 5.7 | | 1.3 | | | 4.4 | | 2.0 | 4.1 | 2.2 | 3.3 | 4.5 | |
| Meander Wavelength (ft) | 81 | | | 244 | | 93 | | | 136 | | 95 | 160 | 94 | 128 | 153 | 18 |
| Meander Width Ratio | 2.9 | | | 8.7 | | 4.5 | | | 5.0 | | 1.5 | 4.1 | 1.7 | | 4.5 | |
| **Profile** | | | | | | | | | | | | | | | | |
| Riffle Length (ft) | | | | | | | | | | | | | 18 | 44 | 89 | 22 |
| Riffle Slope (ft/ft) | 0.041 | | | 0.077 | | 0.013 | | | 0.028 | | 0.032 | 0.064 | 0.027 | 0.047 | 0.098 | 22 |
| Pool Length (ft) | 7 | | | 14 | | 3 | | | 25 | | 5 | 16 | 5 | 9 | 30 | 23 |
| Pool Spacing (ft) | | 231 | | | | 30 | | | 59 | | 30 | 83 | 33 | 61 | 100 | 23 |
| **Substrate and Transport Parameters** | | | | | | | | | | | | | | | | |
| SC% / Sa% / G% / C% / B% / Be% | 14% / 11% / 39% / 29% / 7% / 0% | | | | | 0% / 15% / 78% / 7% / 0% / 0% | | | | | | | 0% / 1% / 21% / 76% / 2% / 0% | | | |
| d16 / d35 / d50 / d84 / d95 (mm) | 0.10 / 5.2 / 11 / 120 / 360 | | | | | 2.0 / 4.2 / 6.9 / 30 / 70 | | | | | | | 55/ 77 / 94 / 150 / 210 | | | |
| **Additional Reach Parameters** | | | | | | | | | | | | | | | | |
| Channel length (ft) | 1,374 | | | | | 297 | | | | | 1,325 | | 1,332 | | | |
| Drainage Area (SM) | 0.50 | | | | | 0.38 | | | | | 0.50 | | 0.50 | | | |
| Rosgen Classification | G/F4b | | | | | B4c | | | | | B4a | | C3b | | | |
| Sinuosity | 1.10 | | | | | 1.20 | | | | | 1.10 | | 1.10 | | | |
| Water Surface Slope (ft/ft) | 0.0399 | | | | | 0.0130 | | | | | 0.0405 | | 0.0404 | | | |

**Table 6c. T1-2 Baseline Stream Summary**
**Dog Bite Stream Restoration Site**

| Parameter | Pre-Existing Condition* | | | | | Reference Reach(es) Data | | | | | Design | | As-built | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dimension - Riffle** | Min | Mean | Med | Max | n | Min | Mean | Med | Max | n | Min | Max | Min | Mean | Max | n |
| Bankfull Width (ft) | 19.5 | | | | 1 | 9.0 | 9.5 | | 10.0 | 2 | 6.6 | | 5.5 | | | 1 |
| Floodprone Width (ft) | 38 | | | | 1 | 13 | 17 | | 20 | 1 | 14 | | 21 | | | 1 |
| Bankfull Mean Depth (ft) | 0.3 | | | | 1 | 1.1 | 1.2 | | 1.2 | 2 | 0.5 | | 0.5 | | | 1 |
| Bankfull Max Depth (ft) | 0.8 | | | | 1 | 1.3 | 1.4 | | 1.5 | 2 | 0.6 | | 0.7 | | | 1 |
| Bankfull Cross-Sectional Area ($ft^2$) | 6.5 | | | | 1 | 10.4 | 10.6 | | 10.7 | 2 | 3.2 | | 3.0 | | | 1 |
| Width/Depth Ratio | 58.5 | | | | 1 | 8.0 | 9.0 | | 10.0 | 2 | 13.6 | | 10.1 | | | 1 |
| Entrenchment Ratio | 1.9 | | | | 1 | 1.3 | 1.8 | | 2.3 | 1 | 2.1 | | 3.8 | | | 1 |
| Bank Height Ratio | 1.0 | | | | 1 | | | 1.0 | | 2 | 1.0 | | 1.0 | | | 1 |
| **Pattern** | | | | | | | | | | | | | | | | |
| Channel Beltwidth (ft) | | | | | | | | 45 | | | 15 | 30 | 15 | | 30 | |
| Radius of Curvature (ft) | | | | | | 13 | | | 42 | | 10 | 25 | 10 | 18 | 25 | 8 |
| Rc:Bankfull width (ft/ft) | | | | | | 1.3 | | | 4.4 | | 1.5 | 3.8 | 1.8 | 3.3 | 4.5 | |
| Meander Wavelength (ft) | | | | | | 93 | | | 136 | | 70 | 105 | 70 | 83 | 105 | 8 |
| Meander Width Ratio | | | | | | 4.5 | | | 5.0 | | 2.3 | 4.5 | 2.7 | | 5.5 | |
| **Profile** | | | | | | | | | | | | | | | | |
| Riffle Length (ft) | | | | | | | | | | | | | 18 | 26 | 32 | 7 |
| Riffle Slope (ft/ft) | | | | | | 0.013 | | | 0.028 | | 0.050 | 0.058 | 0.051 | 0.062 | 0.075 | 7 |
| Pool Length (ft) | | | | | | 3 | | | 25 | | 5 | 17 | 2 | 9 | 13 | 7 |
| Pool Spacing (ft) | | | | | | 30 | | | 59 | | 35 | 45 | 28 | 40 | 45 | 7 |
| **Substrate and Transport Parameters** | | | | | | | | | | | | | | | | |
| SC% / Sa% / G% / C% / B% / Be% | 71% / 29% / 0% / 0% / 0% / 0% | | | | | 0% / 15% / 78% / 7% / 0% / 0% | | | | | | | 3% / 3% / 27% / 61% / 7% / 0% | | | |
| d16 / d35 / d50 / d84 / d95 (mm) | 0.06 / 0.06 / 0.06 / 0.09 / 0.11 | | | | | 2.0 / 4.2 / 6.9 / 30 / 70 | | | | | | | 26 / 68 / 90 / 170 / 2400 | | | |
| **Additional Reach Parameters** | | | | | | | | | | | | | | | | |
| Channel length (ft) | 336 | | | | | 297 | | | | | 336 | | 331 | | | |
| Drainage Area (SM) | 0.08 | | | | | 0.38 | | | | | 0.08 | | 0.08 | | | |
| Rosgen Classification | B5a | | | | | B4c | | | | | B4a | | C3b | | | |
| Sinuosity | 1.00 | | | | | 1.20 | | | | | 1.10 | | 1.10 | | | |
| Water Surface Slope (ft/ft) | 0.0601 | | | | | 0.0130 | | | | | 0.0590 | | 0.0613 | | | |

* T1-2 was historically filled and only a shallow swale with no discernible bed features or pattern present during the existing conditions survey.

**Table 7a. Morphology and Hydraulic Monitoring Summary**
**Dog Bite Stream Restoration Site**

| Parameter | Cross-Section 1 Riffle | | | | | | Cross-Section 2 Pool | | | | | | Cross-Section 3 Riffle | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Reach** | WOC-2 | | | | | | WOC-2 | | | | | | WOC-2 | | | | | |
| **Dimension** | MY0 | MY1 | MY2 | MY3 | MY4 | MY5 | MY0 | MY1 | MY2 | MY3 | MY4 | MY5 | MY0 | MY1 | MY2 | MY3 | MY4 | MY5 |
| Bankfull Width (ft) | 6.8 | 6.4 | | | | | 9.1 | 9.6 | | | | | 7.4 | 7.4 | | | | |
| Floodprone Width (ft) | 26 | 29 | | | | | - | - | | | | | 21 | 22 | | | | |
| Bankfull Cross-Sectional Area ($ft^2$) | 4.8 | 7.1 | | | | | 12.7 | 11.9 | | | | | 5.5 | 5.4 | | | | |
| Bankfull Mean Depth (ft) | 0.7 | 1.1 | | | | | 1.4 | 1.2 | | | | | 0.7 | 0.7 | | | | |
| Bankfull Max Depth (ft) | 1.0 | 1.6 | | | | | 2.3 | 2.0 | | | | | 1.2 | 1.2 | | | | |
| Width/Depth Ratio | 9.6 | 5.8 | | | | | - | - | | | | | 10.0 | 10.1 | | | | |
| Entrenchment Ratio | 3.8 | 4.5 | | | | | - | - | | | | | 2.8 | 3.0 | | | | |
| Bank Height Ratio | 1.0 | 1.0 | | | | | - | - | | | | | 1.0 | 1.0 | | | | |
| **Substrate** | | | | | | | | | | | | | | | | | | |
| d50 (mm) | 51 | 44 | | | | | 9.6 | 2.7 | | | | | 65 | 15 | | | | |
| d84 (mm) | 100 | 87 | | | | | 47 | 50 | | | | | 130 | 120 | | | | |

**Table 7b. Morphology and Hydraulic Monitoring Summary continued**
**Dog Bite Stream Restoration Site**

| Parameter | Cross-Section 4 Riffle | | | | | | Cross-Section 5 Pool | | | | | | Cross-Section 6 Riffle | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Reach** | WOC-4 | | | | | | WOC-4 | | | | | | WOC-4 | | | | | |
| **Dimension** | MY0 | MY1 | MY2 | MY3 | MY4 | MY5 | MY0 | MY1 | MY2 | MY3 | MY4 | MY5 | MY0 | MY1 | MY2 | MY3 | MY4 | MY5 |
| Bankfull Width (ft) | 9.1 | 10.7 | | | | | 11.6 | 12.3 | | | | | 8.6 | 8.5 | | | | |
| Floodprone Width (ft) | 26 | 27 | | | | | - | - | | | | | 28 | 29 | | | | |
| Bankfull Cross-Sectional Area ($ft^2$) | 6.2 | 7.2 | | | | | 16.9 | 16.7 | | | | | 7.6 | 7.7 | | | | |
| Bankfull Mean Depth (ft) | 0.7 | 0.7 | | | | | 1.5 | 1.4 | | | | | 0.9 | 0.9 | | | | |
| Bankfull Max Depth (ft) | 1.2 | 1.2 | | | | | 2.6 | 2.6 | | | | | 1.3 | 1.4 | | | | |
| Width/Depth Ratio | 13.4 | 15.9 | | | | | - | - | | | | | 9.7 | 9.4 | | | | |
| Entrenchment Ratio | 2.8 | 2.5 | | | | | - | - | | | | | 3.3 | 3.4 | | | | |
| Bank Height Ratio | 1.0 | 1.0 | | | | | - | - | | | | | 1.0 | 1.0 | | | | |
| **Substrate** | | | | | | | | | | | | | | | | | | |
| d50 (mm) | 94 | 82 | | | | | 0.062 | 0.062 | | | | | 100 | 90 | | | | |
| d84 (mm) | 150 | 160 | | | | | 0.11 | 0.15 | | | | | 150 | 130 | | | | |

**Table 7c. Morphology and Hydraulic Monitoring Summary continued**
**Dog Bite Stream Restoration Site**

| Parameter | Cross-Section 7 Riffle | | | | | | Cross-Section 8 Riffle | | | | | | Cross-Section 9 Pool | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Reach** | WOC-4 | | | | | | T1-2 | | | | | | T1-2 | | | | | |
| **Dimension** | MY0 | MY1 | MY2 | MY3 | MY4 | MY5 | MY0 | MY1 | MY2 | MY3 | MY4 | MY5 | MY0 | MY1 | MY2 | MY3 | MY4 | MY5 |
| Bankfull Width (ft) | 9.0 | 8.5 | | | | | 5.5 | 5.8 | | | | | 6.9 | 7.1 | | | | |
| Floodprone Width (ft) | 26 | 26 | | | | | 21 | 27 | | | | | - | - | | | | |
| Bankfull Cross-Sectional Area ($ft^2$) | 8.1 | 7.0 | | | | | 3.0 | 3.3 | | | | | 6.8 | 6.2 | | | | |
| Bankfull Mean Depth (ft) | 0.9 | 0.8 | | | | | 0.5 | 0.6 | | | | | 1.0 | 0.9 | | | | |
| Bankfull Max Depth (ft) | 1.3 | 1.1 | | | | | 0.7 | 0.9 | | | | | 1.3 | 1.6 | | | | |
| Width/Depth Ratio | 10.0 | 10.3 | | | | | 10.1 | 10.2 | | | | | - | - | | | | |
| Entrenchment Ratio | 2.9 | 3.1 | | | | | 3.8 | 4.6 | | | | | - | - | | | | |
| Bank Height Ratio | 1.0 | 1.0 | | | | | 1.0 | 1.0 | | | | | - | - | | | | |
| **Substrate** | | | | | | | | | | | | | | | | | | |
| d50 (mm) | 90 | 68 | | | | | 90 | 97 | | | | | 0.062 | 0.062 | | | | |
| d84 (mm) | 130 | 120 | | | | | 170 | 150 | | | | | 0.10 | 0.062 | | | | |

**Table 7d. Morphology and Hydraulic Monitoring Summary continued**
**Dog Bite Stream Restoration Site**

| Reach WOC-2 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Parameter** | MY - 01 (2010) | | | MY - 02 (2011) | | | MY - 03 (2012) | | | MY - 04 (2013) | | | MY - 05 (2014) | | |
| **Profile** | Min | Avg. | Max | Min | Avg. | Max | Min | Avg. | Max | Min | Avg. | Max | Min | Avg. | Max |
| Riffle Length (ft) | 21 | 42 | 80 | | | | | | | | | | | | |
| Riffle Slope (ft/ft) | 0.0353 | 0.0579 | 0.0984 | | | | | | | | | | | | |
| Pool Length (ft) | 2 | 7 | 13 | | | | | | | | | | | | |
| Pool Spacing (ft) | 31 | 57 | 122 | | | | | | | | | | | | |
| **Additional Reach Parameters** | | | | | | | | | | | | | | | |
| Water Surface Slope (ft/ft) | 0.0560 | | | | | | | | | | | | | | |
| Rosgen Classification | C3 | | | | | | | | | | | | | | |

**Table 7e. Morphology and Hydraulic Monitoring Summary continued**
**Dog Bite Stream Restoration Site**

| Reach WOC-4 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Parameter** | MY - 01 (2010) | | | MY - 02 (2011) | | | MY - 03 (2012) | | | MY - 04 (2013) | | | MY - 05 (2014) | | |
| **Profile** | Min | Avg. | Max | Min | Avg. | Max | Min | Avg. | Max | Min | Avg. | Max | Min | Avg. | Max |
| Riffle Length (ft) | 10 | 45 | 102 | | | | | | | | | | | | |
| Riffle Slope (ft/ft) | 0.0090 | 0.0480 | 0.0902 | | | | | | | | | | | | |
| Pool Length (ft) | 2 | 8 | 20 | | | | | | | | | | | | |
| Pool Spacing (ft) | 6 | 54 | 100 | | | | | | | | | | | | |
| **Additional Reach Parameters** | | | | | | | | | | | | | | | |
| Water Surface Slope (ft/ft) | 0.0407 | | | | | | | | | | | | | | |
| Rosgen Classification | C3 | | | | | | | | | | | | | | |

* Pattern measurements will only be taken after MY-00 if it is visually apparent that the pattern has changed.

**Table 7f. Morphology and Hydraulic Monitoring Summary continued**
**Dog Bite Stream Restoration Site**

| Reach T1-2 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Parameter** | MY - 01 (2010) | | | MY - 02 (2011) | | | MY - 03 (2012) | | | MY - 04 (2013) | | | MY - 05 (2014) | | |
| **Profile** | Min | Avg. | Max | Min | Avg. | Max | Min | Avg. | Max | Min | Avg. | Max | Min | Avg. | Max |
| Riffle Length (ft) | 15 | 27 | 31 | | | | | | | | | | | | |
| Riffle Slope (ft/ft) | 0.0461 | 0.0599 | 0.0744 | | | | | | | | | | | | |
| Pool Length (ft) | 3 | 9 | 14 | | | | | | | | | | | | |
| Pool Spacing (ft) | 26 | 39 | 44 | | | | | | | | | | | | |
| **Additional Reach Parameters** | | | | | | | | | | | | | | | |
| Water Surface Slope (ft/ft) | 0.0578 | | | | | | | | | | | | | | |
| Rosgen Classification | C3 | | | | | | | | | | | | | | |

* Pattern measurements will only be taken after MY-00 if it is visually apparent that the pattern has changed.

