Monitoring Year 3 Report

FINAL

Upper South Hominy Mitigation Site, South Hominy Creek, French Broad River Basin, Buncombe County, North Carolina

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1 Executive Summary

This North Carolina Ecosystem Enhancement Program (NCEEP) project preserved, restored, and enhanced approximately 5,951 ft of perennial stream channel on the mainstem of South Hominy Creek (2,820 ft) and on three unnamed tributaries (3,131 ft) that feed into South Hominy Creek within the project area. Additionally, 1.35 acres of wetland habitat was preserved or enhanced within the project area. The NCEEP contracted with the North Carolina Wildlife Resources Commission (NCWRC) under task order 08FB05-1b-d to prepare a mitigation plan, acquire permits, manage informal contracts, oversee construction, and monitor post-construction channel performance and riparian vegetation. The Upper South Hominy mitigation site aims to provide approximately 3,498 stream mitigation units and 0.61 wetland mitigation units to the NCEEP.

The project site is located in Buncombe County, North Carolina, approximately 5.5 miles southwest of Candler, North Carolina. The Upper South Hominy (USH) mitigation site is located on properties owned by Joe and Molly Bianculli, Lorri Bura, James Roberson, and Julia Davis. Combined, a 16.44 acre conservation easement was established. The conservation easements for the four properties were conveyed to the North Carolina State Properties Office between March and June of 2009. The USH mitigation site is located within the French Broad River basin cataloguing unit 06010105 and within the targeted local watershed hydrological unit 06010105060020.

In 2005, the NCEEP developed a Local Watershed Plan (LWP) for the South Hominy Creek (SHC) watershed. The objectives of the plan were to develop a set of management strategies to restore and protect the functional integrity of the watershed, to identify and prioritize stream and wetland project opportunities, and to address functional deficits. Specific project sites were identified and prioritized based on a number of factors including the potential for functional improvement, site constraints, potential stream mitigation units, location within the watershed, and the number of landowners per site. The USH mitigation project is located within the SHC Local Watershed Plan area. Coupled with the extensive farm and livestock Best Management Practices, the project will help to address stream and wetland function by up-lifting aquatic habitat, water quality, and riparian habitat identified in the LWP study.

Historic land use in the immediate vicinity of the project site has consisted of residential homes and low intensity agricultural operations primarily consisting of livestock grazing and hay production. Stream channels within the project area were historically accessed by livestock, resulting in disturbances to the channel banks and wetland areas. Additional land use practices included removal of large woody riparian vegetation and mechanized dredging and straightening of stream channels to increase the amount of usable land. These activities contributed to degraded and unstable stream banks along with compromised water quality due to lack of vegetated buffers, soil erosion, and animal waste.

Construction approaches were assigned with the intent to minimize disturbance to the stream channels and riparian buffers and focus on those reaches that would benefit most from the appropriate level of site work. As such, areas with stable channel conditions and desirable riparian vegetation were placed into preservation. Other reaches were treated with restoration and enhancement level I and level II site work to improve stream functions and terrestrial habitats that were compromised under the existing site conditions.

Restoration site work on SHC was assigned to the reaches where dimension, pattern, and profile modifications were necessary to correct areas of instability including incision, eroding banks, and over-widened and homogenous channel segments. All SHC restoration site work was performed using the Priority III approach. The remaining reaches of SHC were treated with enhancement level I and level II site work.

Tributary channels and associated riparian buffers were treated with the appropriate level of site work to restore ecologic functions. These tributary reaches were treated with the appropriate amount of site work to preserve, restore, and enhance channel reaches and associated riparian buffers. The upper reaches of the Bianculli tributary north (UT1) and the Davis unnamed tributary (UT3) were preserved. Restoration level site work on the lower portions of the Bianculli UT1 and the Davis UT3 were conducted using a Priority I strategy. Priority I Restoration strategies were applied to the lower portion of the Bianculli tributary south (UT2) and the Roberson abandoned channel (UT2) to reconnect that portion of the channel to the historic floodplain that was abandoned during former roadside ditch construction. The remaining reaches of the tributary channels, including Bianculli UT2 and the middle portion of Davis UT3, were treated with enhancement level II strategies.

Site work targeted reconnecting the SHC channel and tributary channels with historic floodplains and creating floodplain benches at the desirable elevations to attenuate high flow events. Periodic out of bank flows along with spring seep hydrology should promote and sustain hydric soil characteristics and wetland vegetation types in those areas supporting jurisdictional wetlands. Areas currently supporting jurisdictional wetlands were enhanced by excluding livestock, removing invasive exotic vegetation, planting wetland vegetation and creating ephemeral pools.

The MY3 survey was completed in the fall of 2014. Dimension, pattern, and profile parameters surveyed in MY3 suggest the restoration, enhancement level II, and enhancement level I sections of SHC are performing as designed but with some variation from design values. Small deviations were found in bankfull width at one riffle cross-section (XS10). Bankfull width at this cross-section has been below the design value in all four monitoring surveys following construction. However, problem areas or instability were not observed at cross-section 10. Several areas of aggradation and degradation were observed during the MY2 survey, often associated with the surveyed cross-sections. Cross-section 9 had reduction in mean depth, maximum depth (1.7 ft), and cross-sectional area (14.9 ft^2) due to significant pool aggradation. However, these areas appear to have stabilized, as no significant change was captured in the MY3 survey. Although many dimensional values either increased or decreased in MY2 due to the 5 May 2013 flood event, most dimensional parameters measured at the 10 mainstem cross-sections were within the design values for SHC during MY3.

Channel profile values derived from the MY3 survey reveal slight changes in channel slope compared with MY0-MY2 channel slope values. The mainstem 1 reach channel slope increased from 0.012 ft/ft to 0.013 ft/ft. The mainstem 2 reach slope decreased from 0.009 ft/ft to 0.008

ft/ft, the same channel slope value as MY0-MY1. The mainstem 3 reach remained 0.006 ft/ft during MY03.

The MY3 morphological results for the three unnamed tributaries revealed that construction activities followed the approaches outlined the in the mitigation plan. Although small variations from design values were noted in dimensional parameters such as bankfull width (UT3 Upper-XS1 riffle) and bankfull cross-sectional area (UT3 Lower-XS2 riffle), the three unnamed tributaries are stable and performing as designed. Moreover, the significant storm events on 28 November 2011 and 5 May 2013 have had no observed negative effects on any of the three unnamed tributaries.

Storm events on 28 November 2011 and 5 May 2013 resulted in several problem areas during MY1-MY2. Field reviews and surveys conducted between October and November of 2014 noted seven problem areas observed in MY3. Mainstem 1 reach problem areas include cross-vane structure instability (sta. 1+50), continued erosion of the right bank (sta. 1+45 to 2+75), aggradation and bar formation below structures (sta. 2+25 to 2+50 and 4+00 to 4+50), and right bank erosion (sta. 6+25 to 6+50). The problem areas observed on Mainstem 2, resulting from the storm events, include aggradation and bar formation below an engineered structure (sta. 9+20 to 9+50). Aggradation, erosion, and reduced structure integrity previously noted in the lower portion of Mainstem 2 was repaired in the Summer of 2014. No problem areas were observed on Mainstem 3 during MY3. The step-pool structures on UT-3 Upper Davis Reach (sta. 0+00 to 2+00) aggraded during MY3, likely due to low flow velocity and a dense herbaceous layer.

The MY3 visual assessment survey found the majority of the 2,820 ft of mainstem channel banks (94%), channel bed (96%), and engineered stream structures (93%) were performing adequately. Metrics that scored low resulted from bed scour or aggradation, sections of bank erosion, and compromised integrity of one engineered stream structure.

A total of 148 planted stems were counted during the MY3 survey. The average density of the planted woody stems in the ten vegetation plots combined was 599 stems per acre. All ten vegetation plots exceeded the success criteria for planted stem density during the MY3 survey. All vegetation plots except VP1 and VP9 were noted as having volunteer native woody species during MY3. The volunteer woody stems increased the total stem count for the ten vegetation monitoring plots to 252 (1020 stems per acre).

Although non-native invasive vegetation remains present at the mitigation site, it is less prevalent when compared to pre-construction conditions. Extensive non-native vegetation treatments were effective during the construction phase of the project, and maintenance treatments each spring (2012, 2013, 2014) continue to suppress undesirable vegetation. Eight dense areas of Japanese honeysuckle (*Lonicera japonica*) and one dense area of bamboo (*Bambusa* sp.) were observed in MY3.

Overall, the USH mitigation site includes 1,093 ft of stream preservation, 1,994 ft of stream restoration, 522 ft of stream enhancement level I, 2,342 ft of stream enhancement level II, 1.11 acres of wetland enhancement, and 0.24 acres of wetland preservation. A total of 16.44 acres of stream channel, riparian buffer, and jurisdictional wetlands are protected by a perpetual conservation easement managed by the NCEEP. It is anticipated that this site should yield 3,498 stream mitigation units and 0.61 wetland mitigation units.

2 Project Background Information

2.1 Project Goals and Objectives

The goals of the USH mitigation project include:

1. Improve water quality in SHC and unnamed tributaries (UT1, UT2, and UT3);
2. Stabilize on-site streams so they transport watershed flows and sediment loads in equilibrium;
3. Promote floodwater attenuation and all secondary functions associated with more frequent and extensive floodwater contact times;
4. Improve in-stream habitat by improving the diversity of bed form features;
5. Protect riparian communities, habitats, and wetlands and enhance floodplain community structure; and
6. Enable improved livestock practices which will result in reduced fecal, nutrient, and sediment loads in surface waters.

The objectives of the USH mitigation project include:

1. Preservation of 1,093 linear feet of un-impacted stream channel and forested riparian area by placing them in a conservation easement for perpetuity;
2. Restoration of the pattern, profile, and dimension of 1,148 linear feet of the mainstem of SHC;
3. Restoration of channel dimension, pattern, and profile of 846 linear feet of unnamed tributaries to SHC on the Bianculli, Bura/Roberson, and Davis properties;
4. Restoration of dimension and profile (enhancement level I) of the channel on 522 linear feet of SHC along the Davis property;
5. Limited channel work combined with livestock exclusion and invasive species control (enhancement level II) on 2,342 linear feet along SHC and unnamed tributaries;
6. Invasive plant species control measures across the entire project wherever necessary;
7. Preservation or enhancement of approximately 1.35 acres of wetlands across the project site; and
8. Livestock exclusion fencing and other best management practice installations on the Bianculli, Roberson, and Davis properties.