# Appendix A
# Vegetation Data

# Appendix A1: Vegetation Data

**Table A1. Vegetation Metadata**
**Dog Bite Stream Restoration Site**

| | |
|---|---|
| **Report Prepared By** | Adam Spiller |
| **Date Prepared** | 11/18/2010 14:06 |
| **Database Name** | KCI-2010_DB.mdb |
| **Database Location** | M:\2006\12065439 - Dog Bite\Vegetation |

**PROJECT SUMMARY----------**

| Project Code | Project Name | Description | Length (ft) | Stream-to-Edge Width (ft) | Area (sq m) | Required Plots (calculated) | Sampled Plots |
|---|---|---|---|---|---|---|---|
| Dog Bite | Dog Bite | This is a Full-Delivery Stream Restoration in Mitchell County, North Carolina | 3,707 | 35 | 24,116 | 7 | 7 |

**Table A2. Stem Count by Plot and Species**
**Dog Bite Stream Restoration Site**

| | Species | Total Planted Stems | # plots | avg # stems | plot Dog Bite-A-0001 | plot Dog Bite-A-0002 | plot Dog Bite-A-0003 | plot Dog Bite-A-0004 | plot Dog Bite-A-0005 | plot Dog Bite-A-0006 | plot Dog Bite-A-0007 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Alnus serrulata* | 3 | 2 | 2 | | 2 | | 1 | | | |
| | *Amelanchier arborea* | 1 | 1 | 1 | 1 | | | | | | |
| | *Betula nigra* | 6 | 3 | 2 | 2 | 1 | | | 3 | | |
| | *Calycanthus floridus* | 1 | 1 | 1 | 1 | | | | | | |
| | *Carya alba* | 1 | 1 | 1 | | | 1 | | | | |
| | *Hamamelis virginiana* | 3 | 2 | 2 | | 2 | | | | 1 | |
| | *Ilex verticillata* | 1 | 1 | 1 | | 1 | | | | | |
| | *Juglans nigra* | 4 | 2 | 2 | | | 3 | | | | 1 |
| | *Liriodendron tulipifera* | 8 | 5 | 2 | 3 | | 2 | 1 | 1 | | 1 |
| | *Nyssa sylvatica* | 6 | 4 | 2 | 2 | | 1 | 1 | | | 2 |
| | *Platanus occidentalis* | 6 | 1 | 6 | 6 | | | | | | |
| | *Quercus* | 3 | 2 | 2 | | 2 | | | | 1 | |
| | *Quercus alba* | 16 | 6 | 3 | 1 | | 6 | 3 | 2 | 1 | 3 |
| | *Quercus montana* | 3 | 2 | 2 | | | 1 | | 2 | | |
| | *Quercus phellos* | 8 | 1 | 8 | | 8 | | | | | |
| | Unknown | 2 | 1 | 2 | | | | | | 2 | |
| **TOT:** | **8** | **70** | **34** | | **16** | **16** | **14** | **6** | **8** | **3** | **7** |
| **Plot Stem Density (stems/acre)** | | | | | **647** | **647** | **567** | **242** | **324** | **202** | **283** |

| Table A3. Vegetation History (stems/acre)<br>Dog Bite Stream Restoration Site | | | | | | |
|---|---|---|---|---|---|---|
| **Plot Number** | **MY-00** | **MY-01** | **MY-02** | **MY-03** | **MY-04** | **MY-05** |
| **1** | 809 | 647 | | | | |
| **2** | 688 | 647 | | | | |
| **3** | 647 | 567 | | | | |
| **4** | 567 | 242 | | | | |
| **5** | 607 | 324 | | | | |
| **6** | 728 | 202 | | | | |
| **7** | 567 | 283 | | | | |

# Appendix A2: Vegetation Monitoring Plot Photos

Plot 1 Photo – 9/23/10 - MY 01

Plot 2 Photo – 9/23/10 - MY 01

Plot 3 Photo – 9/23/10 - MY 01

Plot 4 Photo – 9/23/10 - MY 01

Plot 5 Photo – 9/23/10 - MY 01

Plot 6 Photo – 9/23/10 - MY 01

Plot 7 Photo – 9/23/10 - MY 01

# Appendix B
# Geomorphologic Data

# Appendix B1: Representative Stream Problem Area Photos

No photos taken this year.

# Appendix B2: Stream Photos

Photo Point 1: View looking upstream, from ford crossing near Station 12+50. 10/19/10 – MY01

Photo Point 2: View looking downstream, near Station 14+00. 10/19/10 – MY01

Photo Point 3: View looking upstream at the confluence of WOC and T1. 10/19/10 – MY01

Photo Point 4: View looking upstream taken near Station 20+50. 10/19/10 – MY01

Photo Point 4: View looking downstream near Station 20+50. 10/19/10 – MY01

Photo Point 5: View looking upstream at WOC, near Station 26+25. 10/19/10 – MY01

Photo Point 5: View looking at water treatment pool, near Station 26+25. 10/19/10 – MY01

Photo Point 6: View looking upstream at T2, near Station 27+75. 10/19/10 – MY01

Photo Point 7: View looking upstream near Station 29+25. 10/19/10 – MY01

Photo Point 7: View looking downstream near Station 29+25. 10/19/10 – MY01

Photo Point 8: View looking upstream near Station 34+00. 10/19/10 – MY01

Photo Point 9: View looking upstream near Station 39+25. 10/19/10 – MY01

Photo Point 9: View looking downstream near Station 34+00. 10/19/10 – MY01

Photo Point 10: View looking upstream on T1 near Station 51+00. 10/19/10 – MY01

Photo Point 10: View looking downstream on T1 near Station 51+00. 10/19/10 – MY01

Photo Point 11: View looking upstream on T1 near Station 52+50. 10/19/10 – MY01

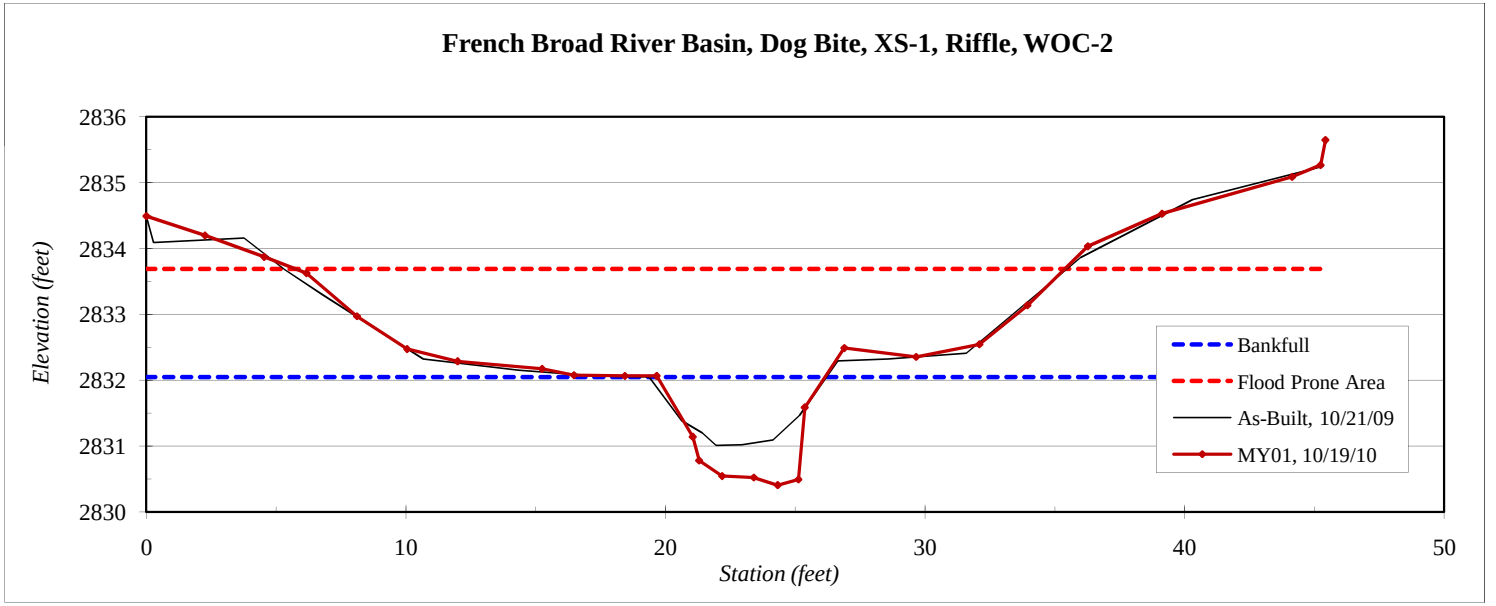
Photo Point 12: View looking upstream on T2 near Station 60+50. 10/19/10 – MY01

| | |
|---|---|
| **River Basin:** | French Broad |
| **Watershed:** | Dog Bite |
| **XS ID** | XS-1, Riffle, WOC-2 |
| **Drainage Area (sq mi):** | 0.36 |
| **Date:** | 10/19/2010 |
| **Field Crew:** | A. Spiller, K. Knight-Meng |

| Station | Elevation |
|---|---|
| 0.0 | 2834.49 |
| 2.3 | 2834.20 |
| 4.5 | 2833.87 |
| 6.2 | 2833.63 |
| 8.1 | 2832.97 |
| 10.0 | 2832.48 |
| 12.0 | 2832.29 |
| 15.2 | 2832.17 |
| 16.5 | 2832.08 |
| 18.4 | 2832.07 |
| 19.7 | 2832.07 |
| 21.1 | 2831.14 |
| 21.3 | 2830.78 |
| 22.2 | 2830.55 |
| 23.4 | 2830.52 |
| 24.3 | 2830.41 |
| 25.1 | 2830.49 |
| 25.4 | 2831.59 |
| 26.9 | 2832.49 |
| 29.7 | 2832.36 |
| 32.1 | 2832.55 |
| 33.9 | 2833.14 |
| 36.3 | 2834.04 |
| 39.1 | 2834.53 |
| 44.1 | 2835.09 |
| 45.2 | 2835.27 |
| 45.4 | 2835.65 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 2832.1 |
| **Bankfull Cross-Sectional Area:** | 7.1 |
| **Bankfull Width:** | 6.4 |
| **Flood Prone Area Elevation:** | 2833.7 |
| **Flood Prone Width:** | 29 |
| **Max Depth at Bankfull:** | 1.6 |
| **Mean Depth at Bankfull:** | 1.1 |
| **W / D Ratio:** | 5.8 |
| **Entrenchment Ratio:** | 4.5 |
| **Bank Height Ratio:** | 1.0 |

| | |
|---|---|
| **Stream Type** | C3b |

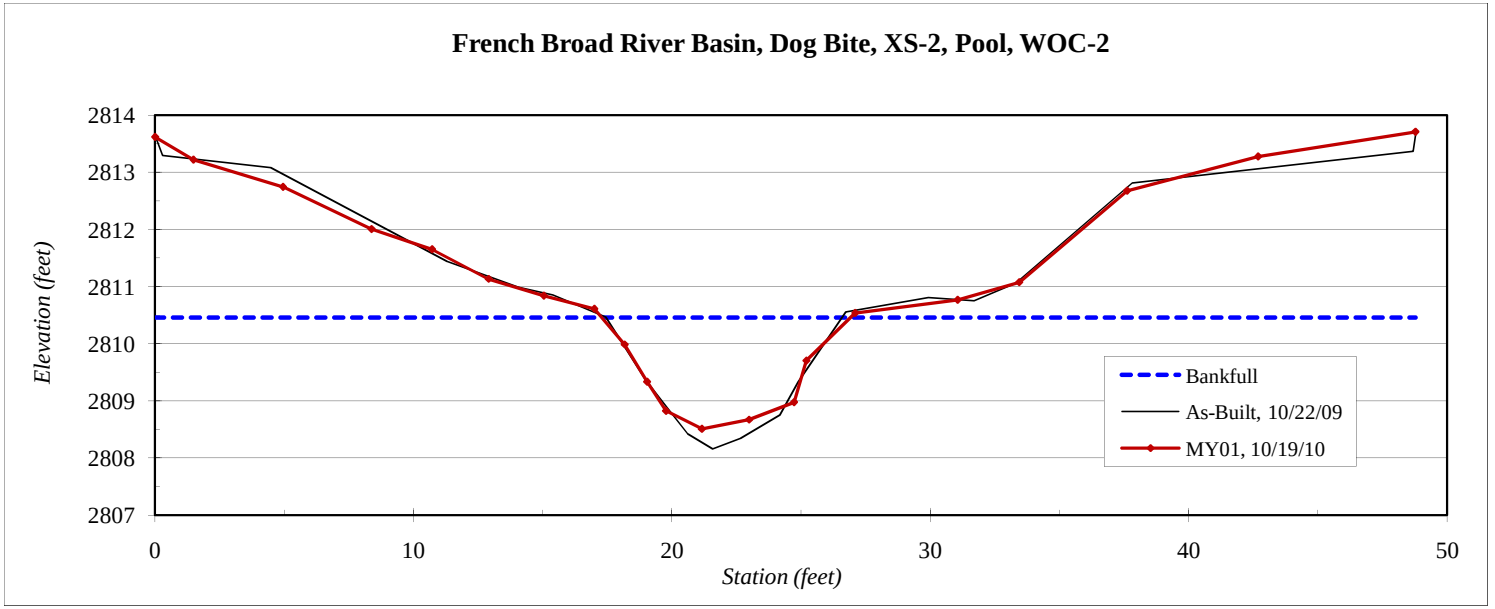


| | |
|---|---|
| **River Basin:** | French Broad |
| **Watershed:** | Dog Bite |
| **XS ID** | XS-2, Pool, WOC-2 |
| **Drainage Area (sq mi):** | 0.36 |
| **Date:** | 10/19/2010 |
| **Field Crew:** | A. Spiller, K. Knight-Meng |

| Station | Elevation |
|---|---|
| 0.0 | 2813.62 |
| 1.5 | 2813.22 |
| 5.0 | 2812.74 |
| 8.4 | 2812.01 |
| 10.7 | 2811.65 |
| 12.9 | 2811.13 |
| 15.0 | 2810.84 |
| 17.0 | 2810.61 |
| 18.2 | 2809.98 |
| 19.0 | 2809.33 |
| 19.8 | 2808.82 |
| 21.2 | 2808.51 |
| 23.0 | 2808.67 |
| 24.7 | 2808.98 |
| 25.2 | 2809.70 |
| 27.1 | 2810.54 |
| 31.1 | 2810.77 |
| 33.4 | 2811.07 |
| 37.6 | 2812.68 |
| 42.7 | 2813.27 |
| 48.8 | 2813.71 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 2810.5 |
| **Bankfull Cross-Sectional Area:** | 11.9 |
| **Bankfull Width:** | 9.6 |
| **Flood Prone Area Elevation:** | - |
| **Flood Prone Width:** | - |
| **Max Depth at Bankfull:** | 2.0 |
| **Mean Depth at Bankfull:** | 1.2 |
| **W / D Ratio:** | - |
| **Entrenchment Ratio:** | - |
| **Bank Height Ratio:** | - |

| | |
|---|---|
| **Stream Type** | C3b |

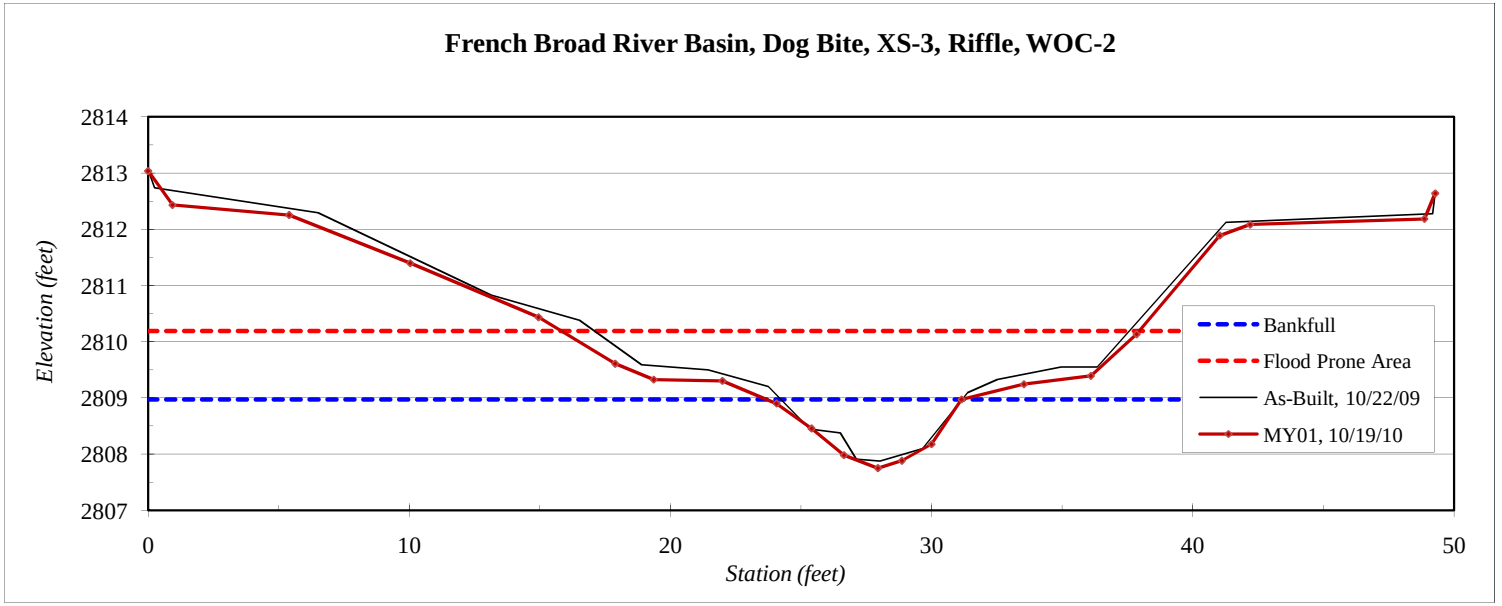


| | |
|---|---|
| **River Basin:** | French Broad |
| **Watershed:** | Dog Bite |
| **XS ID** | XS-3, Riffle, WOC-2 |
| **Drainage Area (sq mi):** | 0.36 |
| **Date:** | 10/19/2010 |
| **Field Crew:** | A. Spiller, K. Knight-Meng |

| Station | Elevation |
|---|---|
| 0.0 | 2813.04 |
| 0.9 | 2812.43 |
| 5.4 | 2812.25 |
| 10.0 | 2811.40 |
| 14.9 | 2810.43 |
| 17.9 | 2809.61 |
| 19.4 | 2809.32 |
| 22.0 | 2809.30 |
| 24.1 | 2808.90 |
| 25.4 | 2808.45 |
| 26.6 | 2807.98 |
| 27.9 | 2807.75 |
| 28.9 | 2807.88 |
| 30.0 | 2808.17 |
| 31.1 | 2808.97 |
| 33.5 | 2809.24 |
| 36.1 | 2809.39 |
| 37.8 | 2810.13 |
| 41.0 | 2811.89 |
| 42.2 | 2812.08 |
| 48.9 | 2812.18 |
| 49.3 | 2812.64 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 2809.0 |
| **Bankfull Cross-Sectional Area:** | 5.4 |
| **Bankfull Width:** | 7.4 |
| **Flood Prone Area Elevation:** | 2810.2 |
| **Flood Prone Width:** | 22 |
| **Max Depth at Bankfull:** | 1.2 |
| **Mean Depth at Bankfull:** | 0.7 |
| **W / D Ratio:** | 10.1 |
| **Entrenchment Ratio:** | 3.0 |
| **Bank Height Ratio:** | 1.0 |

| | |
|---|---|
| **Stream Type** | C3b |

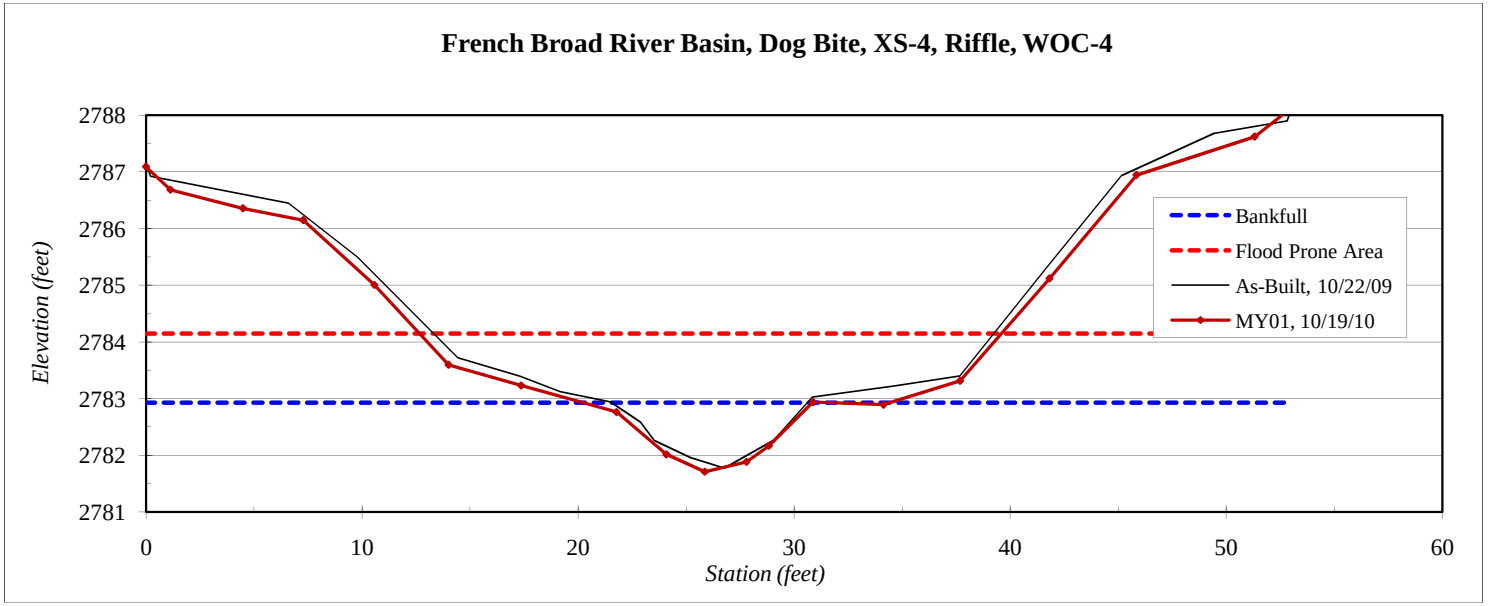


| | |
|---|---|
| **River Basin:** | French Broad |
| **Watershed:** | Dog Bite |
| **XS ID** | XS-4, Riffle, WOC-4 |
| **Drainage Area (sq mi):** | 0.54 |
| **Date:** | 10/19/2010 |
| **Field Crew:** | A. Spiller, K. Knight-Meng |

| Station | Elevation |
|---|---|
| 0.0 | 2787.09 |
| 1.1 | 2786.68 |
| 4.5 | 2786.36 |
| 7.3 | 2786.15 |
| 10.6 | 2785.00 |
| 14.0 | 2783.60 |
| 17.4 | 2783.23 |
| 21.8 | 2782.76 |
| 24.1 | 2782.02 |
| 25.9 | 2781.71 |
| 27.8 | 2781.88 |
| 28.8 | 2782.17 |
| 30.9 | 2782.94 |
| 34.1 | 2782.89 |
| 37.7 | 2783.31 |
| 41.8 | 2785.12 |
| 45.8 | 2786.94 |
| 51.3 | 2787.62 |
| 52.8 | 2788.08 |

| **SUMMARY DATA** | |
|---|---|
| **Bankfull Elevation:** | 2782.9 |
| **Bankfull Cross-Sectional Area:** | 7.2 |
| **Bankfull Width:** | 10.7 |
| **Flood Prone Area Elevation:** | 2784.1 |
| **Flood Prone Width:** | 27 |
| **Max Depth at Bankfull:** | 1.2 |
| **Mean Depth at Bankfull:** | 0.7 |
| **W / D Ratio:** | 15.9 |
| **Entrenchment Ratio:** | 2.5 |
| **Bank Height Ratio:** | 1.0 |

| | |
|---|---|
| **Stream Type** | C3b |

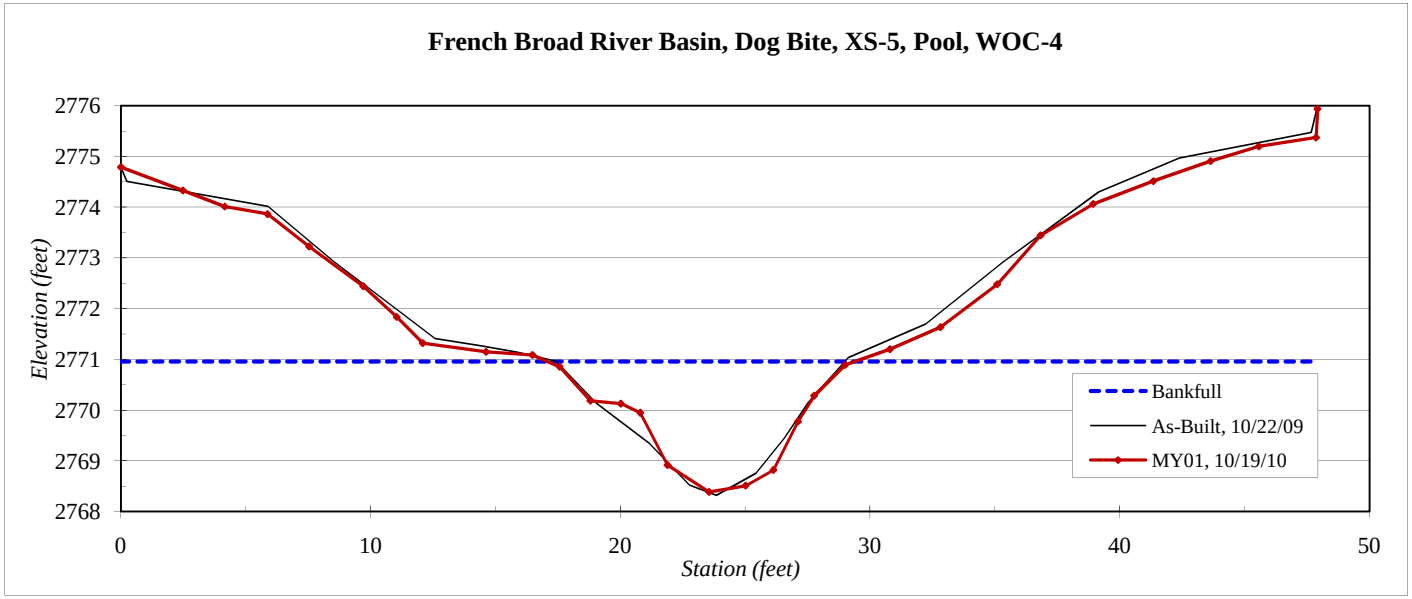


| | |
|---|---|
| **River Basin:** | French Broad |
| **Watershed:** | Dog Bite |
| **XS ID** | XS-5, Pool, WOC-4 |
| **Drainage Area (sq mi):** | 0.54 |
| **Date:** | 10/19/2010 |
| **Field Crew:** | A. Spiller, K. Knight-Meng |

| Station | Elevation |
|---|---|
| 0.0 | 2774.79 |
| 2.5 | 2774.33 |
| 4.2 | 2774.01 |
| 5.9 | 2773.86 |
| 7.5 | 2773.22 |
| 9.7 | 2772.44 |
| 11.0 | 2771.83 |
| 12.1 | 2771.32 |
| 14.6 | 2771.15 |
| 16.5 | 2771.08 |
| 17.6 | 2770.86 |
| 18.8 | 2770.18 |
| 20.0 | 2770.13 |
| 20.8 | 2769.95 |
| 21.9 | 2768.92 |
| 23.6 | 2768.38 |
| 25.0 | 2768.51 |
| 26.1 | 2768.82 |
| 27.1 | 2769.77 |
| 27.8 | 2770.29 |
| 29.0 | 2770.89 |
| 30.8 | 2771.20 |
| 32.8 | 2771.63 |
| 35.1 | 2772.48 |
| 36.8 | 2773.45 |
| 38.9 | 2774.06 |
| 41.4 | 2774.51 |
| 43.6 | 2774.91 |
| 45.6 | 2775.20 |
| 47.9 | 2775.37 |
| 47.9 | 2775.94 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 2771.0 |
| **Bankfull Cross-Sectional Area:** | 16.7 |
| **Bankfull Width:** | 12.3 |
| **Flood Prone Area Elevation:** | - |
| **Flood Prone Width:** | - |
| **Max Depth at Bankfull:** | 2.6 |
| **Mean Depth at Bankfull:** | 1.4 |
| **W / D Ratio:** | - |
| **Entrenchment Ratio:** | - |
| **Bank Height Ratio:** | - |

| | |
|---|---|
| **Stream Type** | C3b |

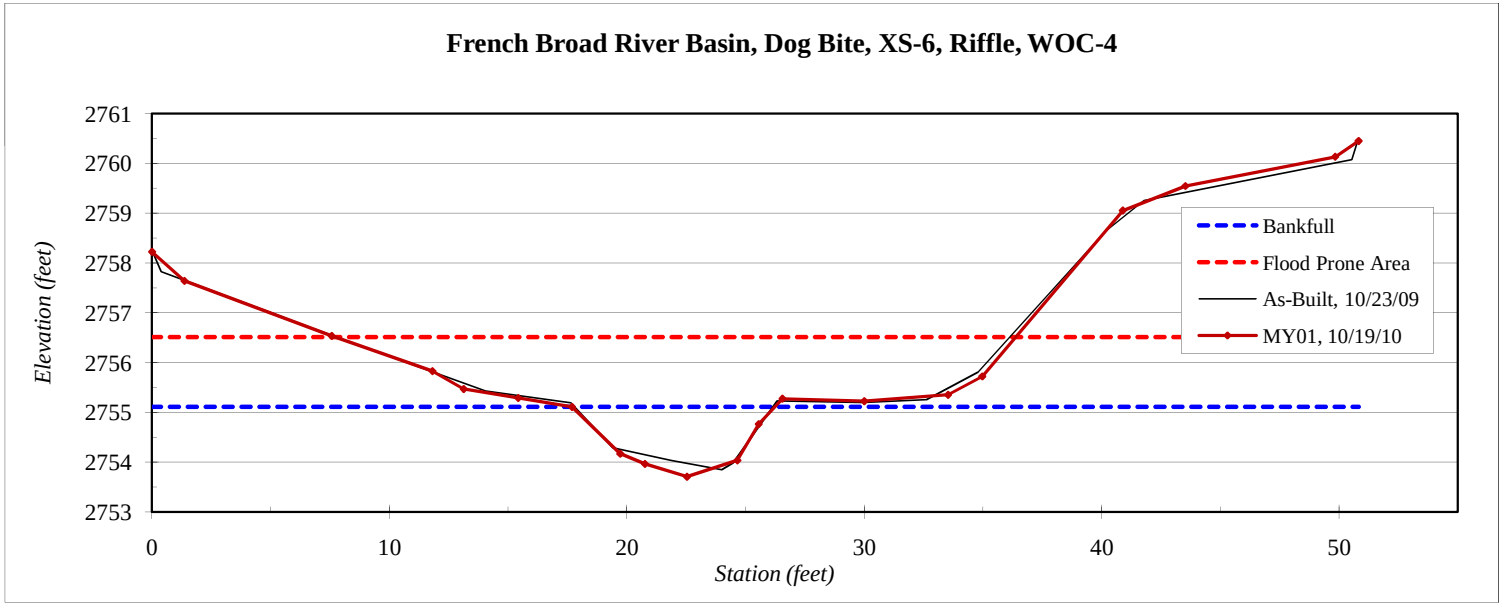


| | |
|---|---|
| **River Basin:** | French Broad |
| **Watershed:** | Dog Bite |
| **XS ID** | XS-6, Riffle, WOC-4 |
| **Drainage Area (sq mi):** | 0.54 |
| **Date:** | 10/19/2010 |
| **Field Crew:** | A. Spiller, K. Knight-Meng |

| Station | Elevation |
|---|---|
| 0.0 | 2758.22 |
| 1.4 | 2757.64 |
| 7.6 | 2756.53 |
| 11.8 | 2755.83 |
| 13.1 | 2755.47 |
| 15.4 | 2755.29 |
| 17.7 | 2755.11 |
| 19.7 | 2754.17 |
| 20.8 | 2753.97 |
| 22.5 | 2753.71 |
| 24.7 | 2754.04 |
| 25.6 | 2754.77 |
| 26.6 | 2755.27 |
| 30.0 | 2755.23 |
| 33.5 | 2755.35 |
| 35.0 | 2755.72 |
| 40.9 | 2759.05 |
| 43.5 | 2759.54 |
| 49.8 | 2760.13 |
| 50.8 | 2760.45 |