2.2 Locations and Setting

The USH mitigation site is located in southwest Buncombe County, North Carolina, approximately 5.5 miles southwest of the town of Candler, North Carolina (Figure A.1). To access the site from Asheville, North Carolina, take I-40 west to the Enka Candler exit (Exit 44). At the light, turn right, onto Smokey Park Highway/US-19S/US-23S and proceed 3.0 miles. Turn left on Pisgah Highway/NC-151S and proceed for 6.0 miles. Turn right on SR1103/S Hominy Road. Proceed 0.2 miles on SR1103/S Hominy Road then turn right on Connie Davis

Road. Connie Davis Road is a private unpaved driveway that accesses the Bura and Davis properties and the lower end of the project site. A narrow driveway bridge crosses SHC approximately 0.3 miles from the start of Connie Davis Road. A large fescue pasture to the right of the driveway and bridge, used for parking, is located at a latitude/longitude of 035° 28' 51.10" North and 082° 44' 52.45" West. Access to the upper portion of the reach will be from the second drive to the right past Connie Davis Lane. Turn right off of SR 1103/S Hominy Road on to Canter Field Lane, a private drive, 0.25 mile after passing Connie Davis Road. A fescue pasture located to the left of the private driveway and before the one lane bridge will be used for parking. The pasture is located at a latitude/longitude of 035° 28' 39.35" North and 082° 45' 01.06" West.

The USH mitigation site is located in the upper portion of the SHC watershed (Figure A.2). Most of the first and second order headwater tributaries originate below ridgelines and peaks that range in height from 3,000 to over 4,000 ft in elevation. The southern portion of the watershed drains from the highest peak, Mount Pisgah, at a height of 5,721 ft. The drainage area for SHC at the lower end of the project site is 7.1 mi^2 (4,515 ac). The two tributaries on the Bianculli property, named for the purpose of this project as tributary north (UT1) and tributary south (UT2), each have drainage areas <0.1 mi^2. The unnamed tributary on the Davis property (UT3) has a drainage area of 0.1 mi^2 (66.7 ac).

The USH mitigation site is located in the Hominy Creek watershed of the French Broad River basin, United States Geological Survey (USGS) 8-digit hydrologic unit code 06010105 and 14-digit hydrologic unit code 06010105060020. The Hominy Creek watershed is within the North Carolina Division of Water Quality (NCDWQ) sub-basin 04-03-02. South Hominy Creek has been assigned the Stream Index Number 6-76-5 by the NCDWQ.

2.3 Project Structure, Restoration Type, and Approach

Overall, the project site consists of approximately 5,951 ft of stream channels, as measured from the channel thalweg on the as-built drawings. A total of 16.44 acres of aquatic and riparian habitats are held in a perpetual conservation easement. Channel morphology was modified by implementing multiple restoration levels and construction approaches (Table A.1). Project assets and components are summarized in Figure A.3. Channel restoration was accomplished on 1,148 ft of SHC along with 522 ft of enhancement level I and 1,150 ft enhancement level II mitigation. The Bianculli tributary north (UT1) was preserved (94 ft) in the upper portion; the lower 183 ft was restored to provide stable channel banks and connectivity with forested floodplain. The Bianculli tributary south (UT2), including the portion of the formerly abandoned channel on the Roberson property, was mitigated using enhancement level II (654 ft) and restoration (236 ft) actions. The unnamed tributary on the Davis property (UT3) was preserved on the upper most 777 ft, enhanced through the middle 538 ft, and restored on the lower 427 ft. The two small spring fed channels on the Davis property (spring seep north 144 ft; spring seep south 78 ft) was placed into preservation.

2.4 Project History and Background

Land use in the USH watershed consists largely of forested areas, pastureland, hay fields, and low-density residential development (NCWRC 2010). Although land use has resulted in the creation of impermeable surfaces within the watershed, impervious areas are primarily from low-density residential development and roads. Low-density residential development and open space land use comprise approximately 3.0% of the watershed, and imperviousness in the watershed is 0.14% (Yang et al 2002; Homer et al 2004). Future residential development pressures can be expected from the current trend of influx of people to Buncombe County and western North Carolina in general; however, dramatic changes in land use in the SHC watershed are not anticipated in the immediate future.

On-site land uses include livestock grazing, hay production, forested areas, and low density farm and residential developments. Grazing of livestock has occurred over many years and access to the stream channels has not been prohibited. Narrow riparian areas and lack of exclusionary fencing contributed to the degradation of on-site wetlands and channels banks.

The NCEEP acquired the project site from four landowners (Suzanne Loar, Patrick Roberson, James Roberson, and Julia Davis). Following site acquisition, the Loar property was sold to Joe and Molly Bianculli and the Patrick Roberson property sold to Lorri Bura. The NCWRC performed the initial site assessment, designed the restoration plans, and provided construction oversight (NCWRC 2010). Construction of the USH mitigation project took place between 20 June and 30 November 2011. Stream and riparian impacts were addressed using natural channel design techniques, eliminating livestock access to the riparian areas and stream channels, and removing all foreign materials (old fencing, scrap metals, out buildings, etc.) from within the project footprint. The as-built morphological surveys were completed in February 2012. Vegetation planting was conducted between December 2011 and February 2012; the baseline vegetation survey was completed in February 2012. The Monitoring Year-1 (MY1) survey was conducted during October and November 2012. A diversion channel was constructed in October of 2012 to carry storm water runoff to SHC further upstream of the Connie Davis Road bridge; whereas, prior to the project, storm runoff entered SHC adjacent to the upstream right bank bridge abutment. The MY2 survey was completed in November 2013. The MY3 survey was completed in October 2014. Project reporting history and contact information are presented in Tables A.2 and A.3. Project attributes for SHC, UT1, UT2, and UT3 are presented in Table A.4.

3 Methods and Success Criteria

MY3 conditions for the USH mitigation site were determined during October-November 2014. Established representative cross-sectional dimensions and longitudinal profile data were collected using standard stream channel survey techniques (Harrelson et al. 1994; NCSRI 2003). The geomorphology of the stream was classified using the Rosgen (1994, 1996) stream classification system. Project site MY3 morphological data were analyzed using Carleson survey software for AutoCAD and converted to Bentley Microstation Version 8.0. Plan view drawings were prepared using ESRI ArcGIS software with overlays of site features on the most current CGIA Orthoimagery. Stream data was processed and overlain on previous monitoring data using Microsoft Excel with graphing of cross-sectional data and profile data printed from Excel. Bed material composition and mobility was assessed by doing a reach-wide and riffle cross-section pebble counts. Vegetation surveys and data reduction were completed following established Carolina Vegetation Survey protocols (Lee et al. 2006). Additional project monitoring components were performed following the guidance of the NCEEP procedural Guidance and Content Requirements document (NCEEP 2012). References to the left and right channel banks in this document are oriented when viewing the channel in the downstream direction.

Monitoring protocols and performance criteria follow what is outlined in the NCEEP site specific mitigation plan for the USH mitigation site and the USACE Stream Mitigation Guidelines (USACE 2003). Site monitoring will consist of data collection, analysis, and reporting on channel stability and survival of riparian vegetation and will be conducted on an annual basis for a minimum of 5 years post construction.

3.1 Monitoring Plan View

Survey data and plan view sheets provide a means to compare current project site conditions to the design specifications and the baseline condition following construction. Plan view sheets not only provide a detailed representation of the current condition of the project sites channel geomorphology, stability, and riparian vegetation but also illustrate the location of all fixed point survey locations for the mitigation site (Figure D.1).

All 14 established cross-sections on SHC, UT2, and UT3 were resurveyed in MY3. Ten established cross-sections were resurveyed on SHC, six riffles and four pools. Riffle (XS1, XS3, XS5, XS7, XS8, and XS10) and pool (XS2, XS4, XS6, and XS9) cross-sections were resurveyed to compare channel morphology and stability to the baseline condition. The single riffle cross-section on the restored section of UT2, Roberson property, was resurveyed. Three cross-sections (riffles: XS1 and XS2; pool: XS3) were resurveyed on the restored portion of UT3, Davis property.

Longitudinal profile surveys were conducted to evaluate thalweg movement and change in channel slope. The longitudinal profiles of the entire mainstem of SHC and the restored portions of UT2 and UT3 have been surveyed each year following construction (MY0-MY3). A longitudinal profile survey was performed on the restored portion of UT1 following construction (MY0). The longitudinal profiles of the enhancement level II (UT2) and preservation portions of UT1 and UT3 have not been surveyed since pre-construction.

Vegetation monitoring plots were resurveyed at the 10 established locations along the mainstem of SHC and the tributaries. Vegetation plots are identified on the plan view sheets and will be used to determine survival of planted stems over the course of project monitoring.

Fixed photo stations were established at 26 locations on the stream channels and riparian areas. Five photo stations were established in wetland areas across the project site. Fixed station photographic points were established to provide visual comparison of channel banks, in-stream structures, and riparian buffer condition over time. Fixed station locations are identified on the plan view sheets.

In addition to all the established monitoring locations, plan view sheets illustrates site topography, easement boundaries, and other attributes of the project to aid in the long-term monitoring of the mitigation site (Figure D.1).

3.2 Stream Monitoring

Stream morphological surveys in MY3 included cross-sectional (dimension), pattern, longitudinal profile, and bed material measurements. Bankfull flow events were monitored using a simple crest gauge.

3.3 Vegetation Monitoring

Established vegetation monitoring plots within the planted conservation easement were resurveyed in MY3 in accordance with established NCEEP/CVS protocols (Lee et al. 2006). Vegetation plots were evaluated to ascertain the performance and density of planted woody stems. The 10 vegetation plots were again photographed to provide a visual record of each plot over time. Minimum success criteria, established by USACE (2003), for planted woody vegetation must be 320 stems/acre in year-1, 280 stems/acre in year-3, and 260 stems/acre during the year-5 monitoring period.

3.4 Schedule and Reporting

The MY3 document was prepared following NCEEP content requirements and procedural guidelines (NCEEP 2012). The report documents the mitigation sites pre-existing morphological values, design values, and a quantitative summary of the post construction morphological and vegetative project elements. The report also includes photographic documentation of the sites past and present condition. Annual monitoring reports will build upon the data tables, graphs, and photographs presented in this report.