| **SUMMARY DATA** | |
|---|---|
| **Bankfull Elevation:** | 2755.1 |
| **Bankfull Cross-Sectional Area:** | 7.7 |
| **Bankfull Width:** | 8.5 |
| **Flood Prone Area Elevation:** | 2756.5 |
| **Flood Prone Width:** | 29 |
| **Max Depth at Bankfull:** | 1.4 |
| **Mean Depth at Bankfull:** | 0.9 |
| **W / D Ratio:** | 9.4 |
| **Entrenchment Ratio:** | 3.4 |
| **Bank Height Ratio:** | 1.0 |

| | |
|---|---|
| **Stream Type** | C3b |

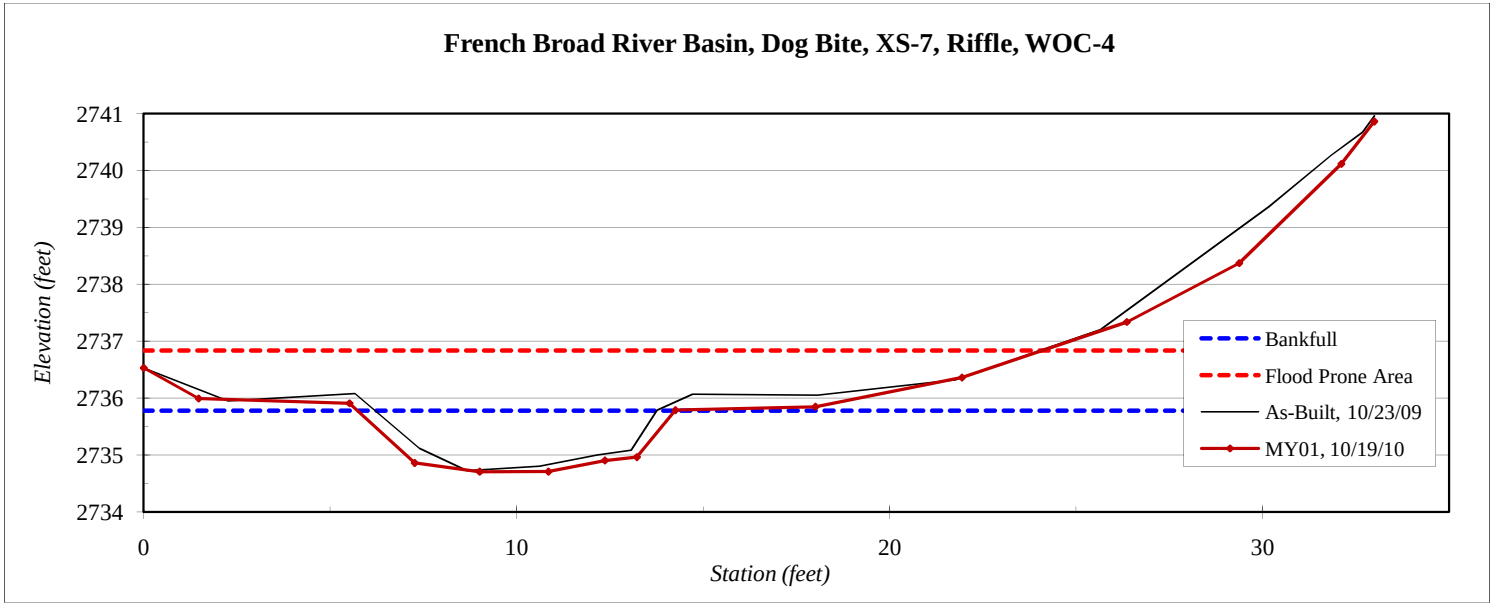


| | |
|---|---|
| **River Basin:** | French Broad |
| **Watershed:** | Dog Bite |
| **XS ID** | XS-7, Riffle, WOC-4 |
| **Drainage Area (sq mi):** | 0.54 |
| **Date:** | 10/19/2010 |
| **Field Crew:** | A. Spiller, K. Knight-Meng |

| Station | Elevation |
|---|---|
| 0.0 | 2736.53 |
| 2.3 | 2735.95 |
| 5.7 | 2736.08 |
| 7.4 | 2735.12 |
| 8.7 | 2734.72 |
| 10.6 | 2734.80 |
| 12.2 | 2735.00 |
| 13.1 | 2735.08 |
| 13.8 | 2735.79 |
| 14.7 | 2736.07 |
| 18.1 | 2736.05 |
| 21.8 | 2736.32 |
| 25.7 | 2737.20 |
| 30.2 | 2739.36 |
| 31.8 | 2740.27 |
| 32.7 | 2740.67 |
| 33.0 | 2740.96 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 2735.8 |
| **Bankfull Cross-Sectional Area:** | 7.0 |
| **Bankfull Width:** | 8.5 |
| **Flood Prone Area Elevation:** | 2736.8 |
| **Flood Prone Width:** | 26 |
| **Max Depth at Bankfull:** | 1.1 |
| **Mean Depth at Bankfull:** | 0.8 |
| **W / D Ratio:** | 10.3 |
| **Entrenchment Ratio:** | 3.1 |
| **Bank Height Ratio:** | 1.0 |

| | |
|---|---|
| **Stream Type** | C3b |

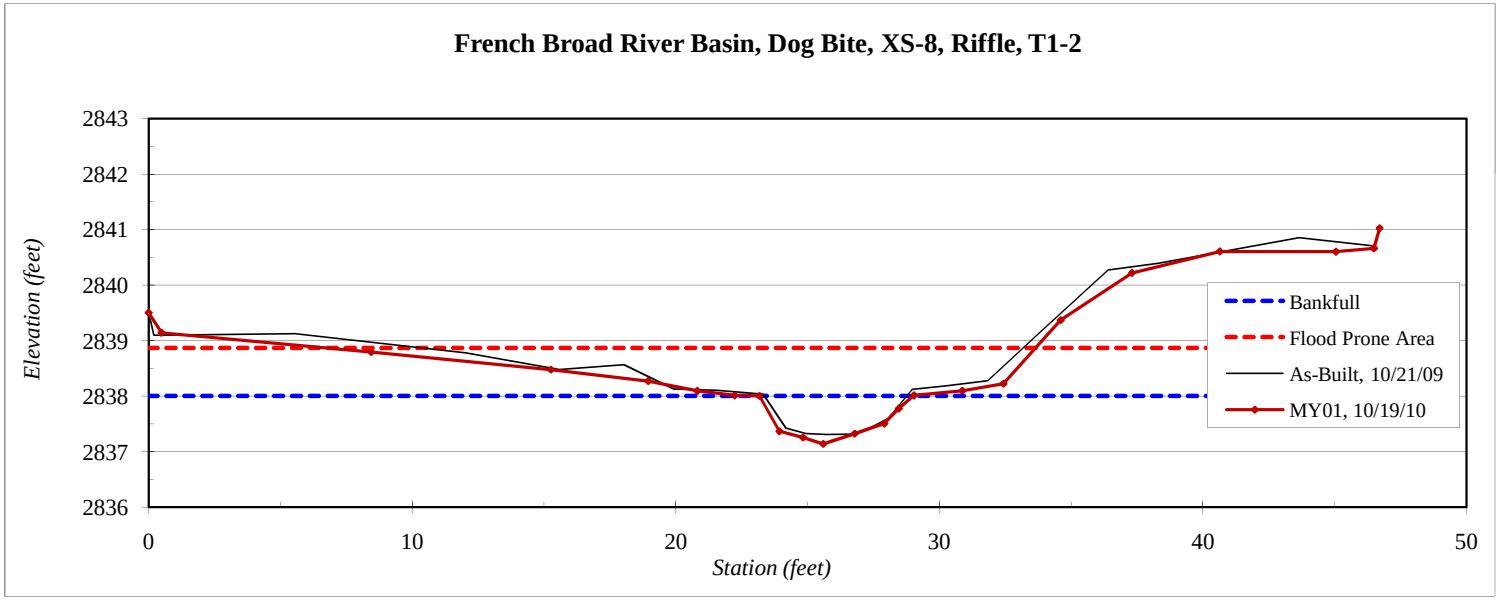


| | |
|---|---|
| **River Basin:** | French Broad |
| **Watershed:** | Dog Bite |
| **XS ID** | XS-8, Riffle, T1-2 |
| **Drainage Area (sq mi):** | 0.08 |
| **Date:** | 10/19/2010 |
| **Field Crew:** | A. Spiller, K. Knight-Meng |

| Station | Elevation |
|---|---|
| 0.0 | 2839.50 |
| 0.5 | 2839.14 |
| 8.5 | 2838.80 |
| 15.3 | 2838.48 |
| 19.0 | 2838.27 |
| 20.8 | 2838.10 |
| 22.2 | 2838.01 |
| 23.2 | 2838.01 |
| 23.9 | 2837.37 |
| 24.8 | 2837.26 |
| 25.6 | 2837.14 |
| 26.8 | 2837.33 |
| 27.9 | 2837.51 |
| 28.5 | 2837.78 |
| 29.0 | 2838.02 |
| 30.9 | 2838.10 |
| 32.4 | 2838.23 |
| 34.6 | 2839.37 |
| 37.3 | 2840.22 |
| 40.6 | 2840.61 |
| 45.0 | 2840.60 |
| 46.5 | 2840.66 |
| 46.7 | 2841.03 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 2838.0 |
| **Bankfull Cross-Sectional Area:** | 3.3 |
| **Bankfull Width:** | 5.8 |
| **Flood Prone Area Elevation:** | 2838.9 |
| **Flood Prone Width:** | 27 |
| **Max Depth at Bankfull:** | 0.9 |
| **Mean Depth at Bankfull:** | 0.6 |
| **W / D Ratio:** | 10.2 |
| **Entrenchment Ratio:** | 4.6 |
| **Bank Height Ratio:** | 1.0 |

| | |
|---|---|
| **Stream Type** | C3b |

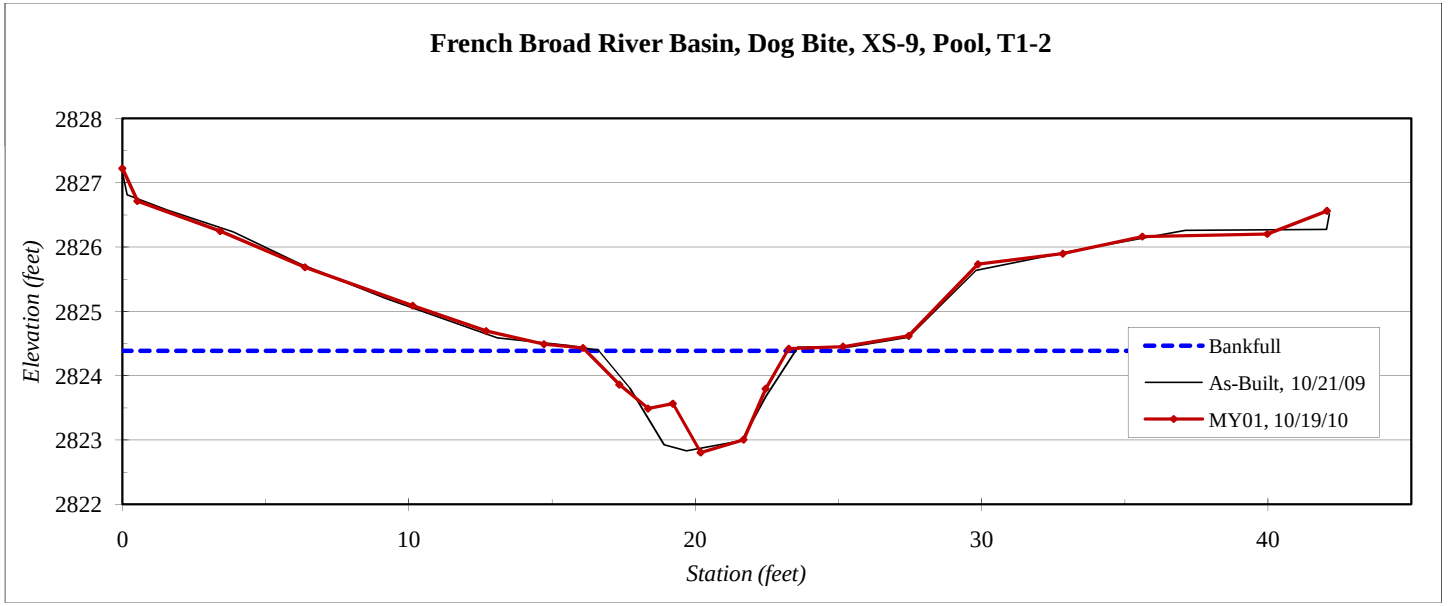


| | |
|---|---|
| **River Basin:** | French Broad |
| **Watershed:** | Dog Bite |
| **XS ID** | XS-9, Pool, T1-2 |
| **Drainage Area (sq mi):** | 0.08 |
| **Date:** | 10/19/2010 |
| **Field Crew:** | A. Spiller, K. Knight-Meng |

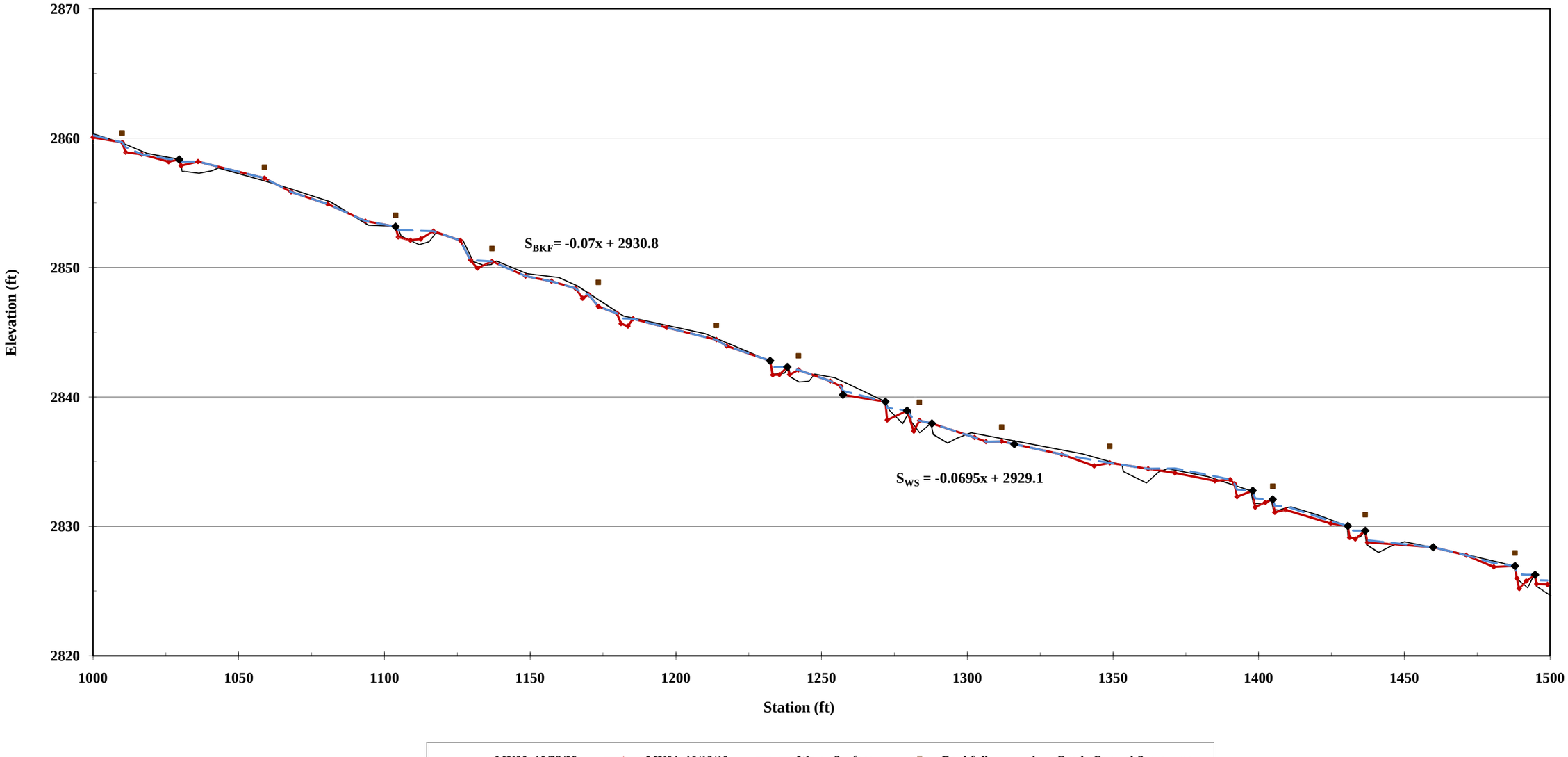
| Station | Elevation |
|---|---|
| 0.0 | 2827.22 |
| 0.5 | 2826.72 |
| 3.4 | 2826.25 |
| 6.4 | 2825.69 |
| 10.1 | 2825.09 |
| 12.7 | 2824.69 |
| 14.7 | 2824.49 |
| 16.1 | 2824.43 |
| 17.4 | 2823.86 |
| 18.4 | 2823.49 |
| 19.2 | 2823.57 |
| 20.2 | 2822.81 |
| 21.7 | 2823.01 |
| 22.5 | 2823.80 |
| 23.3 | 2824.42 |
| 25.2 | 2824.45 |
| 27.5 | 2824.62 |
| 29.9 | 2825.73 |
| 32.8 | 2825.90 |
| 35.6 | 2826.16 |
| 40.0 | 2826.20 |
| 42.1 | 2826.56 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 2824.4 |
| **Bankfull Cross-Sectional Area:** | 6.2 |
| **Bankfull Width:** | 7.1 |
| **Flood Prone Area Elevation:** | - |
| **Flood Prone Width:** | - |
| **Max Depth at Bankfull:** | 1.6 |
| **Mean Depth at Bankfull:** | 0.9 |
| **W / D Ratio:** | - |
| **Entrenchment Ratio:** | - |
| **Bank Height Ratio:** | - |