Annual monitoring reports will provide a discussion of any significant deviations from the as-built condition as well as the potential for the mitigation site to meet the success criteria for channel stability and vegetation survival at the end of the 5-year monitoring period. Monitoring reports will be submitted annually to the NCEEP, preferably by March 1.

4 Project Conditions and Monitoring Results

4.1 Stream Assessment

4.1.1 Morphometric Criteria

Channel cross-sectional dimensions, pattern, and longitudinal profile were surveyed in October 2014 for MY3 to document morphological characteristics of the active channel (Figure

D.1). In addition, the locations of all constructed stream features (i.e., rock vanes, log vanes, J-hook vanes, geolifts, wood toe, and root wads) were assessed for stability and structural integrity.

4.1.2 Quantitative Measures Summary

MY3 morphological data were obtained by resurveying established fixed survey locations on the mainstem of SHC and the three unnamed tributaries. Morphological data from established cross-sectional survey stations were compared with existing, reference, design, and previous years monitoring data for riffle stream features (Tables B.1 and B.1.1). Mean morphologic and hydraulic data presented in Tables B.1 are from riffle cross-sections 1, 3, 5, 7, 8 and 10 on the mainstem of SHC. Mean values were not derived for the single riffle cross-sections surveyed on UT2 and UT3 Upper and UT3 Lower (Table B.1.1). Morphological data presented in Table B.2 reflect post construction dimensions for each of the 14 individual cross-sections, including both riffles and pools, established on the mainstem of SHC, UT2 and UT3. Channel cross-sectional data plots were used to evaluate the channel condition and for the visual comparison of channel stability over time (Figure B.1).

Statistical values of the pattern data for each mainstem reach (Mainstem 1 Bianculli Reach, Mainstem 2 Bura/Roberson Reach, and Mainstem 3 Davis Reach) are presented in Table B.1. Insufficient pattern geometry on UT2 and UT3 Upper resulted in a low sample size (N=1) of pattern data parameters (Table B.1.1). Pattern geometry data was more robust for UT3 Lower, and a range of values were calculated for each parameter (Table B.1.1).

Longitudinal profile data, including feature lengths, depths, slopes, and spacing, for the three SHC mainstem reaches and the restored portions of UT2 and UT3 were evaluated. Statistical values of each profile parameter are presented in Table B.1. Longitudinal profile data for UT2 and UT3 are presented in Table B.1.1. Longitudinal profile data plots were used to evaluate the channel condition and for future comparison of morphological data over time (Figure B.2).

Channel bed material was surveyed by performing a reach-wide pebble count consisting of 10 pebble grabs from both riffle (6) and pool (4) features along the entire mainstem of SHC. The reach-wide pebble count is used to assign a number to the stream type classification based on median grain size (D50) encountered. Additionally, pebble counts were performed by collecting 100 pebbles from each of the 10 (6 riffles and 4 pools) mainstem cross-sections (Tables B.1 and B.2). Pebble counts were not performed on UT1, UT2 or UT3 due to homogenous (silt) bed material. Pebble count data plots are presented for visual comparison of bed material data over the course of the monitoring surveys (Figure B.3).

4.1.2.1 Mainstem 1 – Bianculli Reach – 797 ft

The entire length of Mainstem 1 Bianculli reach of SHC within the conservation easement is 797 ft. The Bianculli reach was divided into two approach levels (restoration and enhancement level II). The channel length of the restoration reach is 630 ft. The channel length of the enhancement level II reach is 167 ft.

Dimension.—Channel dimensions data from three cross-sections (XS1 riffle, XS2 pool, XS3 riffle) were collected in the Mainstem 1 Bianculli reach and plotted for visual evaluation (Figure B.1). Channel dimensions of the two riffle cross-sections were compared with the range of design values (Table B.1). Design values for riffle bankfull width ranged from 27.4 to 39.4 ft. Bankfull widths during MY0-MY3 have ranged from 26.9 to 32.7 ft. Bankfull width (29.2 ft) at cross-section 1 in MY3 was within the range of design bankfull width. In previous monitoring years, the bankfull width at cross-section 1 was slightly below the range of design, likely due to the proximity of the Bianculli barn (<15ft) to the top of the right bank of SHC, which necessitated a reduced amount of bank shaping in this location during construction. The increase from MY2 to MY3 can be attributed to bank adjustments from several heavy flow events. Bankfull width at cross-section 3 (MY3=32.7 ft) has been within the range of design values each monitoring year post-construction. Dimensions of each individual cross-section are presented in Table B.2.

Design values for riffle cross-sectional area ranged from 43.8 to 75.5 ft^2. Bankfull cross-sectional area ranged from 54.8 to 62.9 ft^2 for the as-built channel and 42.3 to 71.4 ft^2 in MY1-MY3 (Table B.1). Riffle cross-section 1 (59.8 ft^2) approximated the mean design value (61.3 ft^2); whereas, riffle cross-section 3 (71.4 ft^2) exceeded the maximum design value for cross-sectional area during MY3. Increase in cross-sectional area in MY3 could be attributed to high flow events moving sediment and scouring the stream bed and displacing much of the gravel bar deposited in a May 2013 flood event. The reduction of substrate in this cross-section can be seen in the 2014 cross-section 1 photo (Figure B.1).

Mean depth at bankfull for both riffle cross-sections ranged from 1.6 to 2.3 ft during MY0-MY3 (Table B.1). Cross-section 1 mean depth (2.0 ft) remained within the design value range for mean depth. This was a slight increase from MY2 (1.6 ft) because the gravel bar deposited during a heavy flow event in May 2013 was washed out during heavy flow events of 2014. Mean depth at riffle cross-section 3 (2.2 ft) was similar to the previous monitoring years and within the design mean depth range (1.5 to 2.2 ft) during MY3.

Riffle bankfull maximum depth design values ranged from 2.0 to 3.3 ft (Table B.1). Bankfull maximum depths for the two riffle cross-sections ranged from 2.6 to 3.4 ft during MY0-MY1. These values were within the design range for riffle maximums depths. In MY2, the values ranged from 2.5 ft to 4.2 ft, slightly above design range values. This increase at cross-section 3 was due to bed degradation along the left channel bank resulting from the 5 May 2013 flood event. Riffle cross-section 1 maximum depth (3.2 ft) was within the range for bankfull maximum depth values in MY3. Riffle cross-section 3 maximum depth remained the same (4.2 ft) in MY3, indicating that the riffle bankfull maximum depth has stabilized.

The width/depth ratio design values ranged from 12.0 to 18.6 (Table B.1). Following construction, the width/depth ratio for the two Mainstem 1 reach riffle cross-sections ranged from 13.2 to 14.4. In MY1, width/depth ratio values ranged from 13.6 to 14.2 ft. During MY2, width/depth ratios ranged from 14.1 to 17.4. During MY3, the width/depth ratios ranged from 14.2 to 15.0. Width/depth ratio values have been within the range of design values during all monitoring surveys.

The post-construction entrenchment ratios, a measure of vertical containment, have been similar to the existing range of 6.6 to 13.4. Entrenchment ratios taken from measurements at the two riffle cross-sections have ranged from 8.1 to 12.2 during MY0-MY3 (Table B.1).

Pattern.—Utilizing a Priority III approach during construction resulted in minimal change in pattern geometry on the Mainstem 1 Bianculli reach. Channel sinuosity (1.1) is low due to a single meander bend in this reach located at station 2+50 to 3+50. The MY3 values for channel belt width, radius of curvature, and meander wavelength are similar to the values obtained from the pre-existing site survey and are within the range of design values (Table B.1).

Profile.—The entire length (797 ft) of the Mainstem 1 Bianculli reach longitudinal profile was surveyed during MY3 (Figure B.2). Channel slope was 0.013 ft/ft during MY3, a slight increase in slope from MY0-MY1 (0.011 ft/ft) and MY2 (0.012 ft/ft). Feature lengths, slopes, depths, and spacing were calculated following the monitoring survey (Table B.1).

The MY0 riffle lengths ranged from 32.4 to 62.9 ft and were within the range of design values (15.8 to 86.9 ft). Riffle length ranged from 48.2 to 108.2 ft in MY1. The maximum riffle length was exceeded in one measurement buy approximately 20 ft in MY1. Riffle length ranged from 45.5 to 85.5 ft during MY2. Riffle length ranged from 12.7 to 41.5 in MY3. Minimum riffle length was slightly below the range of design values for one measurement in MY1. Riffle slopes ranged from 0.011 to 0.016 ft/ft in MY0, 0.010 to 0.020 ft/ft in MY1, and 0.006 to 0.018 ft/ft in MY2. A single riffle slope measurement (0.006 ft/ft) was slightly below the design range of values (0.007 to 0.027 ft/ft) during MY2 survey. Riffle slopes ranged from 0.0002 to 0.027 in MY3. A single riffle slope measurement (0.0002 ft/ft) was well below the design range of values during the MY3 survey.

Pool lengths were within the range of design values (14.7 to 96.7 ft) in MY0 (20.7 to 34.4 ft), MY1 (18.4 to 56.7 ft), and MY2 (26.7 to 35.4 ft). Pool lengths (21.5 to 86.3 ft) were again within the range of design values during MY3. Pool maximum depths have ranged from 4.2 to 5.9 ft during MY0-MY3 and are within the design range of values (3.6 to 8.8 ft).

Six in-stream structures (1 rock vane, 1 log vane, and 4 J-hooks) were constructed in the Mainstem 1 reach to provide grade control, channel stability and a heterogeneous bed form for increased habitat. Pool-to-pool spacing ranged from 86.7 to 217.6 ft in MY0, 98.1 to 240.4 ft in MY1, 58.9 to 297.0 ft in MY2, and 37.0 to 122.2 ft in MY3. One measurement (37.0 ft) was slightly below design range of values for pool-to-pool spacing during MY3. The thalweg alignments and edge of water survey points that define the location of the active channel for the as-built channel are presented in Figure D.1.

Substrate Data.—Riffle substrate particle sizes at cross-section 1 and cross-section 3 revealed that the D50 ranged from 22.1 to 28.9 mm during MY0, 40.9 to 46.7 mm in MY1, 32.0 to 56.4 mm in MY2, and 35.0 to 40.0 in MY3 (Table B.1). The D50 pebble sizes were in the coarse gravel category (16.0 to 32.0 mm) in MY0 and very coarse gravel category (32.0 to 64.0 mm) in MY1-MY3. The D50 for each individual cross-section, including the pool count (cross-section 2), are presented in Table B.2. Plots of the cumulative percent of particles finer than a specific particle size for the riffle pebble counts are summarized in Figure B.3.