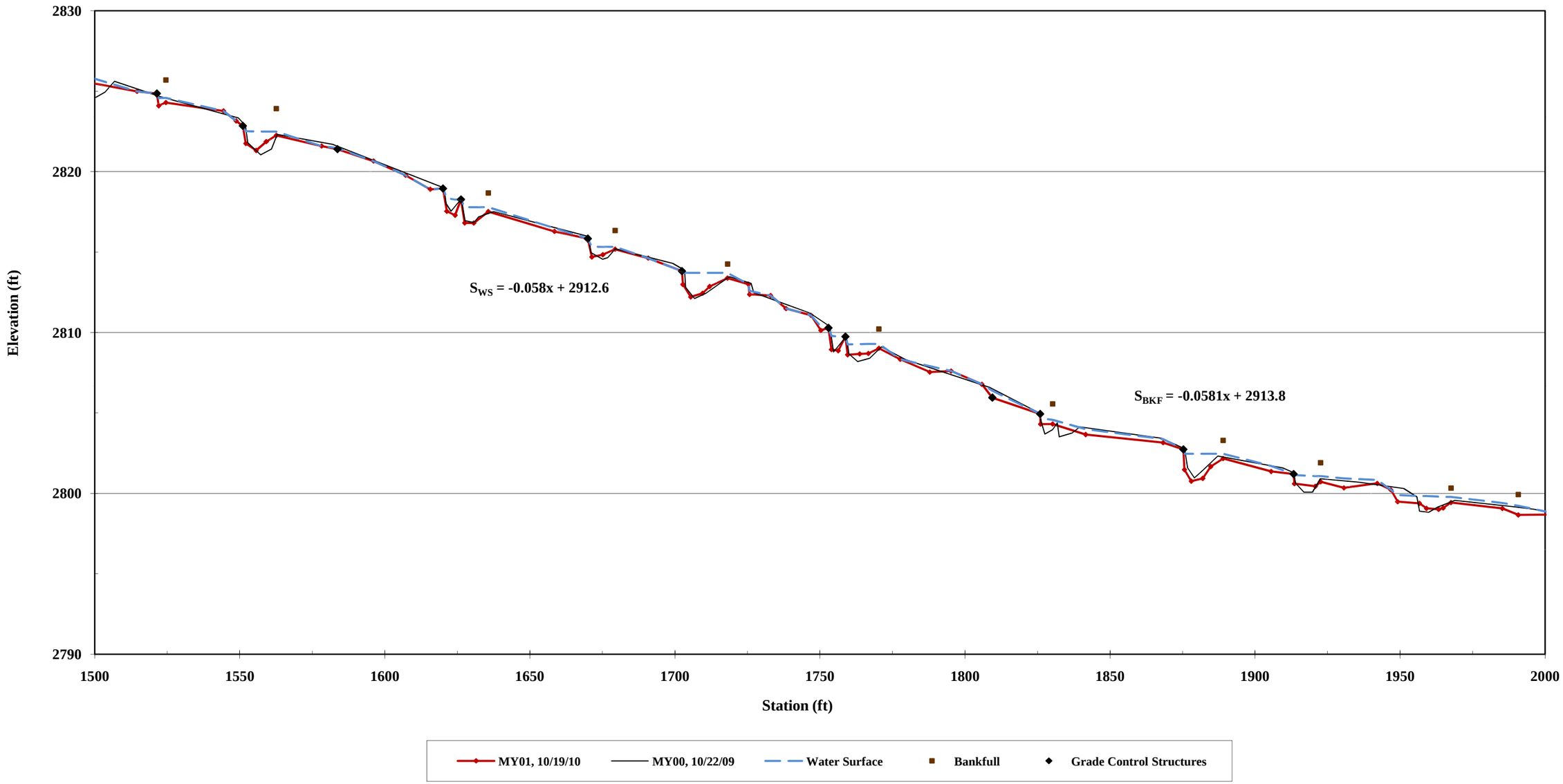
| | |
|---|---|
| **Stream Type** | C3b |



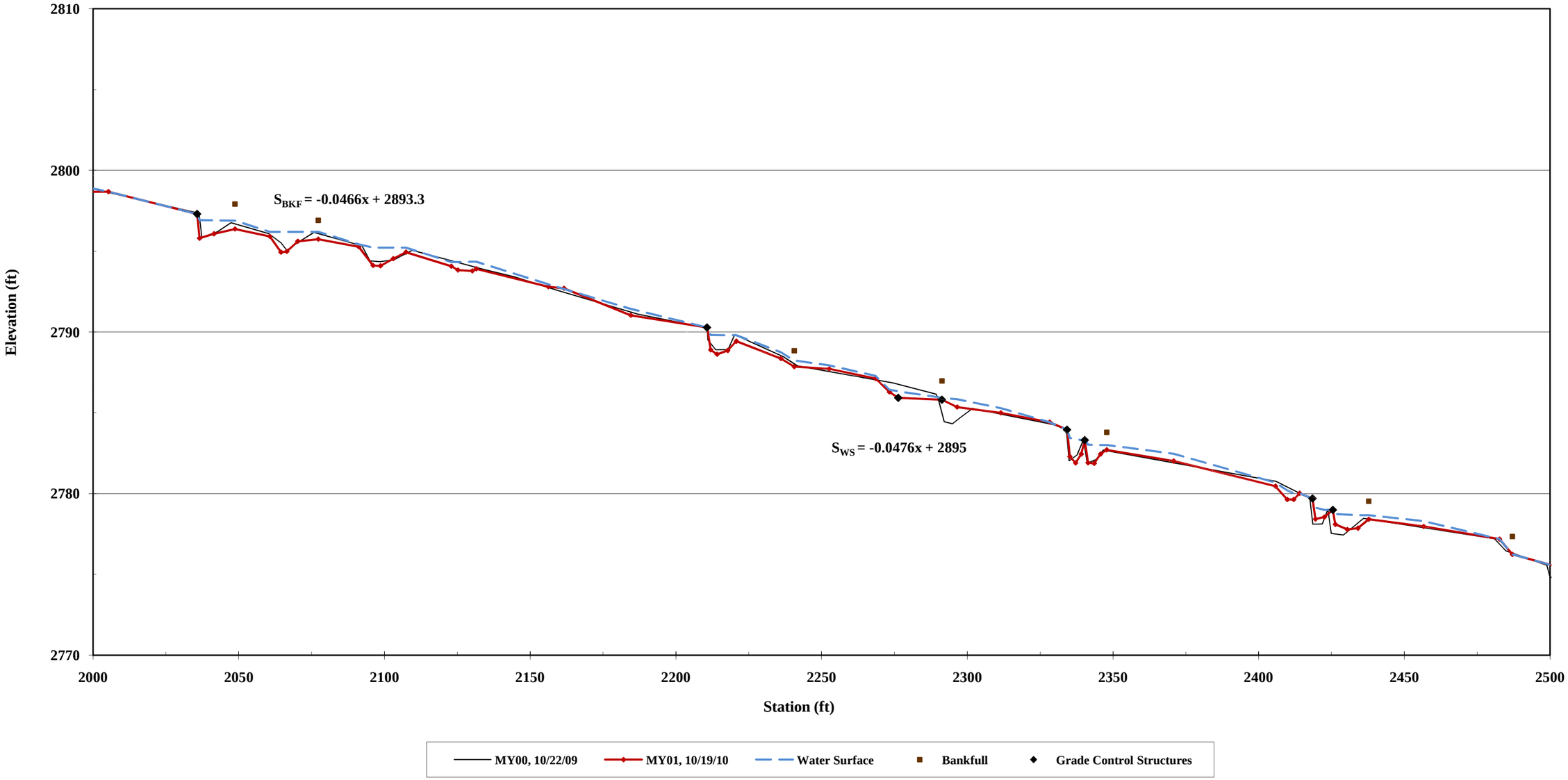
# Dog Bite Site
# Longitudinal Profile
# White Oak Creek, MY01
# Stations 10+00 - 15+00



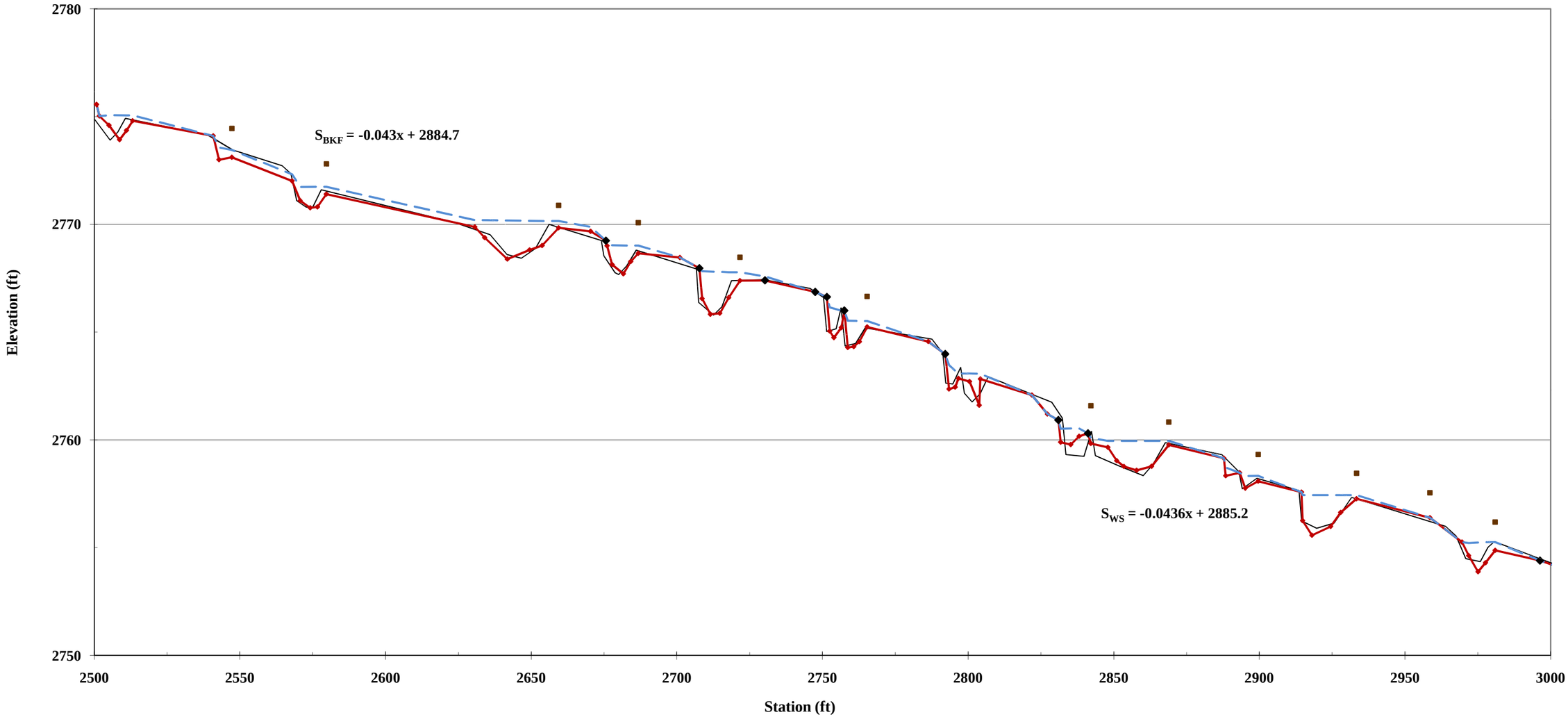
# Dog Bite Site
# Longitudinal Profile
# White Oak Creek, MY01
# Stations 15+00 - 20+00



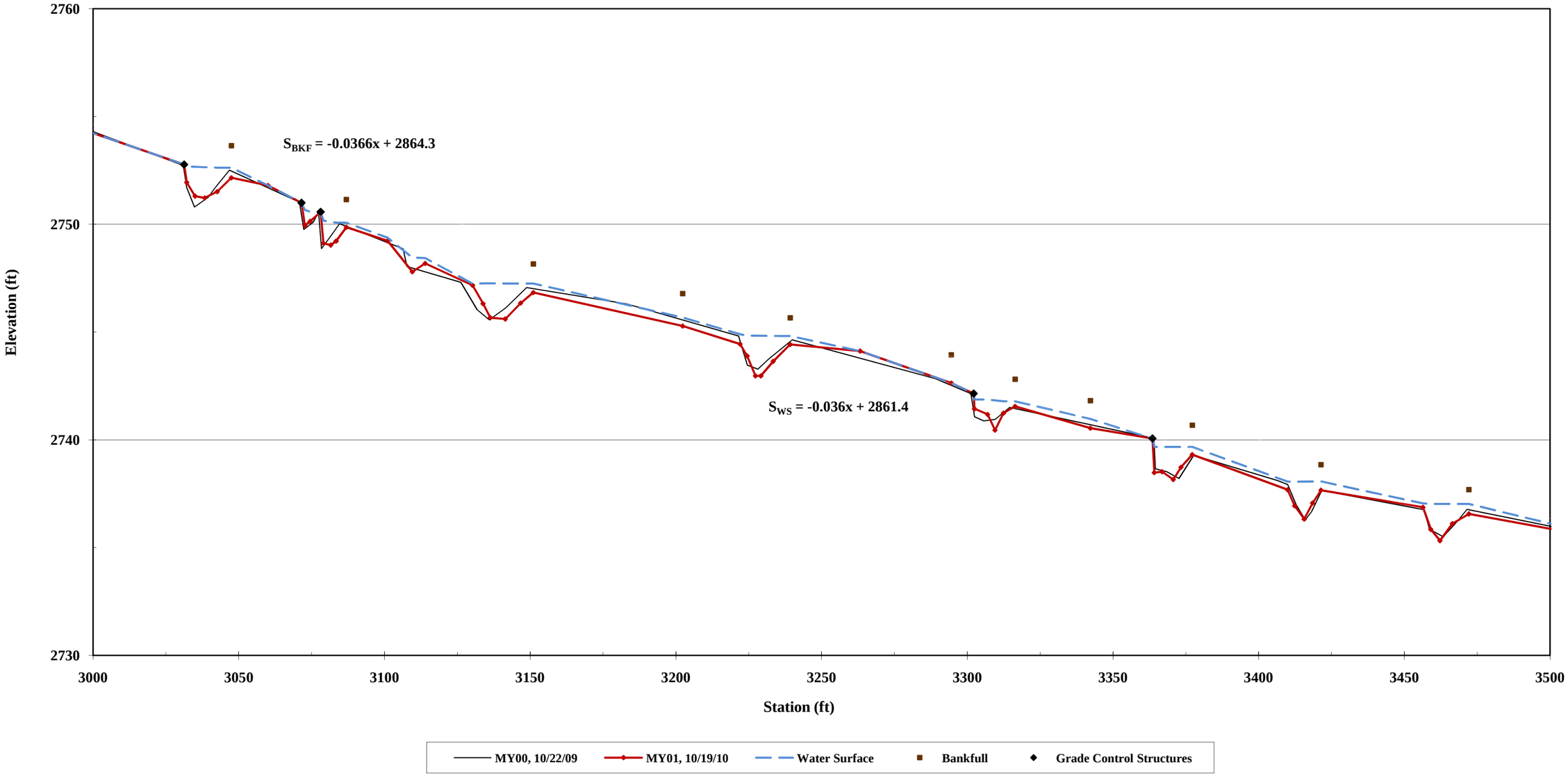
# Dog Bite Site
# Longitudinal Profile
# White Oak Creek, MY01
# Stations 20+00 - 25+00