4.1.2.2 Mainstem 2 - Bura/Roberson Reach – 1,286 ft

The entire length of Mainstem 2 Bura/Roberson reach of SHC within the conservation easement is 1,286 ft. The Mainstem 2 reach was separated into two distinct approach levels (restoration and enhancement level II) based on channel condition prior to construction. The channel length of the restoration reach is 518 ft. The channel length of the enhancement level II reach is 768 ft.

Dimension.—Channel dimensions data from four cross-sections (XS4 pool, XS5 riffle, XS6 pool, XS7 riffle) were collected in the Mainstem 2 Bura/Roberson reach and plotted for visual evaluation (Figure B.1). Channel dimensions from the two riffle cross-sections (XS5, XS7) were compared with the range of design values (Table B.1). Design values for riffle bankfull width ranged from 28.1 to 37.2 ft. Bankfull widths have ranged from 29.5 to 38.3 ft each year post-construction. Riffle cross-section 5 has approximated the mean bankfull width design value (30.7 ft) each of the three monitoring years. Riffle cross-section 7 slightly exceeded the maximum design value during MY0 (37.5 ft) and MY1 (37.4 ft), was within the design range during MY2 (37.1 ft), and exceeded the range again in MY3 (38.3 ft). Dimensions of each individual cross-section are presented in Table B.2.

Design values for riffle cross-sectional area ranged from 43.8 to 75.5 ft^2. Bankfull cross-sectional area ranged from 62.2 to 65.2 ft^2 in MY0, 61.6 to 65.4 ft^2 in MY1, 61.8 to 62.2 ft^2 in MY2, and 64.6 to 65.0 in MY3 (Table B.1). Both of the riffle cross-sections surveyed are well within the range of design values for cross-sectional area during the MY0-MY3 surveys.

Mean depth at bankfull for the two riffle cross-sections have ranged from 1.7 to 2.2 ft during MY0-MY2 (Table B.1). Cross-section 5 mean depth (2.0 ft) matched the design value for mean depth during MY0-MY2. The mean depth increased slightly (2.2 ft) in MY3. Mean depth at cross-section 7 was within the design mean depth range (1.5 to 2.2) ranging from 1.7 to 1.8 ft in MY0-MY3.

Riffle bankfull maximum depth design values ranged from 2.0 to 3.3 ft (Table B.1). Bankfull maximum depths for the two riffle cross-sections ranged from 2.7 to 3.3 ft during MY0-MY3. Cross-section 5 maximum depth was 3.3 ft in MY3, a slight increase from MY2. Cross-section 7 maximum depth has been 1.7 ft in each of the four monitoring surveys.

The width/depth ratio design values ranged from 12.0 to 18.6 (Table B.1). The width/depth ratio for the two Mainstem 2 reach riffle cross-sections ranged from 13.4 to 22.7 during MY0-MY3. The width/depth ratio for cross-section 7 (MY0=21.6; MY1=21.4; MY2=22.1; MY3=22.7) is moderate to high for a “C” stream type. Although the channel bed and banks are stable at this location, a bankfull width on the high end of the design range coupled with a mean depth on the low end of the design range resulted in the width/depth ratio at cross-section 7 higher than the maximum design value. A significant inner berm is present at cross-section 7, influencing the width and depth values. This feature increased in size following the 5 May 2013 flood event, further influencing the channel dimension at this location.

The post-construction entrenchment ratios, a measure of vertical containment, were similar to the existing range of 6.6 to 13.4. Entrenchment ratios taken from measurements at riffle cross-section 5 and cross-section 7 have ranged from 7.4 to 11.4 during MY0-MY3 (Table B.1).

Pattern.—Utilizing a Priority III approach during construction resulted in minimal to no change in pattern geometry to the Mainstem 2 Bura/Roberson reach; however, dimension and profile adjustments were made to the existing channel. Sinuosity for the as-built channel was 1.1. The MY0-MY3 values for channel belt width, radius of curvature, and meander wavelength were similar to the values obtained from the pre-existing site survey (Table B.1).

Profile.—The entire length (1,286 ft) of the Mainstem 2 Bura/Roberson reach longitudinal profile was surveyed during MY3 (Figure B.2). Channel slope was 0.008 ft/ft duiring MY3, a slight decrease in slope from MY2 (0.009 ft/ft), but the same value as MY0-MY1 (0.008 ft/ft). Feature lengths, slopes, depths, and spacing were calculated for each monitoring survey (Table B.1).

The MY0 riffle lengths ranged from 47.6 to 77.8 ft, which were within the range of the design values (15.8 to 86.9 ft) for riffle length. The MY1 (27.1 to 82.2 ft) and MY2 riffle lengths (44.2 to 83.3 ft), determined from multiple (N=5) riffle features, also were within the design range. The MY3 riffle lengths ranged from 5.4 ft to 82.9 ft. One measurement (5.4 ft) was below the range of design values for riffle length. Riffle slopes ranged from 0.007 to 0.014 ft/ft in MY0, 0.007 to 0.024 ft/ft in MY1, 0.004 to 0.019 ft/ft in MY2, and 0.0006 to 0.046 in MY3. Several riffle slope measurements fell outside the design range of values (0.007 to 0.027 ft/ft) in MY3. The mean riffle slope (0.016 ft/ft) in MY3 remained within the design range of values.

Pool lengths were within the design values (14.7 to 96.7 ft) during MY0-MY2, ranging from 32.8 to 87.1 ft. Pool lengths ranged from 24.1 to 121.2 ft during MY3, slightly higher than the design values. Five in-stream structures (3 log vanes, and 2 J-hooks) were constructed in the Mainstem 2 reach to provide grade control, channel stability, and a heterogeneous bed form for increased habitat. Pool-to-pool spacing ranged from 69.1 to 469.9 ft in MY0, 65.1 to 466.6 ft in MY1, 128.4 to 455.8 ft in MY2, and 37.6 to 150.1 in MY3. Pool-to-pool spacing exceeded the maximum spacing for pools based on design values (44.2 to 309.4 ft) in each of the first three monitoring years, and it fell short of the minimum spacing during MY3. The thalweg alignment and edge of water survey points that define the location of the active channel for the as-built survey is presented in the MY3 plan view sheets (Figure D.1).

Substrate Data.—Statistical values for the substrate data are presented in Table B.1. Riffle substrate particle analyses at cross-section 5 and cross-section 7 revealed that the D50 values were 49.4 mm and 31.4 mm during MY0 (Table B.2). D50 particles sizes decreased in MY1 at cross-section 5 (16.7 mm) and cross-section 7 (18.6 mm). D50 particle sizes increased in MY2 at cross-section 5 (28.8 mm) and cross-section 7 (32.0 mm). In MY3, D50 values were 22 mm for cross section 5 and 23 mm for cross section 7. The MY3 D50 values fall within the coarse gravel categories. Riffle substrate data along with field observations suggests the project site stream channel is predominately made up of a gravel and cobble matrix. Plots of the cumulative percent of particles finer than a specific particle size for the riffle cross-section pebble counts are summarized in Figure B.3.

4.1.2.3 Mainstem 3 - Davis Reach – 737 ft

The entire length of Mainstem 3 Davis reach of SHC is 737 ft. The Davis reach was separated into two distinct approach levels (enhancement level I and enhancement level II), based on channel condition prior to construction. The channel length of the enhancement level I reach is 522 ft. The channel length of the enhancement level II reach is 215 ft.

Dimension.—Channel dimensions data from three cross-sections (XS8 riffle, XS9 pool, XS10 riffle) were collected in the Mainstem 3 Davis reach and plotted for visual evaluation (Figure B.1). Channel dimensions from the two riffle cross-sections (XS8; XS10) were compared with the range of design values (Table B.1). Design values for riffle bankfull width ranged from 28.1 to 37.2 ft. Bankfull widths have ranged from 29.6 to 30.1 ft for cross-section 8 and 25.5 to 27.4 ft for cross-section 10 during the MY0-MY3 surveys. Bankfull width for cross-section 10 was slightly under the minimum design value during each of the four monitoring surveys. Both the right and left banks were shaped at this location and a bench was established on the left bank. Bankfull width was measured at the front edge of the bench. Therefore, additional width is available for flows to expand out onto the bench during bankfull or greater flows. Channel banks at cross-section 10 were stable and performing satisfactorily during the MY0-MY3 surveys. Dimensions of each individual cross-section are presented in Table B.2.

Design values for riffle cross-sectional area ranged from 43.8 to 75.5 ft^2. Bankfull cross-sectional area ranged from 53.4 to 65.1 ft^2 for the as-built channel, 53.7 to 66.0 ft^2 in MY1, 59.4 to 64.3 ft^2 during MY2, and 61.2 to 62.3 ft^2 during the MY3 survey (Table B.1). Both riffle cross-sections have approximated the mean design value (61.3 ft^2) for cross-sectional area during the MY0-MY3 surveys.

Mean depth at bankfull for the two riffle cross-sections ranged from 2.1 to 2.2 ft for the as-built channel and was the same during MY1. Mean depth at bankfull values ranged from 2.2 to 2.3 ft in MY2. During MY3, mean depth at bankfull values ranged from 2.1 to 2.2 ft (Table B.1), within the design mean depth range (1.5 to 2.2 ft).

Riffle bankfull maximum depth design values ranged from 2.0 to 3.3 ft (Table B.1). Bankfull maximum depths for both two riffle cross-sections were 3.1 ft during MY0. Cross-section 8 was again 3.1 ft in MY1-MY2 and 3.0 ft in MY3. Cross-section 10 was 3.0 ft in MY1 and increased to 3.4 ft during the MY2 and MY3 surveys, slightly exceeding the maximum depth design value. Degradation (0.4 ft) along the right bank occurred during the 5 May 2013 flood event. This is apparent in the visual comparison of cross-section 10 plots (Figure B.1). During MY3, the bankfull maximum depth fell slightly to 3.0 ft for cross section 8 and remained 3.4 ft for cross section 10, indicating no further degradation during MY3.

The width/depth ratio design values ranged from 12.0 to 18.6 ft (Table B.1). Following construction, the width/depth ratio for the two Mainstem 3 reach riffle cross-sections ranged from 12.1 to 13.9 ft. Width/depth ratios ranged from 12.4 to 13.8 ft in MY1, 11.5 to 13.9 during

MY2, and 12.2 to 14.1 in MY3. Though the width/depth ratio at cross-section 10 had decreased below the range of design values during the MY2, MY3 survey measurements indicate that the values are back within normal range.

The post-construction entrenchment ratios, a measure of vertical containment, were improved compared to the existing range of 6.6 to 13.4. Entrenchment ratios taken from measurements at the two riffle cross-sections have ranged from 9.7 to 21.6 during MY0-MY3 (Table B.1).

*Pattern.—*Utilizing a Priority III approach during construction resulted in minimal to no change in pattern geometry to the Mainstem 3 Davis reach. In large part, only dimension and profile adjustments were made within the existing channel. Sinuosity for the as-built channel was 1.1. The MY0-MY3 values for channel belt width, radius of curvature, and meander wavelength were similar to the values obtained from the pre-existing site survey (Table B.1).

*Profile.—*The entire length (737 ft) of the Mainstem 3 Davis reach longitudinal profile was surveyed during MY0-MY3 (Figure B.2). Channel slope was 0.006 ft/ft. Feature lengths, slopes, depths, and spacing were calculated following each monitoring survey (Table B.1).

The MY0 riffle lengths ranged from 22.0 to 60.8 ft and were within the range of the design values (15.8 to 86.9 ft). The MY1 riffle lengths ranged from 30.4 to 58.5 ft, and the MY2 riffle lengths ranged from 29.1 to 60.5 ft. MY3 riffle lengths ranged from 9.0 to 56.9 ft. One measurement (9.0 ft) was slightly below the range of design values. Riffle slopes ranged from 0.008 to 0.020 ft/ft in MY0, 0.010 to 0.019 ft/ft in MY1, 0.004 to 0.015 ft/ft in MY2, and 0.006 to 0.034 ft/ft during MY3 surveys.

Pool lengths were within the design values range (14.7 to 96.7 ft) in each of the previous three monitoring years (MY0=17.6 to 38.5 ft; MY1=17.1 to 55.6 ft; MY2=17.5 to 43.0 ft). Pool length values ranged from 30.1 to 111.6 ft during the MY3, with one measurement (111.6 ft) being slightly above the range of design values. Four in-stream structures (3 j-hook log vanes, 1 rock cross vane) were constructed in the Mainstem 3 reach to provide grade control, channel stability, and a heterogeneous bed form for increased habitat. Pool-to-pool spacing was within the design value range (44.2 to 309.4 ft) in MY0 (65.6 to 258.1 ft) and MY1 (64.2 to 225.1 ft). MY2 pool-to-pool spacing values ranged from 42.2 to 229.7 ft, and MY3 values ranged from 39.0 to 112.0 ft, revealing that a single measurement during each year was slightly below the design values range. The thalweg alignment and edge of water survey points that define the location of the active channel for the as-built survey is presented in the MY3 plan view sheets (Figure D.1).

*Substrate Data.—*Statistical values for the substrate data are presented in Table B.1. Riffle substrate particle analyses at cross-section 8 and cross-section 10 revealed that the D50 values were 47.7 mm and 33.5 mm during MY0. The MY1 D50 value for cross-section 8 was 37.9 mm and 25.0 mm for cross-section 10. The D50 value in MY2 was 29.2 mm at cross-section 8and 16.0 mm cross-section 10. In MY3, D50 values were 24 mm at cross section 8 and 14 mm at cross section 10 (Table B.2). The MY3 D50 values are within the coarse gravel category at cross section 8 and the medium gravel at cross section 10. Riffle substrate data along with field observations suggests the project site stream channel is predominately made up of a gravel and cobble matrix. Plots of the cumulative percent of particles finer than a specific particle size for the riffle pebble counts are summarized in Figure B.3.

4.1.2.4 Unnamed Tributary 1 – Bianculli Reach – 277 ft

The upper most portion of UT1 was mitigated using a preservation (94 ft) approach. The lower portion of UT1 was restored (183 ft) during construction using a Priority I approach. The lower two-thirds of UT1 had been ditched by previous property owners in an attempt to quickly drain two small spring areas and the adjacent wooded wetland. The existing channel was severely entrenched and was approximately 3 ft below the floodplain and forest floor. A new channel was constructed to reconnect the channel to the floodplain and wooded wetland. An ephemeral pool was constructed at the outflow of UT1, further enhancing the quality of the adjacent wetlands. The existing ditched channel was filled with compacted material during construction. The banks of the new channel are very low (≤12 in.) over much of the reach to allow for the desired connectivity with the floodplain and associated wetlands. Due to its short length and relatively little flow, a cross-sectional survey was not performed. Minimal pattern was added to the new channel when constructed. The entire length of the new channel was surveyed following construction. Pattern and profile data for UT1 are presented in the plan view drawing sheets (Figure D.1).

Substrate Data.—Bed material in UT1 was not collected during the MY0-MY3 surveys. From observation, it consists of clay, silt, and fine sand materials.

4.1.2.5 Unnamed Tributary 2 – Bianculli and Roberson Reaches – 890 ft

Unnamed Tributary 2 originates on the Bianculli property. The first 654 ft was treated as enhancement level II mitigation; the last 45 ft of UT2 on the Bianculli property was restored. The portion of UT2 on the Roberson property had been rerouted to divert the flow to a roadside ditch and the original channel abandoned to expand agricultural practices. In order to restore flow back to UT2 and adjacent wetlands, flow was piped under Canterfield Lane during construction. Channel alignment was similar to what it was prior to flow diversion. A new channel (191 ft) with grade control structures and bankfull benches was constructed to carry the re-established flow.

Dimension.—A single riffle cross-section (XS1) was surveyed on the restored portion of UT2 and plotted for visual evaluation (Figure B.1). Therefore, a range of dimensional values are not presented for UT2 (Table B.1.1). Channel dimensions for UT2 cross-section 1 are also presented in Table B.2. Bankfull widths have ranged from 21.9 to 22.6 ft during the MY0-MY3 surveys. Bankfull cross-sectional area was 14.2 ft^2 in MY0, 13.9 ft^2 in MY1, 13.7 ft^2 in MY2, and 14.4 ft^2 during MY3. Mean depth at bankfull for the riffle cross-section was 0.6 ft in each of the first four monitoring surveys, MY0-MY3. Bankfull maximum depth (1.4 ft) for the riffle cross-section has been the same in MY0-MY3. Following construction, the width/depth ratio for cross-section 1 was 35.8, dropped slightly in MY1 to 34.9, was 34.8 in MY2, and was 35.6 during MY3. The entrenchment ratio was found to be 12.5 in MY0, 12.8 in MY1, 12.9 in MY2, and 12.5 during MY3.

Pattern.—Due to short length of the restored channel, insufficient pattern data precluded presentation of a range of pattern data values. Moreover, a Priority III approach during construction resulted in minimal no change in pattern geometry. The MY0-MY3 values for channel belt width, radius of curvature, and meander wavelength are presented in Table B.1.1.

Profile.—Only the portion (191 ft) of the restored UT2 channel longitudinal profile was surveyed during the four monitoring surveys, MY0-MY3 (Figure B.2). The MY3 longitudinal profile survey did not include the short (45 ft) section of channel on the adjoining Bianculli property and does not include the section of channel piped under Canter Field Lane. Two rock sills were constructed to provide grade control and channel stability near the confluence of UT2 and SHC.

Feature lengths, slopes, depths, and spacing were calculated following the longitudinal survey (Table B.1.1). The MY0 riffle lengths ranged from 12.3 to 31.8 ft. The MY1 riffle lengths varied slightly ranging from 13.8 to 21.9 ft. The MY2 riffle lengths ranged from 22.3 to 29.5 ft. The MY3 riffle lengths varied ranging from 3.5 to 56.6 ft. Riffle slopes ranged from 0.009 to 0.012 ft/ft in MY0, 0.007 to 0.016 ft/ft in MY1, 0.012 to 0.018 ft/ft in MY2, and 0.010 to 0.075 during MY3. Pool lengths ranged from 10.7 to 23.1 ft in MY0, 17.1 to 23.1 ft in MY1, 12.3 to 15.4 ft in MY2, and 6.6 to 29.0 ft during MY3. Pool-to-pool spacing ranged from 50.6 to 69.2 ft in each of the first three monitoring surveys, MY0-MY2. Pool-to-pool spacing varied in MY3, ranging from 11.2 to 63.7 ft. Channel slope ranged from 0.015 to 0.019 ft/ft in each of the four monitoring surveys. The thalweg alignment and edge of water survey points that define the location of the active channel during the as-built survey is presented in the MY3 plan view sheets (Figure D.1).

Substrate Data.—Bed material was not collected from UT2 during the MY0-MY3 surveys. From observation, it consists of clay, silt, and fine sand materials.

4.1.2.6 Unnamed Tributary 3 – Davis Reach – 1,742 ft

The UT3 channel on the Davis property was approached several different ways during project planning and implementation based on existing condition and need. The upstream most portion of UT3 is bordered by a mature forest and has stable channel features; therefore, it was treated as a preservation (777 ft) reach. The middle portion of UT3 was infested with non-native invasive vegetation and the banks were littered with old farm equipment. The middle portion was treated as enhancement II (538 ft) during construction by removing the invasive vegetation and all foreign materials, excluding livestock from the riparian zone, and performing some targeted bank shaping along the right and left channel banks. The bottom portion of UT3, from the wet-ford to the confluence with SHC, was restored during construction using a priority II and priority I restoration approach. Because of the two different restoration approaches and the significant changes in channel slope, the bottom portion of UT3 was divided into the upper (201 ft) and the lower (226 ft) restoration sections. Presented below are the dimension, pattern, and longitudinal profile data for both the upper and lower reaches of the UT3 restoration section.