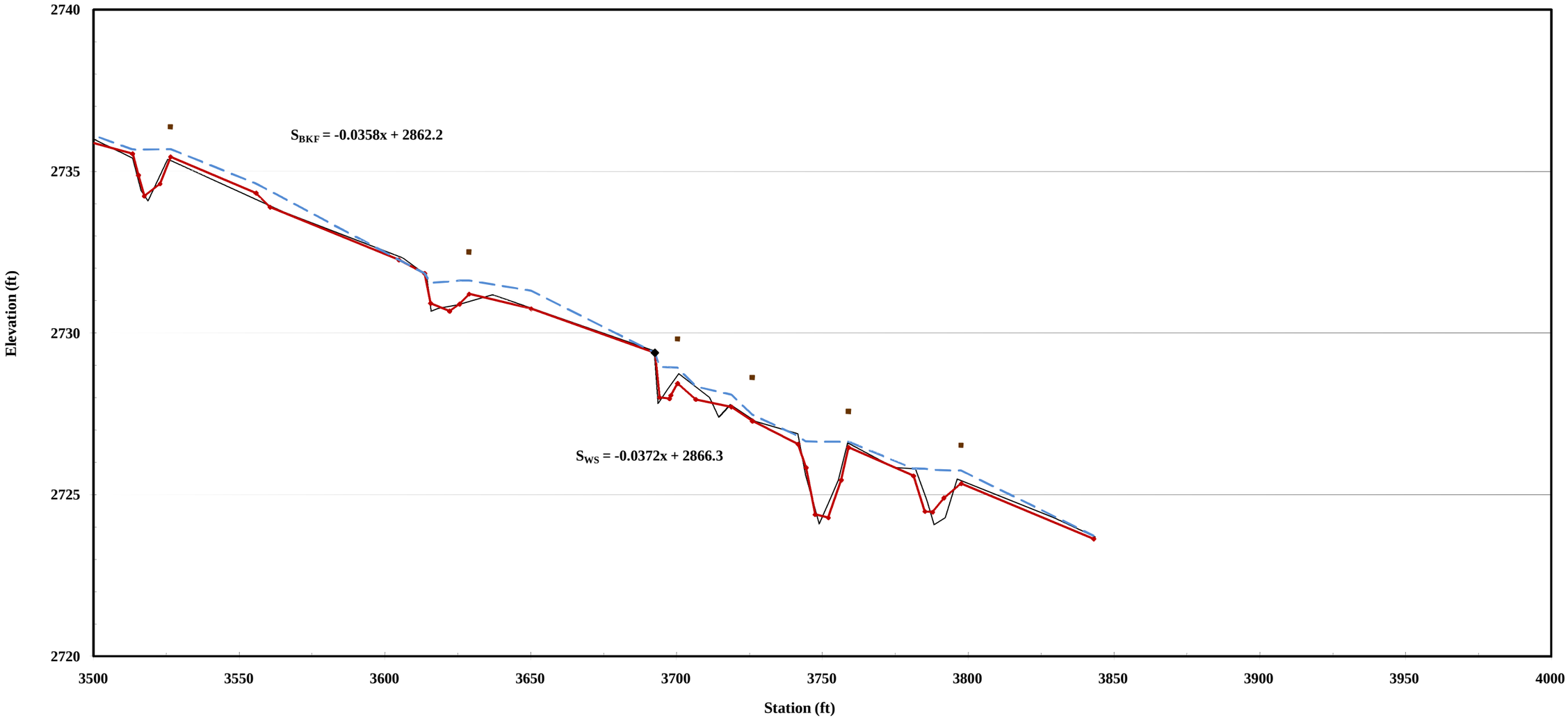
# Dog Bite Site
# Longitudinal Profile
# White Oak Creek, MY01
# Stations 25+00 - 30+00



# Dog Bite Site
# Longitudinal Profile
# White Oak Creek, MY01
# Stations 30+00 - 35+00



# Dog Bite Site
# Longitudinal Profile
# White Oak Creek, MY01
# Stations 35+00 - 40+00

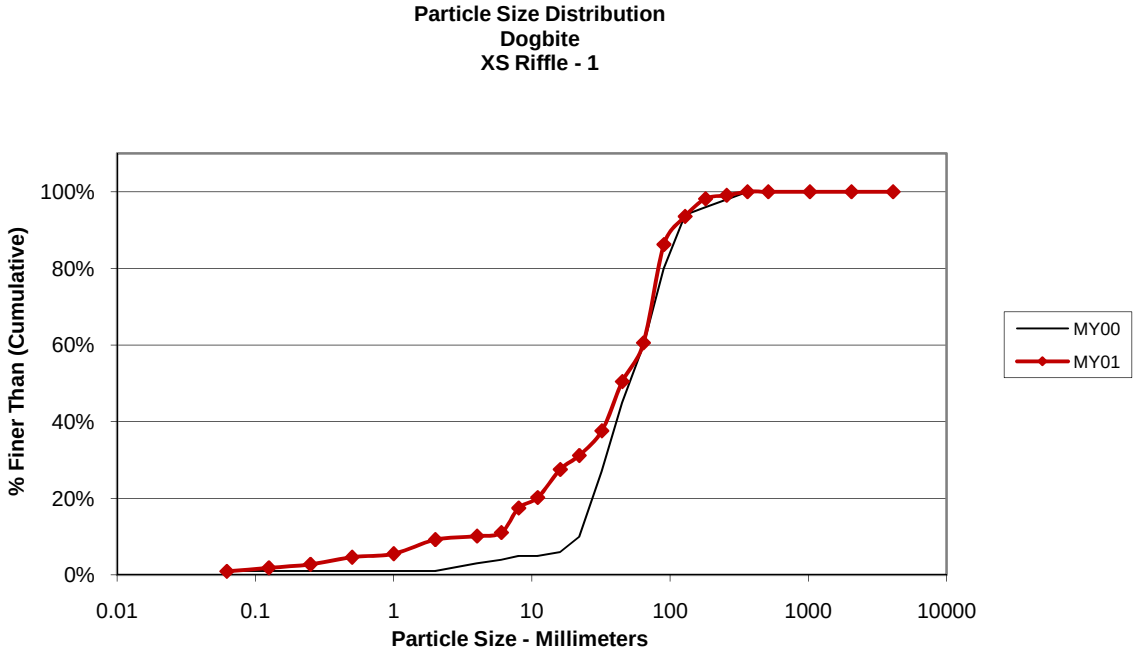


# Dog Bite Site
# Longitudinal Profile
# T1, MY01
# Stations 51+00 - 54+13

# Pebble Count Plots

| Cross-Section Riffle 1 - MY01 | | | |
|---|---|---|---|
| Particle | Millimeter | | Count |
| Silt/Clay | < 0.062 | S/C | 1 |
| Very Fine | .062 - .125 | S | 1 |
| Fine | .125 - .25 | A | 1 |
| Medium | .25 - .50 | N | 2 |
| Coarse | .50 - 1 | D | 1 |
| Very Coarse | 1 - 2 | S | 4 |
| Very Fine | 2 - 4 | | 1 |
| Fine | 4 - 5.7 | G | 1 |
| Fine | 5.7 - 8 | R | 7 |
| Medium | 8 - 11.3 | A | 3 |
| Medium | 11.3 - 16 | V | 8 |
| Coarse | 16 - 22.6 | E | 4 |
| Coarse | 22.6 - 32 | L | 7 |
| Very Coarse | 32 - 45 | S | 14 |
| Very Coarse | 45 - 64 | | 11 |
| Small | 64 - 90 | C | 28 |
| Small | 90 - 128 | O | 8 |
| Large | 128 - 180 | B | 5 |
| Large | 180 - 256 | L | 1 |
| Small | 256 - 362 | B | 1 |
| Small | 362 - 512 | L | |
| Medium | 512 - 1024 | D | |
| Lrg- Very Lrg | 1024 - 2048 | R | |
| Bedrock | >2048 | BDRK | |
| | | **Total** | 109 |

Note:



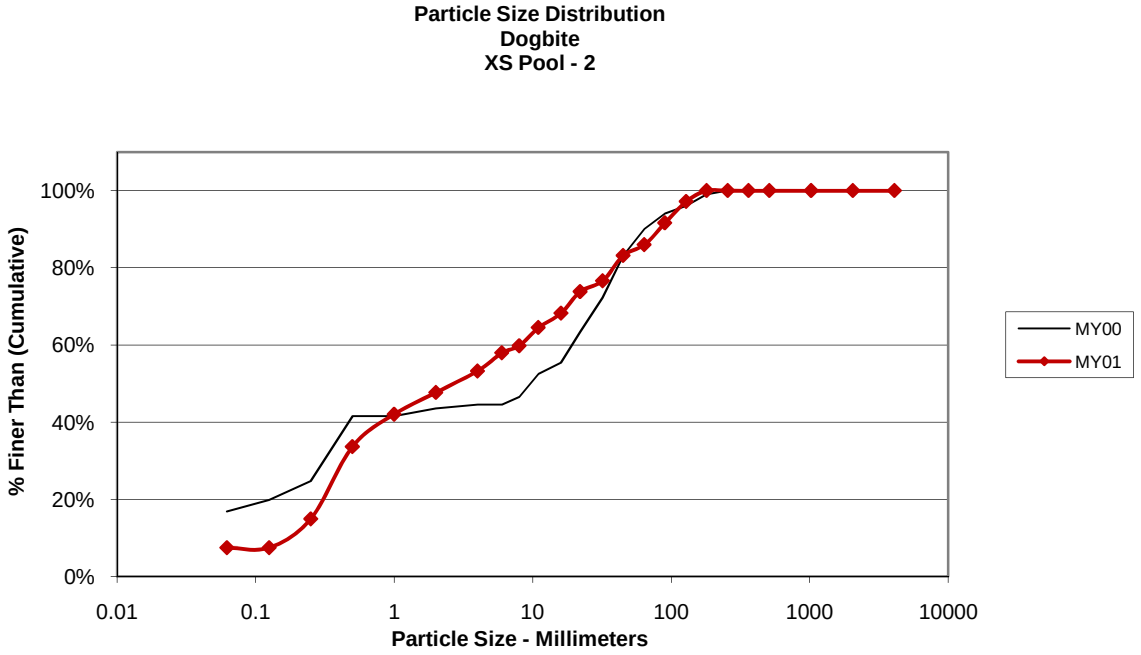

| Size (mm) | |
|---|---|
| D16 | 7.5 |
| D35 | 27 |
| D50 | 44 |
| D65 | 68 |
| D84 | 87 |
| D95 | 140 |

| Size Distribution | |
|---|---|
| mean | 25.5 |
| dispersion | 3.9 |
| skewness | -0.02 |

| Type | |
|---|---|
| silt/clay | 1% |
| sand | 8% |
| gravel | 51% |
| cobble | 39% |
| boulder | 1% |
| bedrock | 0% |
| hardpan | 0% |
| wood/det | 0% |
| artificial | 0% |

| Cross-Section Pool 2 - MY01 | | | |
|---|---|---|---|
| Particle | Millimeter | | Count |
| Silt/Clay | < 0.062 | S/C | 8 |
| Very Fine | .062 - .125 | S | |
| Fine | .125 - .25 | A | 8 |
| Medium | .25 - .50 | N | 20 |
| Coarse | .50 - 1 | D | 9 |
| Very Coarse | 1 - 2 | S | 6 |
| Very Fine | 2 - 4 | | 6 |
| Fine | 4 - 5.7 | G | 5 |
| Fine | 5.7 - 8 | R | 2 |
| Medium | 8 - 11.3 | A | 5 |
| Medium | 11.3 - 16 | V | 4 |
| Coarse | 16 - 22.6 | E | 6 |
| Coarse | 22.6 - 32 | L | 3 |
| Very Coarse | 32 - 45 | S | 7 |
| Very Coarse | 45 - 64 | | 3 |
| Small | 64 - 90 | C | 6 |
| Small | 90 - 128 | O | 6 |
| Large | 128 - 180 | B | 3 |
| Large | 180 - 256 | L | |
| Small | 256 - 362 | B | |
| Small | 362 - 512 | L | |
| Medium | 512 - 1024 | D | |
| Lrg- Very Lrg | 1024 - 2048 | R | |
| Bedrock | >2048 | BDRK | |
| | | **Total** | 107 |

Note:



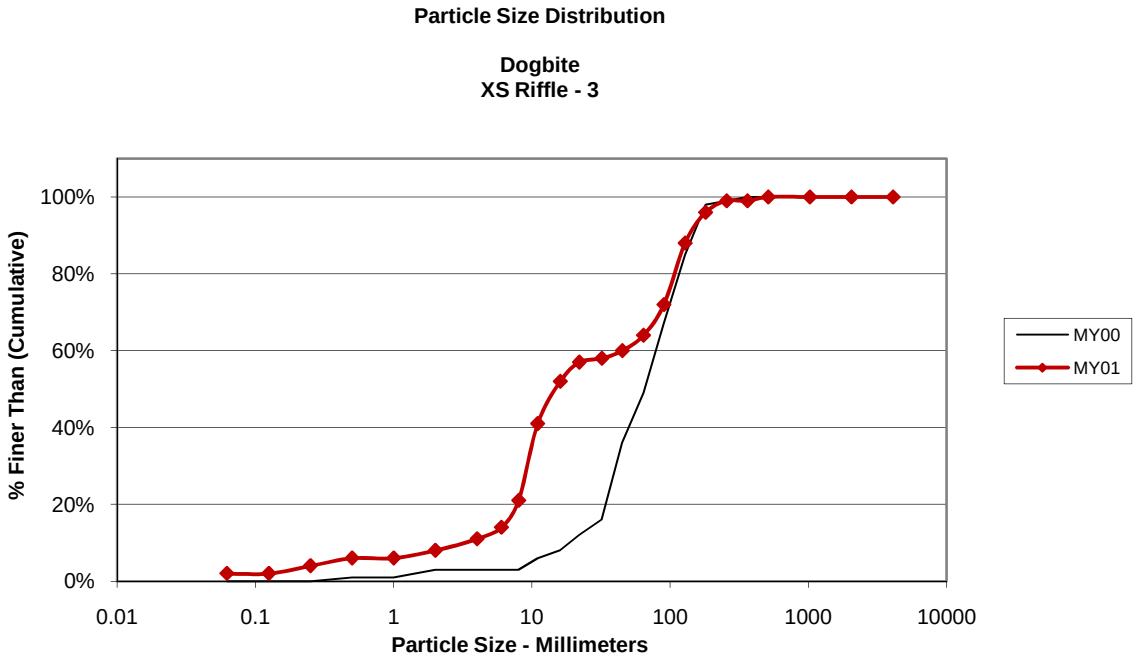

| Size (mm) | |
|---|---|
| D16 | 0.26 |
| D35 | 0.56 |
| D50 | 2.7 |
| D65 | 12 |
| D84 | 50 |
| D95 | 110 |

| Size Distribution | |
|---|---|
| mean | 3.6 |
| dispersion | 14.5 |
| skewness | 0.08 |

| Type | |
|---|---|
| silt/clay | 7% |
| sand | 40% |
| gravel | 38% |
| cobble | 14% |
| boulder | 0% |
| bedrock | 0% |
| hardpan | 0% |
| wood/det | 0% |
| artificial | 0% |

| Cross-Section Riffle 3 - MY01 | | | |
|---|---|---|---|
| Particle | Millimeter | | Count |
| Silt/Clay | < 0.062 | S/C | 2 |
| Very Fine | .062 - .125 | S | |
| Fine | .125 - .25 | A | 2 |
| Medium | .25 - .50 | N | 2 |
| Coarse | .50 - 1 | D | |
| Very Coarse | 1 - 2 | S | 2 |
| Very Fine | 2 - 4 | | 3 |
| Fine | 4 - 5.7 | G | 3 |
| Fine | 5.7 - 8 | R | 7 |
| Medium | 8 - 11.3 | A | 20 |
| Medium | 11.3 - 16 | V | 11 |
| Coarse | 16 - 22.6 | E | 5 |
| Coarse | 22.6 - 32 | L | 1 |
| Very Coarse | 32 - 45 | S | 2 |
| Very Coarse | 45 - 64 | | 4 |
| Small | 64 - 90 | C | 8 |
| Small | 90 - 128 | O | 16 |
| Large | 128 - 180 | B | 8 |
| Large | 180 - 256 | L | 3 |
| Small | 256 - 362 | B | |
| Small | 362 - 512 | L | 1 |
| Medium | 512 - 1024 | D | |
| Lrg- Very Lrg | 1024 - 2048 | R | |
| Bedrock | >2048 | BDRK | |
| | | **Total** | 100 |