Unnamed Tributary 3 – Davis Reach – Upper Restoration 201 ft

Dimension.—A single riffle cross-section (XS1) was surveyed on the UT3 Upper restoration section and plotted for visual evaluation (Figure B.1). Therefore, a range of dimensional values are not presented for UT3 Upper. Channel dimensions for UT3 Upper cross-section 1 are presented in Table B.2. Comparison of UT3 Upper dimensional values to the design values are presented in Table B.1.1. Bankfull width during MY0 was 12.9 ft, 13.0 ft in MY1, 12.9 ft in MY2, and 14.4 ft during MY3. Values from each of the four surveys slightly exceed the design bankfull width of 12.0 ft. Bankfull cross-sectional area was 10.3 ft^2 in MY0, 10.6 ft^2 in MY1, 9.9 ft^2 in MY2, and 8.9 ft^2 during MY3. Values have exceeded the maximum design value for cross-sectional area (7.5 ft^2) in each of the four monitoring years. The slight reduction of the bankfull cross-sectional area during MY3 can be explained by the aggradation that occurred due to low velocity flows and dense herbaceous layer in the upper UT-3 reach. Mean depth at bankfull for the riffle cross-section was 0.8 ft during MY0-MY2, slightly exceeding the design values range for mean riffle depth (0.4 to 0.6 ft). In MY3, the mean depth reduced to 0.6 ft, placing it within the range of design values. Bankfull maximum depth for the riffle cross-section was 1.3 ft in MY0-MY2 and 1.1 ft during MY3. Bankfull maximum depth values ranged from 1.0 to 1.4 ft in the design plan. Following construction, the width/depth ratio for cross-section 1 was 16.1 and 16.5 in MY1. The width/depth ratio (16.7) was slightly higher in MY2, but was still within the design range of 16.0 to 20.0. During MY3, the width/depth ratio was 23.0, slightly above design range.

Pattern.—A range of pattern geometry values are lacking on the UT3 Upper restoration section due in large part to channel type (Ba). This section of UT3 was restored by designing step-pool channel features and employing a priority II approach. Therefore, very little meander is present in this section. The MY0-MY3 values for channel belt width, radius of curvature, and meander wavelength are presented in Table B.1.1.

Profile.—The entire length (201 ft) of the UT3 Upper restored channel longitudinal profile was surveyed in MY3 (Figure B.2). The total profile length includes the section of UT3 from the wet-ford downstream to just below the confluence of Spring Seep South and Wetland C, station 0+00 to 2+01. A series of nine rock step-pool features were constructed to provide grade control and channel stability. Feature lengths, slopes, depths, and spacing were calculated following each monitoring survey (Table B.1.1). The MY0 riffle lengths ranged from 13.7 to 26.4 ft, 13.3 to 25.1 ft in MY1, 17.7 to 26.5 ft in MY2, and 11.7 to 60.5 ft in MY3. Riffle slopes ranged from 0.054 to 0.102 ft/ft in MY0, 0.054 to 0.106 ft/ft in MY1, 0.058 to 0.092 ft/ft in MY2, and 0.053 to 0.095 ft/ft during MY3. The design slopes ranged from 0.095 to 0.120 ft/ft for UT3 Upper. Pool lengths ranged from 2.9 to 5.1 ft for the as-built channel, 2.2 to 5.0 ft in MY1, 2.4 to 4.5 ft in MY2, and 6.0 to 7.4 ft during MY3. Pool-to-pool spacing ranged from 21.2 to 24.2 ft in MY0, 20.0 to 27.1 ft in MY1, 18.6 to 48.3 ft in MY2, and 18.0 to 66.4 ft during MY3. Several pool-to-pool spacing measurements have been slightly below the design values (22.8 to 23.0 ft) each of the three monitoring years. Additionally, a couple of pool-to-pool measurements exceeded design values in MY2 and MY3. However, this was an artifact of measurement stations and not indication that pool spacing has change significantly on UT3 Upper. Channel slope ranged from 0.082 to 0.086 ft/ft in each of the four monitoring years. The thalweg alignment and edge of water survey points that define the location of the active channel for the as-built survey is presented in the MY3 plan view sheets (Figure D.1).

Substrate Data.—Bed material in UT3 Upper was not collected during the MY0-MY3 surveys. From observation native material consists of clay, silt, and fine sand materials. Gravel and cobble material was added to the channel following construction to increase roughness and provide benthic organism habitat. An increase of very fine particle size material has been observed over the past four monitoring surveys.

Unnamed Tributary 3 – Davis Reach – Lower Restoration 226 ft

Dimension.—Two cross-sections, XS2-riffle and XS3-pool, were surveyed on the UT3 Lower restoration section and plotted for visual evaluation (Figure B.1). Dimensional parameters, for cross-sections 2 and 3, representing the condition of the priority I channel restoration of UT3 Lower are presented in Table B.2. Dimensional parameters for the riffle cross-section (XS2) were compared with the design values (Table B.1.1). Bankfull widths have ranged from 9.9 to 10.2 ft during MY0-MY3. Bankfull width measurements have been within the design range (8.0 to 12.0 ft) each monitoring year. Bankfull cross-sectional area was 7.6 ft^2 in MY0, 7.4 ft^2 in MY1, 7.3 ft^2 in MY2, and 6.7 ft^2 during MY3. Cross-sectional area values have been slightly below the minimum design value of 8.6 ft^2, likely due to aggradation that has occurred throughout the reach since construction. Mean depth at bankfull for the riffle cross-section was 0.8 ft in MY0-MY1 and dropped slightly during MY2-MY3 to 0.7 ft. The design range for mean riffle depth was 0.5 to 0.7 ft. Bankfull maximum depth for the riffle cross-section was 1.4 ft during MY0-MY1, dropped slightly in MY2 to 1.3 ft, and dropped again in MY3 to 1.2 ft. Maximum depth values ranged from 0.9 to 2.2 ft in the design plan. Following construction, the width/depth ratio for the UT3 Lower riffle cross-section was 12.8 and fell below the design range of 16.0 to 17.1. The width/depth ratio was 13.2 in MY1, 14.4 in MY2, and 14.5 during MY3.

Pattern.—The lower most portion of UT3 was restored by constructing a priority I meandering channel with three distinct bends over the course of 226 ft. Therefore, a range of pattern geometry values were determined for UT3 Lower. The MY0-MY3 range of values for channel belt widths, radius of curvatures, and meander wavelengths are presented in Table B.1.1.

Profile.—The entire length (226 ft) of the UT3 Lower restored channel longitudinal profile was surveyed during MY3 (Figure B.2). A "C" type channel was constructed with a series of four riffles and three pool features. Feature lengths, slopes, depths, and spacing were calculated following the MY0-MY3 surveys (Table B.1.1). The design range for riffle length values was 10.0 to 18.0 ft. The MY0-MY3 riffle lengths have exceeded the design values all years post-construction, ranging from 6.9 to 51.2 ft. Riffle slopes ranged from 0.013 to 0.065 ft/ft in MY0, 0.007 to 0.057 ft/ft in MY1, 0.012 to 0.058 ft in MY2, and 0.012 to 0.128 during MY3. The design slopes ranged from 0.018 to 0.056 ft/ft for UT3 Lower. Riffle slope measurements have been below and above the design range of values in each of the four monitoring years; however, mean riffle slope (MY0=0.039 ft/ft; MY1=0.027 ft/ft; MY2=0.039 ft/ft; MY3=0.048 ft/ft) has been within the design range all four years post construction.

Pool lengths ranged from 16.0 to 19.7 ft for the as-built channel, 17.8 to 27.4 ft in MY1, 12.1 to 22.4 ft in MY2, and 5.4 to 23.0 ft during MY3. All pool lengths have been within the design range of values (13.4 to 32.3 ft) except for a single pool length measurements in MY2 (12.1 ft) and MY3 (5.4 ft). Pool-to-pool spacing ranged from 17.8 to 69.8 ft in MY0-MY3, exceeding the maximum design value (33.1 ft) for pool-to-pool spacing in each of the 4-years post construction. Channel slope was 0.031 ft/ft in MY3. The thalweg alignment and edge of water survey points that define the location of the active channel for the as-built survey is presented in the MY3 plan view sheets (Figure D.1).

Substrate Data.—Bed material in UT3 Lower was not collected during the MY0-MY3 surveys. From observation it consists of clay, silt, and fine sand materials.

4.1.3 Fixed Station Channel and Riparian Area Photographs

Fixed station photographs document pre- and post-construction conditions and provide a time series view of the USH mitigation site stream channel features and riparian areas (Figure B.4). A total of 26 photo stations were established during the as-built survey. These same 26 stations were photographed again in MY3.

4.1.4 Bankfull Event Documentation and Verification

One bankfull event (28 November 2011) was documented between the end of construction and completion of the as-built survey (Table B.3). A wrack line above the bankfull elevation was observed and photographed for verification on December 5, 2011 (Figure B.5). To monitor additional bankfull events, a simple crest gauge was installed on the right bank (sta. 7+75) downstream of cross-section 6 and adjacent to a large root wad feature. Although several storm events occurred in 2012 (MY1), visual observations and crest gage readings were negative for bankfull events.

A second bankfull event was observed and documented on May 6, 2013 (Table B.3). This was a major storm event that produced 3.5 inches of rain in a 24-hour period at the Asheville Regional Airport. Over a 6-day period, more than 5 inches of precipitation was recorded. Property owners in the SHC watershed reported collecting more than 7 inches of rain in personal gages over the same period of time. The median daily discharge for the French Broad River at Asheville is 2,000 cfs. On May 6, 2013, the discharge for the French Broad River at Asheville was 23,200 cfs, more than ten times the median daily flow. The French Broad River crested at 9.98 ft, 2 feet above flood stage. A 3.3 ft high stream gage plate, station 8+00 on the Mainstem 1 reach, was over-topped during the May 6, 2013 flood event. The simple crest gage at station 7+75 on the Mainstem 2 reach revealed that SHC crested at 5.0 ft, two feet above the bankfull elevation (Figure B.5). Bankfull flow was estimated to be 250-350 cfs based on regional curves during project design. Using base flow data correlated with the stream gage plate, a bankfull flow of 295 cfs is estimated at the project site. A flow cresting at 5.0 ft would have an estimated discharge of 490 cfs.

A third bankfull event occurred on October 14, 2014 with wrack observed on October 28, 2014 within the floodplain (Table B.3). A storm produced 2.41 inches of rain in a 24-hour period at the Asheville Regional Airport. In addition, 1.53 inches of rain fell in the 11-day period preceeding the larger 2.41-inch event, and crest gage readings were indicative of a recent bankfull event.

4.1.5 Stream Feature Visual Stability Assessment

Monitoring Year-0.—A visual assessment of the project reach was performed to inspect the morphological stability of the channel and to serve as a basis for comparison with future channel stability monitoring. Based on the visual assessment of channel features, stream structures, and channel banks following the flood event on 28 November 2011 (MY0) several areas of instability were apparent. The most instability was observed in the Mainstem 1 Bianculli reach (sta. 1+50 to 3+00) and was associated with the large meander bend. Above the meander bend, a structure had failed and 50 ft of the right bank had sloughed into the channel. Below the structure, a large amount of bed material had aggraded and formed a mid-channel bar.

A second area of instability was observed in the Mainstem 2 Bura/Roberson reach (sta. 9+25 to 9+75). A large amount of bed material aggraded at this location and formed a mid-channel bar. However, the observed areas of instability make up only a small percentage of the overall stable condition of the SHC mainstem. No areas of instability were observed on Mainstem 3 Davis reach or the three unnamed tributaries.

Monitoring Year1.—A visual assessment was performed over the entire project site several times during the calendar year 2012, including visits following storm events and to perform the MY1 monitoring survey. Based on the visual stream stability assessment of channel features, stream structures, and channel banks, there were no new areas of instability. Metrics generated from the MY1 visual stream stability assessment are reported in Table B.4. The MY1 "scores" from the visual stream stability assessment largely reflect the damage that occurred during the 28 November 2011 flood event. In fact, 2012 (MY1) was positive in terms of project site rehabilitation following the 2011 storm with many areas self-adjusting. Channel banks were better protected with the continued growth of planted vegetation, and the stream channel stability also showed signs of improvement. However, specific structures, channel bank segments, and channel features will require modification for the project site to reach its full potential.

Visual assessment of Mainstem 1 Bianculli reach during MY1 revealed that problem areas that occurred during the 2011 storm event were still contributing to a lack in desired form and function of channel morphology. A significant (> 50%) reduction in pool depth and habitat in the large meander bend at station 2+25 to 3+00 persists due to the large amount of bed material that was deposited at this location during the storm event of 2011. Bank scour and erosion continue to plague the right bank between station 1+75 to 2+25 and station 6+25 to 6+75. The second structure (sta. 1+50) in this reach was compromised with several sill and arm rocks dislodged. These observed channel stability problems are reflected in the stream visual stability morphology assessment (Table B.4).

Visual assessment of Mainstem 2 Bura/Roberson reach during MY1 revealed that aggraded areas below structure 1 (sta. 1+00), structure 4 (sta. 9+25), and structure 5 (sta.12+75) remained. Although the structures are stable and fully intact, the large amount of deposition in the pools below each of these structures has significantly reduced available pool habitat and altered thalweg alignment. In addition, pool depth, length and available rootwad habitat cover have been reduced (Table B.4).

Visual assessment of Mainstem 3 Davis reach during MY1 revealed the least amount of impact from the 2011 storm event (Table B.4). Aggraded areas below structure 1 (sta. +25), structure 2 (sta. 2+75), and structure 4 (sta. 7+00) still exist, significantly reducing available pool habitat and to a lesser extent altering thalweg alignment. Channel bed and channel bank observations suggest morphological function across the majority of Mainstem 3 reach is being attained.

Monitoring Year-2.—A visual assessment was performed over the entire project site several times during the calendar year 2013, including visits following storm events and to perform the MY2 monitoring survey. Based on the visual stream stability assessment of the channel bed, channel banks, and engineered stream structures, several new areas of instability were noted following the 5 May 2013 flood event. The MY2 "scores" from the visual stream stability assessment largely reflect the damage that occurred during the May 2013 flood event. Again in 2013, as with the 2011 flood event, most of the instability was observed in the Mainstem 1 Bianculli reach. However, a significant area of instability in the Mainstem 2 Bura/Roberson reach resulted from the 2013 flood. Metrics generated from the MY2 visual stream stability assessment are reported in Table B.4.

Visual assessment of Mainstem 1 Bianculli reach during MY2 revealed that problem areas that occurred during the 2011 storm event were still contributing to a lack in desired form and function of channel morphology. In addition to the previous problem areas associated with the large meander bend and second stream structure, new problem areas were observed with the first and sixth stream structures, lateral bar formation, and channel bank scour. The 2013 flood event dislodged several top rocks on the left arm of the cross-vane at the top of the project reach (sta. 0+50). The same was the case for the sixth stream structure (sta. 5+75) where several top rocks on the arm of the J-hook were dislodged. Scour and erosion were noted downstream on the sixth structure on the right bank (sta. 6+25 to 6+50). A lateral bar formed along the right bank from sta. 4+00 to 4+50, altering the channel dimensions of the riffle and cross-section 1. A second lateral bar was noted in the vicinity of cross-section 3, sta. 7+00 to 7+25. Overall, the MY2 visual stability assessment identified numerous deficiencies with the channel bed, banks and engineered structures, negatively influencing the stability rating of the Mainstem 1 reach (Table B.4).

Visual assessment of Mainstem 2 Bura/Roberson reach during MY2 revealed that previously aggraded pool habitat below structure 1 (sta. 1+00) and structure 4 (sta. 9+25) still were apparent but some improvement had occurred. The aggraded material below structure 4 was repositioned during the May 2013 flood event from the center of the channel to the right bank forming a lateral bar or inner berm feature. The portion of channel directly below structure 4 has transitioned to a riffle feature (sta. 9+00 to 9+50). A significant area of instability occurred during the May 2013 flood event at the lower end of the Mainstem 2 reach (sta. 12+25 to 12+85). The right bank below the root wads and toe wood features suffered severe scour and erosion during the May 2013 flood event. The flood event eroded >50 ft of the right channel bank, and the integrity of the fifth stream structure was comprised (sta. 12+75). Additionally, a lateral bar formed along the left bank at this location (sta. 12+25 to 12+75). The MY2 visual stability ratings for bank and engineered structures categories reflect the damage caused to the Mainstem 2 reach during the 2013 flood event (Table B.4).

Visual assessment of Mainstem 3 Davis reach during MY2 revealed the least amount of impact from the 2013 storm event (Table B.4). Aggradation in the pool features directly below structure 1, structure 2, and structure 4 has completely filled in the constructed pool habitat and the three stream structures are functioning as riffles. Much of the aggradation occurred during the November 2011 storm event and no improvement to pool depth or length was observed following the May 2013 flood event. Channel dimension for cross-section 9 (pool) have been significantly altered with 100% loss of available pool habitat below structure 2. Additionally, a short section of bank scour was observed along the right bank (sta. 0+00 to 0+20) directly below the Connie Davis bridge.

Monitoring Year-3.—A visual assessment was performed over the entire project site several times during the calendar year 2014, including visits to perform the MY3 monitoring survey. No new areas of stream instability were observed in MY3.

Visual assessments of the Mainstem 1 Bianculli reach during MY3 indicate that several large boulders in the right-bank arm of the second downstream structure (Sta. 1+50), have dislodged and fallen into the stream (Problem Area 1). Although the downstream arms have failed, the structure continues to maintain grade and is providing excellent stream habitat. In addition, right bank scour/sloughing (Problem Area 2) has increased slightly encompassing approximately 110 linear feet of bank between Sta. 1+45 to 2+75. Approximately 30 feet of additional right bank scour was observed between sta. 6+25 and 6+50. Significant aggradation of several pools within the reach has occurred, namely between sta. 2+25 to 2+50 and 4+00 to 4+50 (Problem areas 3 and 8).

Visual assessment of the Mainstem 2 Bura reach during MY3 indicated little change from previous observations during MY0-MY02, and the cross-vane at Sta. 0+50 (Former Problem Area 5) is stable and no longer considered a problem. High storm flows created heavy aggradation (Problem Area 4) in the downstream pool of structure number 4 (sta. 9+20 to 9+50). A riffle has formed in the pool of the structure, however, a small pool is forming just downstream creating high quality habitat. Stream repairs to a large structure and both banks were completed at Sta. 12+75 (Former Problem Area 7) and the area is currently stable and well-vegetated. In addition, sediment bars deposited during the 2013 flood event remain stable.

Visual assessment of the downstream Mainstem 3 Davis reach during MY3 indicate that banks at Sta. 0+00 to 0+20 (Former Problem Area 9) are stable and though they will continue to be monitored closely, are no longer considered a problem. The aggradation that occurred during a November 2011 in the pools below structures 1, 2, and 4 remained unchanged during MY3. The structures are functioning as high-quality riffle habitat and do not appear to be causing problems.

Visual assessments of the unnamed tributaries onsite indicate that the step structures on the UT-3 Upper Davis Reach (sta. 0+00 to 2+00) have aggraded (Problem Area 10) due to low flow velocity and a dense herbaceous layer. Otherwise, Site tributaries are functioning as designed.

4.1.6 Stream Problem Areas

Several problem areas with regards to bank stability, channel morphology, and structure integrity were observed during the MY0-MY3 surveys. Problem areas observed along the SHC mainstem channel, resulting from the 28 November 2011 and 5 May 2013 storm events, are noted on the MY2 plan view sheets (Figure D.1) and Fig 2a-2c. The problem, likely cause, and location of each observed stream problem area is presented in Table B.5. Issues within the stream channel include aggradation and bar formation, bank scour, and structure integrity. Additionally, these problem areas were further detailed in the stream feature visual stability assessment section above and the stream feature visual stability assessment table.

Mainstem 1 Bianculli problem areas previously documented during MY1-MY2 were assessed during the stream survey, and continue to be mostly apparent in this reach. The second downstream structure (sta. 1+50) is compromised due to previous storm flows (Problem Area 1). Several large boulders in right-bank arm dislodged and fell into the stream; although the downstream arms failed the structure continues to maintain grade and is providing excellent stream habitat. Structure 3 located at Sta. 2+25 has been covered with cobble and gravel sized material, filling the pool downstream (sta. 2+25 to 2+50) and forming a large bar along the left bank (Problem Area 3). Approximately 110 feet of right bank, located between Sta. 1+45 to 2+75, is scoured/sloughing (Problem Area 2). Additionally, approximately 30 feet of the right bank between sta. 6+25 to 6+50 is scoured and eroded (Problem Area 6). Problem Area 8 includes a pool that was aggraded and filled with cobble during a high flow event.