Note:



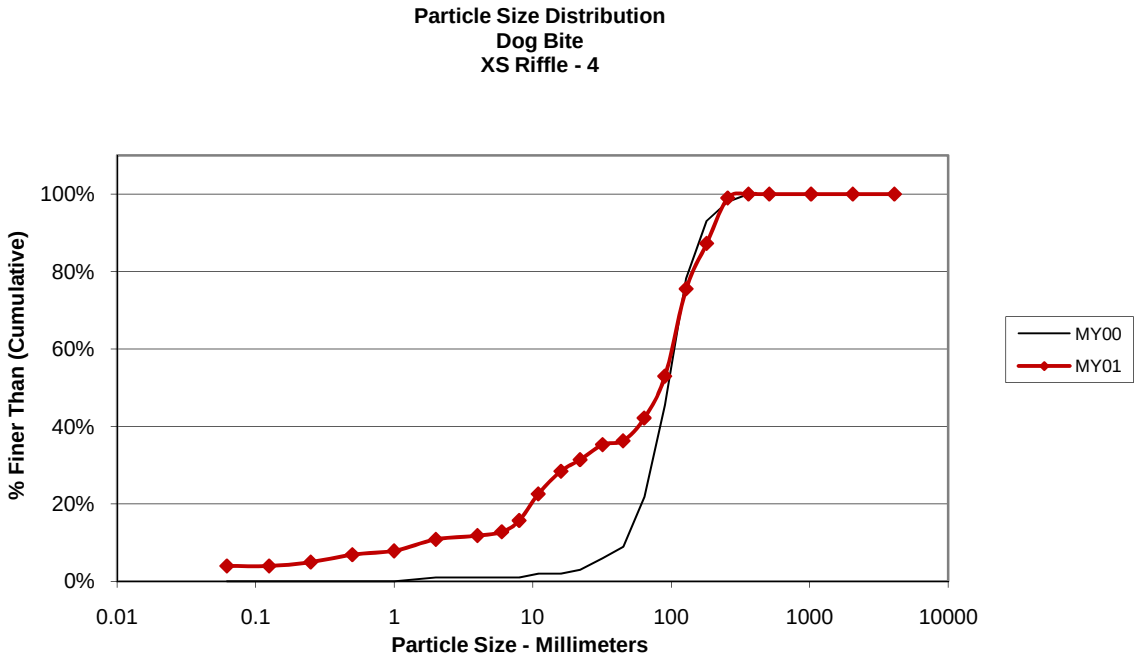

| Size (mm) | |
|---|---|
| D16 | 6.5 |
| D35 | 10 |
| D50 | 15 |
| D65 | 67 |
| D84 | 120 |
| D95 | 170 |

| Size Distribution | |
|---|---|
| mean | 27.9 |
| dispersion | 5.2 |
| skewness | 0.24 |

| Type | |
|---|---|
| silt/clay | 2% |
| sand | 6% |
| gravel | 56% |
| cobble | 35% |
| boulder | 1% |
| bedrock | 0% |
| hardpan | 0% |
| wood/det | 0% |
| artificial | 0% |

| Cross-Section Riffle 4 - MY01 | | | |
|---|---|---|---|
| Particle | Millimeter | | Count |
| Silt/Clay | < 0.062 | S/C | 4 |
| Very Fine | .062 - .125 | S | |
| Fine | .125 - .25 | A | 1 |
| Medium | .25 - .50 | N | 2 |
| Coarse | .50 - 1 | D | 1 |
| Very Coarse | 1 - 2 | S | 3 |
| Very Fine | 2 - 4 | | 1 |
| Fine | 4 - 5.7 | G | 1 |
| Fine | 5.7 - 8 | R | 3 |
| Medium | 8 - 11.3 | A | 7 |
| Medium | 11.3 - 16 | V | 6 |
| Coarse | 16 - 22.6 | E | 3 |
| Coarse | 22.6 - 32 | L | 4 |
| Very Coarse | 32 - 45 | S | 1 |
| Very Coarse | 45 - 64 | | 6 |
| Small | 64 - 90 | C | 11 |
| Small | 90 - 128 | O | 23 |
| Large | 128 - 180 | B | 12 |
| Large | 180 - 256 | L | 12 |
| Small | 256 - 362 | B | 1 |
| Small | 362 - 512 | L | |
| Medium | 512 - 1024 | D | |
| Lrg- Very Lrg | 1024 - 2048 | R | |
| Bedrock | >2048 | BDRK | |
| | | **Total** | 102 |

Note:



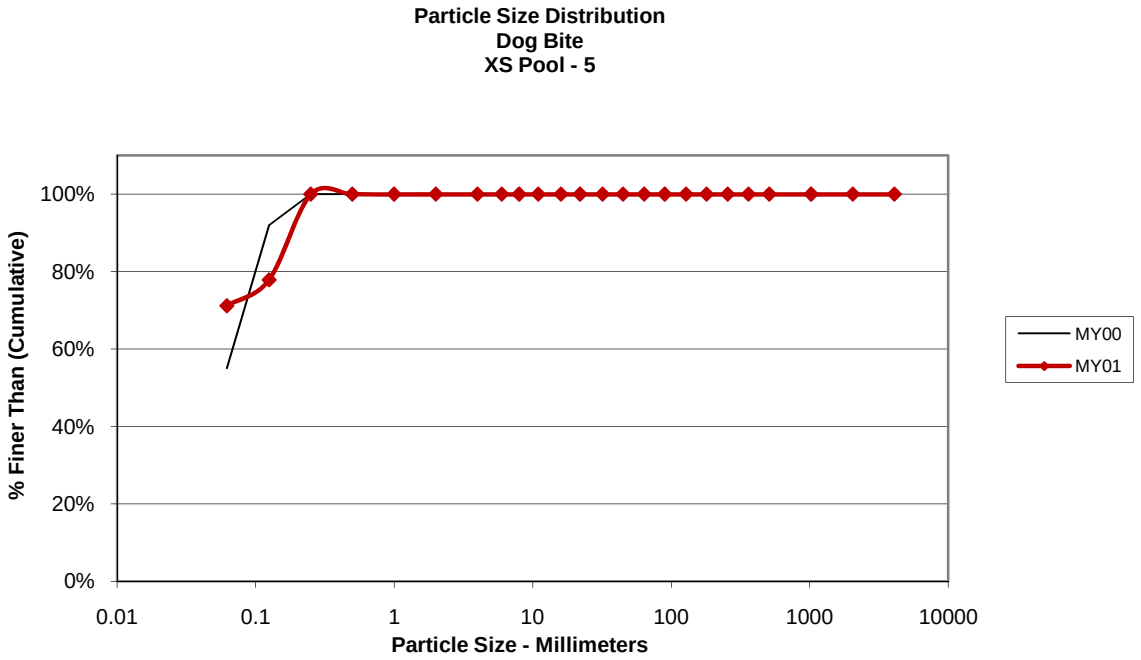

| Size (mm) | |
|---|---|
| D16 | 8.1 |
| D35 | 31 |
| D50 | 82 |
| D65 | 110 |
| D84 | 160 |
| D95 | 230 |

| Size Distribution | |
|---|---|
| mean | 36.0 |
| dispersion | 6.0 |
| skewness | -0.31 |

| Type | |
|---|---|
| silt/clay | 4% |
| sand | 7% |
| gravel | 31% |
| cobble | 57% |
| boulder | 1% |
| bedrock | 0% |
| hardpan | 0% |
| wood/det | 0% |
| artificial | 0% |

| Cross-Section Pool 5 - MY01 | | | |
|---|---|---|---|
| Particle | Millimeter | | Count |
| Silt/Clay | < 0.062 | S/C | 74 |
| Very Fine | .062 - .125 | S | 7 |
| Fine | .125 - .25 | A | 23 |
| Medium | .25 - .50 | N | |
| Coarse | .50 - 1 | D | |
| Very Coarse | 1 - 2 | S | |
| Very Fine | 2 - 4 | | |
| Fine | 4 - 5.7 | G | |
| Fine | 5.7 - 8 | R | |
| Medium | 8 - 11.3 | A | |
| Medium | 11.3 - 16 | V | |
| Coarse | 16 - 22.6 | E | |
| Coarse | 22.6 - 32 | L | |
| Very Coarse | 32 - 45 | S | |
| Very Coarse | 45 - 64 | | |
| Small | 64 - 90 | C | |
| Small | 90 - 128 | O | |
| Large | 128 - 180 | B | |
| Large | 180 - 256 | L | |
| Small | 256 - 362 | B | |
| Small | 362 - 512 | L | |
| Medium | 512 - 1024 | D | |
| Lrg- Very Lrg | 1024 - 2048 | R | |
| Bedrock | >2048 | BDRK | |
| | | **Total** | 104 |

Note:



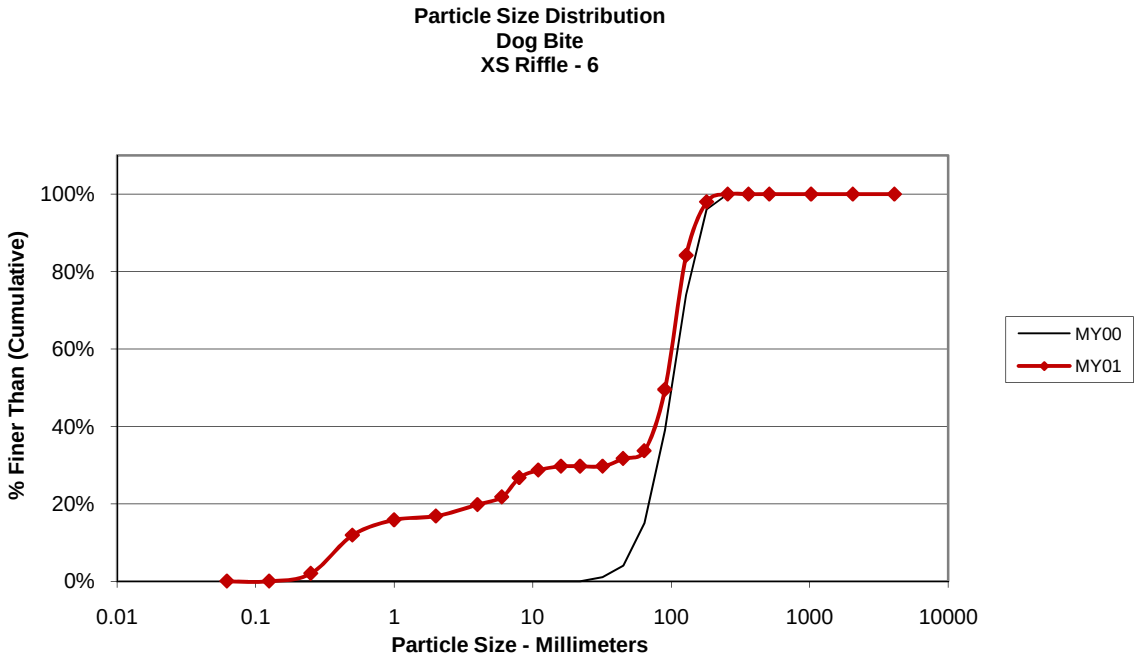

| Size (mm) | |
|---|---|
| D16 | 0.062 |
| D35 | 0.062 |
| D50 | 0.062 |
| D65 | 0.062 |
| D84 | 0.15 |
| D95 | 0.21 |

| Size Distribution | |
|---|---|
| mean | 0.1 |
| dispersion | 1.7 |
| skewness | 0.31 |

| Type | |
|---|---|
| silt/clay | 71% |
| sand | 29% |
| gravel | 0% |
| cobble | 0% |
| boulder | 0% |
| bedrock | 0% |
| hardpan | 0% |
| wood/det | 0% |
| artificial | 0% |

| Cross-Section Riffle 6 - MY01 | | | |
|---|---|---|---|
| Particle | Millimeter | | Count |
| Silt/Clay | < 0.062 | S/C | |
| Very Fine | .062 - .125 | S | |
| Fine | .125 - .25 | A | 2 |
| Medium | .25 - .50 | N | 10 |
| Coarse | .50 - 1 | D | 4 |
| Very Coarse | 1 - 2 | S | 1 |
| Very Fine | 2 - 4 | | 3 |
| Fine | 4 - 5.7 | G | 2 |
| Fine | 5.7 - 8 | R | 5 |
| Medium | 8 - 11.3 | A | 2 |
| Medium | 11.3 - 16 | V | 1 |
| Coarse | 16 - 22.6 | E | |
| Coarse | 22.6 - 32 | L | |
| Very Coarse | 32 - 45 | S | 2 |
| Very Coarse | 45 - 64 | | 2 |
| Small | 64 - 90 | C | 16 |
| Small | 90 - 128 | O | 35 |
| Large | 128 - 180 | B | 14 |
| Large | 180 - 256 | L | 2 |
| Small | 256 - 362 | B | |
| Small | 362 - 512 | L | |
| Medium | 512 - 1024 | D | |
| Lrg- Very Lrg | 1024 - 2048 | R | |
| Bedrock | >2048 | BDRK | |
| | | **Total** | 101 |

Note:



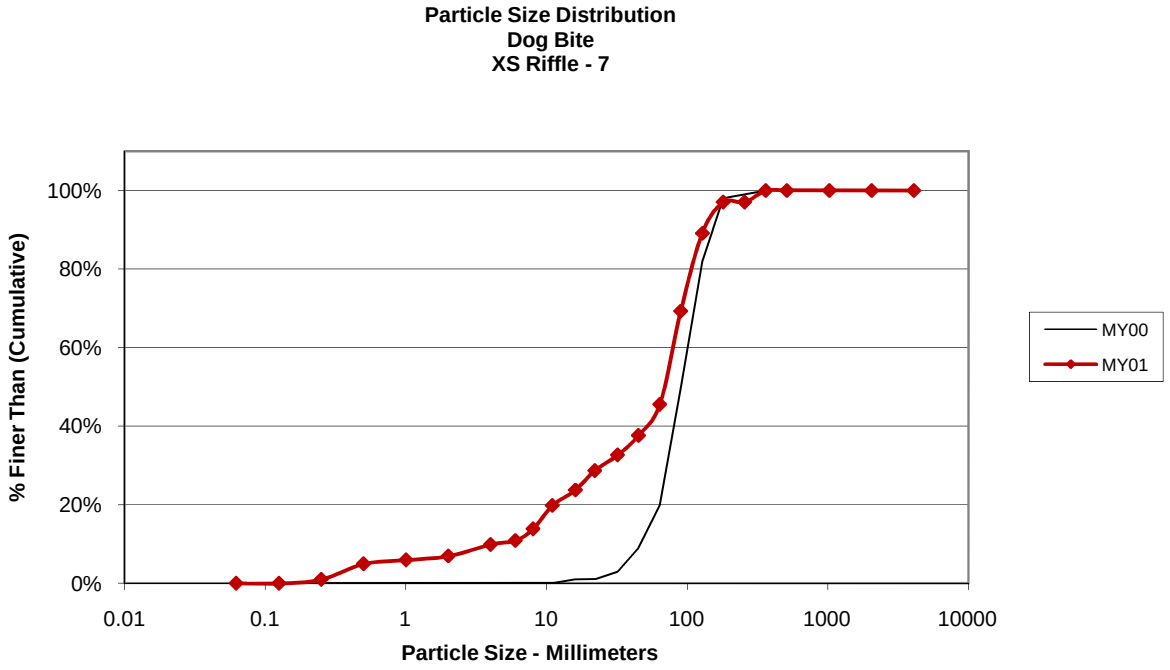

| Size (mm) | |
|---|---|
| D16 | 1.1 |
| D35 | 66 |
| D50 | 90 |
| D65 | 110 |
| D84 | 130 |
| D95 | 170 |

| Size Distribution | |
|---|---|
| mean | 12.0 |
| dispersion | 41.6 |
| skewness | -0.61 |

| Type | |
|---|---|
| silt/clay | 0% |
| sand | 17% |
| gravel | 17% |
| cobble | 66% |
| boulder | 0% |
| bedrock | 0% |
| hardpan | 0% |
| wood/det | 0% |
| artificial | 0% |

| Cross-Section Riffle 7 - MY01 | | | |
|---|---|---|---|
| Particle | Millimeter | | Count |
| Silt/Clay | < 0.062 | S/C | |
| Very Fine | .062 - .125 | S | |
| Fine | .125 - .25 | A | 1 |
| Medium | .25 - .50 | N | 4 |
| Coarse | .50 - 1 | D | 1 |
| Very Coarse | 1 - 2 | S | 1 |
| Very Fine | 2 - 4 | | 3 |
| Fine | 4 - 5.7 | G | 1 |
| Fine | 5.7 - 8 | R | 3 |
| Medium | 8 - 11.3 | A | 6 |
| Medium | 11.3 - 16 | V | 4 |
| Coarse | 16 - 22.6 | E | 5 |
| Coarse | 22.6 - 32 | L | 4 |
| Very Coarse | 32 - 45 | S | 5 |
| Very Coarse | 45 - 64 | | 8 |
| Small | 64 - 90 | C | 24 |
| Small | 90 - 128 | O | 20 |
| Large | 128 - 180 | B | 8 |
| Large | 180 - 256 | L | |
| Small | 256 - 362 | B | 3 |
| Small | 362 - 512 | L | |
| Medium | 512 - 1024 | D | |
| Lrg- Very Lrg | 1024 - 2048 | R | |
| Bedrock | >2048 | BDRK | |
| | | **Total** | 101 |

Note:



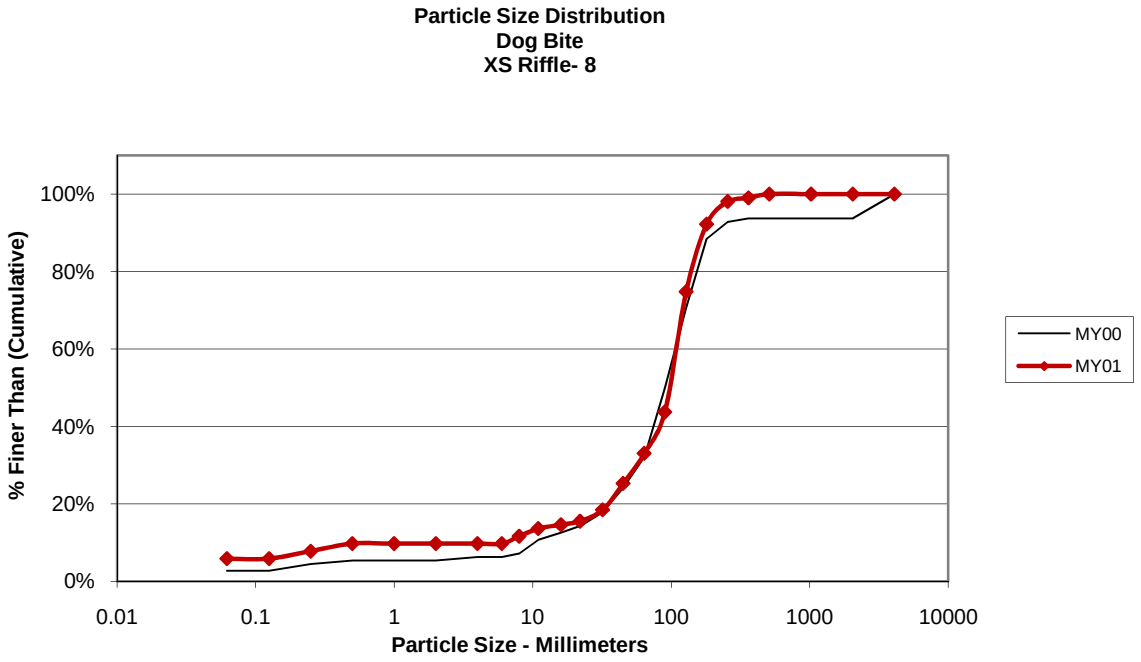

| Size (mm) | |
|---|---|
| D16 | 9 |
| D35 | 38 |
| D50 | 68 |
| D65 | 85 |
| D84 | 120 |
| D95 | 160 |

| Size Distribution | |
|---|---|
| mean | 32.9 |
| dispersion | 4.7 |
| skewness | -0.30 |

| Type | |
|---|---|
| silt/clay | 0% |
| sand | 7% |
| gravel | 39% |
| cobble | 51% |
| boulder | 3% |
| bedrock | 0% |
| hardpan | 0% |
| wood/det | 0% |
| artificial | 0% |

| Cross-Section Riffle 8 - MY01 | | | |
|---|---|---|---|
| Particle | Millimeter | | Count |
| Silt/Clay | < 0.062 | S/C | 6 |
| Very Fine | .062 - .125 | S | |
| Fine | .125 - .25 | A | 2 |
| Medium | .25 - .50 | N | 2 |
| Coarse | .50 - 1 | D | |
| Very Coarse | 1 - 2 | S | |
| Very Fine | 2 - 4 | | |
| Fine | 4 - 5.7 | G | |
| Fine | 5.7 - 8 | R | 2 |
| Medium | 8 - 11.3 | A | 2 |
| Medium | 11.3 - 16 | V | 1 |
| Coarse | 16 - 22.6 | E | 1 |
| Coarse | 22.6 - 32 | L | 3 |
| Very Coarse | 32 - 45 | S | 7 |
| Very Coarse | 45 - 64 | | 8 |
| Small | 64 - 90 | C | 11 |
| Small | 90 - 128 | O | 32 |
| Large | 128 - 180 | B | 18 |
| Large | 180 - 256 | L | 6 |
| Small | 256 - 362 | B | 1 |
| Small | 362 - 512 | L | 1 |
| Medium | 512 - 1024 | D | |
| Lrg- Very Lrg | 1024 - 2048 | R | |
| Bedrock | >2048 | BDRK | |
| | | **Total** | 103 |

Note:



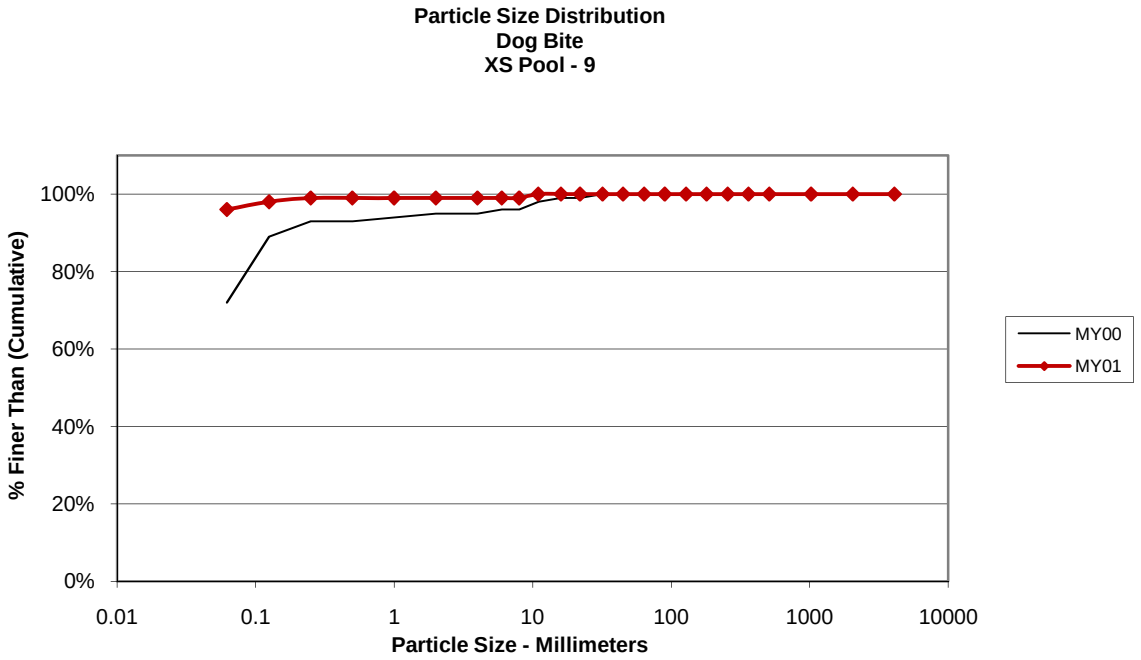

| Size (mm) | |
|---|---|
| D16 | 23 |
| D35 | 68 |
| D50 | 97 |
| D65 | 110 |
| D84 | 150 |
| D95 | 210 |

| Size Distribution | |
|---|---|
| mean | 58.7 |
| dispersion | 2.9 |
| skewness | -0.24 |

| Type | |
|---|---|
| silt/clay | 6% |
| sand | 4% |
| gravel | 23% |
| cobble | 65% |
| boulder | 2% |
| bedrock | 0% |
| hardpan | 0% |
| wood/det | 0% |
| artificial | 0% |

| Cross-Section Pool 9 - MY01 | | | |
|---|---|---|---|
| Particle | Millimeter | | Count |
| Silt/Clay | < 0.062 | S/C | 96 |
| Very Fine | .062 - .125 | S | 2 |
| Fine | .125 - .25 | A | 1 |
| Medium | .25 - .50 | N | |
| Coarse | .50 - 1 | D | |
| Very Coarse | 1 - 2 | S | |
| Very Fine | 2 - 4 | | |
| Fine | 4 - 5.7 | G | |
| Fine | 5.7 - 8 | R | |
| Medium | 8 - 11.3 | A | 1 |
| Medium | 11.3 - 16 | V | |
| Coarse | 16 - 22.6 | E | |
| Coarse | 22.6 - 32 | L | |
| Very Coarse | 32 - 45 | S | |
| Very Coarse | 45 - 64 | | |
| Small | 64 - 90 | C | |
| Small | 90 - 128 | O | |
| Large | 128 - 180 | B | |
| Large | 180 - 256 | L | |
| Small | 256 - 362 | B | |
| Small | 362 - 512 | L | |
| Medium | 512 - 1024 | D | |
| Lrg- Very Lrg | 1024 - 2048 | R | |
| Bedrock | >2048 | BDRK | |
| | | **Total** | 100 |

Note:




| Size (mm) | |
|---|---|
| D16 | 0.062 |
| D35 | 0.062 |
| D50 | 0.062 |
| D65 | 0.062 |
| D84 | 0.062 |
| D95 | 0.062 |

| Size Distribution | |
|---|---|
| mean | 0.1 |
| dispersion | 1.0 |
| skewness | --- |

| Type | |
|---|---|
| silt/clay | 96% |
| sand | 3% |
| gravel | 1% |
| cobble | 0% |
| boulder | 0% |
| bedrock | 0% |
| hardpan | 0% |
| wood/det | 0% |
| artificial | 0% |

# Appendix C
# Current Condition Plan View

## LEGEND

EASEMENT BOUNDARY.....

AS-BUILT STATIONED

CENTERLINE AND TOP OF BANK.....

PHOTO POINT.....

CROSS-SECTION.....

BMP.....

STREAM GAUGE.....

## PROJECT CONDITION

VEG PLOT ACHIEVING DENSITY ABOVE 320 STEMS/ACRE.....

VEG PLOT WITH DENSITY BELOW 320 STEMS/ACRE.....

–50 –25 0 50 100

GRAPHIC SCALE

NORTH


REVISIONS

| NO. | DESCRIPTION | DATE | APPROVED |
|---|---|---|---|

Ecosystem Enhancement PROGRAM


KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4001 SIX FORKS ROAD
RALEIGH, NORTH CAROLINA 27609


# DOG BITE STREAM RESTORATION PROJECT

BAKERSVILLE, MITCHELL COUNTY, NORTH CAROLINA

WOC STATION 10+00 TO STATION 25+25; T1

DATE: DECEMBER 2010

SCALE: 1" = 100'

CURRENT CONDITION PLAN VIEW MY 1 OF 5

SHEET 1 OF 2

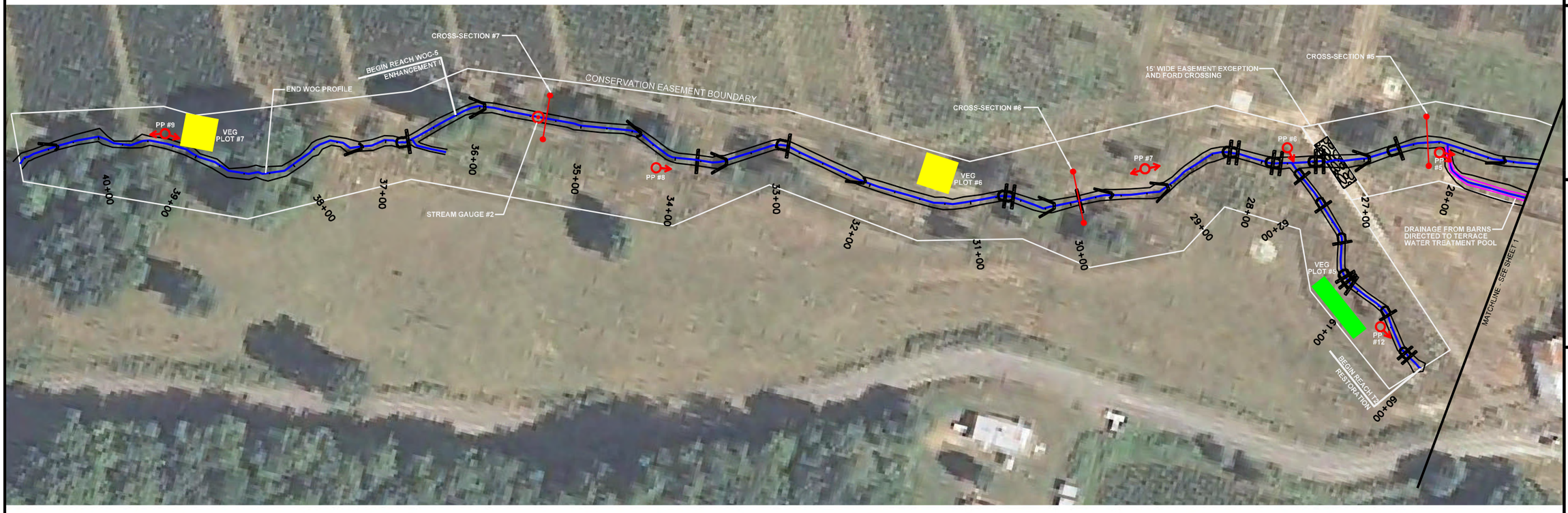
## LEGEND

- EASEMENT BOUNDARY
- AS-BUILT STATIONED CENTERLINE AND TOP OF BANK (11+00, 12+00)
- PHOTO POINT
- CROSS-SECTION
- BMP
- STREAM GAUGE

## PROJECT CONDITION

- VEG PLOT ACHIEVING DENSITY ABOVE 320 STEMS/ACRE
- VEG PLOT WITH DENSITY BELOW 320 STEMS/ACRE

GRAPHIC SCALE: –50 –25 0 50 100




REVISIONS

| NO. | DESCRIPTION | DATE | APPROVED |
|---|---|---|---|

Ecosystem Enhancement Program


KCI ASSOCIATES OF NC
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4601 SIX FORKS ROAD
RALEIGH, NORTH CAROLINA 27609


# DOG BITE
# STREAM RESTORATION PROJECT

BAKERSVILLE, MITCHELL COUNTY, NORTH CAROLINA

WOC STATION 25+25 TO STATION 40+82; T2

DATE: DECEMBER 2010

SCALE: 1" = 100'

CURRENT CONDITION PLAN VIEW MY 1 OF 5

SHEET 2 OF 2