Problem areas in the Mainstem 2 Bura/Roberson reach include aggradation and bar formation. Problem Area 4 (sta. 9+20 to 9+50) includes aggradation in the downstream pool of an engineered structure during high storm flows. A riffle has formed in the pool of the structure, however, a small pool is forming just downstream providing high quality habitat. The 5 May 2013 flood event contributed to significant scour, bar formation, and loss of function of an engineered structure at the lower end of the reach (sta. 12+25 to 12+75) (Former Problem Area 7). This area was repaired during the Summer of 2014 and is no longer considered a problem.

The Mainstem 3 Davis reach has endured 2 major flood events since construction, but little channel instability was observed during MY3. Aggradation of pool features below engineered structures 1, 2, and 4 was first observed following a November 2011 storm event. Aggradation in these three areas altered the as-built dimensions of each pool, decreasing pool depth and length. This aggradation remained unchanged during MY3. The structures are functioning as high-quality riffle habitat and do not appear to be causing problems. Additionally, previously documented Problem Area 9 (sta. 0+00 to 0+20) is stable with good vegetation root depth and density along the bank, and is no longer considered a problem.

Of the three unnamed tributaries onsite, only one small portion in the UT-3 Upper Davis Reach had issues during MY3. Due to the low flow velocity and a dense herbaceous layer, the step pool structures (sta. 0+00 to 2+00) have aggraded (Problem Area 10).

4.1.7 Stream Problem Area Photographs

Channel bank, stream bed, and engineered structure integrity problem areas observed during the MY0-MY3 surveys were photographed for documentation of the extent of damage and departure from as-built condition. Problem area photographs are included in Appendix B of this report (Figure B.6).

4.1.8 Summary of Morphological Results

The MY3 survey was completed in the fall of 2014. Dimension, pattern, and profile parameters surveyed in MY3 suggest the restoration, enhancement level II, and enhancement level I sections of SHC are performing as designed but with some variation from design values. Small deviations were found in bankfull width at one riffle cross-section (XS10). Bankfull width at this cross-section has been below the design value in all four monitoring surveys following construction. However, problem areas or instability were not observed at cross-section 10. Several areas of aggradation and degradation were observed during the MY2 survey, often associated with the surveyed cross-sections. Cross-section 9 had reduction in mean depth, maximum depth (1.7 ft), and cross-sectional area (14.9 ft^2) due to significant pool aggradation. However, these areas appear to have stabilized, as no significant change was captured in the MY3 survey. Although many dimensional values either increased or decreased in MY2 due to the 5 May 2013 flood event, most dimensional parameters measured at the 10 mainstem cross-sections were within the design values for SHC duiring MY3.

Pattern values derived from the MY3 survey reveal that the mainstem reaches of SHC are largely within the design values for this the morphological parameter.

Channel profile values derived from the MY3 survey reveal slight changes in channel slope compared with MY0-MY2 channel slope values. The mainstem 1 reach increased in channel slope from 0.012 ft/ft to 0.013 ft/ft. The mainstem 2 reach decreased in slope from 0.009 ft/ft to 0.008 ft/ft. The mainstem 3 reach slope remained at 0.006 ft/ft. Riffle slope measurements varied from the design values in each of the three mainstem reaches. However, the mean riffle slope for each of the mainstem reaches approximated the design mean riffle slope. The majority of all other profile values were within the design ranges for the features measured.

Reach-wide substrate particle size analysis revealed that the MY3 D50 value was within the very coarse gravel category. The median particle size at each of the 6 riffle cross-sections fell within the coarse to very coarse gravel categories during the MY3 survey, with the exception of cross-section 10, which was borderline medium to coarse gravel (14.0 mm).

Problem areas resulting from the storm events on 28 November 2011 and 5 May 2013. A compromised rock vane structure, some right bank erosion, and aggradation and bar formation below a j-hook structure was observed in the Mainstem 1 reach sta. 1+45 to 2+50, resulting from the 2011 flood event. Additional Mainstem 1 reach problem areas include continued erosion of the right bank (sta. 6+25 to 6+50) as well as aggradation and bar formation (sta. 4+00 to 4+50), resulting from the 2013 flood event.

The problem area observed on Mainstem 2, sta. 9+20 to 9+50, resulted from a large amount of bed material forming a mid-channel bar below a J-hook stream structure during the 2011 flood event. This material was shifted to the right bank during the 2013 flood event forming an inner berm or lateral bar. The constructed pool below the J-hook was functioning as a riffle during the MY3 survey, although a small pool was reforming on the downstream end of the newly formed riffle creating some high quality and diverse habitat.

No Problem areas were observed on the Mainstem 3 reach during the MY3 survey. However, aggradation of bed material directly below three of the four engineered structures has reduced constructed pool habitat. Aggradation in these three areas altered the as-built dimensions of each pool, decreasing pool depth and length. This aggradation remained unchanged during MY3. The structures are functioning as high-quality riffle habitat and do not appear to be causing problems.

The MY3 visual assessment survey found the majority of the 2,820 ft of mainstem channel banks (94%), channel bed (91%), and engineered stream structures (73%) were performing adequately. Metrics that scored low resulted from bed scour or aggradation, sections of bank erosion, and compromised integrity of engineered stream structures.

Monitoring year-3 morphological results for the three unnamed tributaries revealed that construction activities followed the approaches outlined the in the USH mitigation plan. Although small variations from design values were noted in dimensional parameters such as bankfull width (UT3 Upper-XS1 riffle) and bankfull cross-sectional area (UT3 Lower-XS2 riffle), the three unnamed tributaries were stable and performing as designed. Moreover, the significant storm event on 28 November 2011 and 5 May 2013 did not have any observed negative effects on any of the three unnamed tributaries.

4.2 Wetland Enhancement and Preservation

ClearWater Environmental Consultants Inc. identified nine wetlands totaling approximately 1.35 acres in the project area during an October 2009 field investigation of jurisdictional wetlands (Figure B.7).

Wetland C.—(Part of Davis Spring Seep South) is approximately 0.01 acres and is adjacent to Davis UT3. There is a hand built rock spring box at the head of this feature. Wetland C was treated as a preservation area during construction and the removal of non-native invasive plants and livestock access were the two management activities directed at this area.

Wetland D.—is the largest wetland on site totaling approximately 0.69 acres. Wetland D is adjacent to SHC and was heavily impacted by cattle before construction. Despite previous impacts from cattle access, Wetland D has the highest diversity of wetland plant species found within the study area. In addition to excluding livestock from Wetland D, the area was enhanced by removing a 4-inch pipe that was installed by the landowner to divert spring flows to SHC and away from the wetland area. This resulted in replenishing spring water back into the wetland. Wetland D was further enhanced by creating three ephemeral pools to increase wetland plant and amphibian habitat.

Wetland E.—is approximately 0.02 acres and is adjacent to SHC and Roberson UT2. This wetland was greatly impacted by cattle. A large pile of scrapped farm machinery, metal, and tree stumps were removed from this feature. Additionally, spring flow was reconnected to the formerly abandoned UT2 further enhancing the long-term viability of the area.

Wetland G.—is approximately 0.05 acres and is contiguous with Bianculli UT2 and adjacent to Canter Field Lane. Enhancement to this area included the extensive treatment of non-native invasive vegetation. Chinese privet *Ligustrum sinense* and multiflora rose *Rosa multiflora* were the dominant non-native vegetation types present pre-construction.

Wetland H.—is approximately 0.05 acres and is located adjacent to Bianculli UT2. Enhancement to this area included the extensive treatment of non-native invasive vegetation. Chinese privet *Ligustrum sinense* and multiflora rose *Rosa multiflora* were the dominant non-native vegetation types present pre-construction.

Wetland I.—is approximately 0.06 acres and is located between a pasture, which is actively mowed and grazed, and the left bank of Bianculli UT2. In addition to the removal of the non-native vegetation, easement fencing now encompasses the delineated area removing the livestock access and mechanized encroachment that was occurring pre-construction.

Wetlands J and K.—combined are approximately 0.04 acres and are located adjacent to the Bianculli southwestern property line. This area was treated for non-native invasive vegetation and permanently protected with the establishment of the conservation easement and exclusionary fencing.

Wetland L.—is approximately 0.44 acres and is the second largest wetland within the project area. Wetland L is located adjacent to SHC and Bianculli UT1. It is a forested wetland with trees and shrubs throughout. Past landowners channelized UT1 in an attempt to direct flow away from the wetland and to quickly move water to SHC. During construction, priority I restoration of UT1 established a new channel and directed the flow into an ephemeral pool that was created. The restoration of UT1 and creation of the ephemeral pool significantly enhanced the wetland feature and amphibian habitat.

4.2.1 Wetland Areas Fixed Station Photographs

Fixed wetland station photographs document the pre-and post-construction conditions of the jurisdictional wetland areas found on the USH mitigation site. Wetland photographs from the MY0-MY3 surveys will serve as a comparative timeline sequence with future photographs over the course of the monitoring surveys (Figure B.7).

4.3 Vegetation Assessment

The USH mitigation site was revegetated with a variety of annual and perennial native seed mixes during construction to minimize soil erosion immediately following ground disturbing activities and to provide a diversity of herbaceous plant species within the conservation easement (Table C.1). A large number of mature trees and shrubs, representing a variety of species, were not disturbed during construction. Most of these trees and shrubs were located along top of the SHC channel banks and within the established conservation easement. They were retained because they were contributing to bank stability, providing shade to the stream, and would be a seed source that would help contribute to the revegetation of the project area.

Native tree and shrub species, including live stakes, were installed during November and December 2011 and January 2012. Live stakes were used to promote the long-term stability of the channel banks, particularly in areas of potential high bank stress. A total of 5,000 livestakes consisting of three different species were installed along SHC and the three unnamed tributaries (Table C.1). A total of 1,492 native tree and shrub species were installed (Table C.2). Woody stems were propagated as either bare-root whips or containerized stock. Woody stems were dispersed across the mitigation site to enhance riparian areas that were lacking woody stems due to past land use practices. Shrub and tree selections ranged from species tolerant (obligate wetland) to weakly tolerant of flooding (facultative upland). Shrubs and trees were matched with one of four planting zones based on a species wetness tolerance (Figure D.1). Planting zones typically ranged from wet areas with saturated soils to upland areas where the soils were better drained.

To monitor the performance of the planted woody stems, ten vegetation assessment plots were established following woody stem installation (Figure D.1). Location, orientation, and dimension information for each of the ten vegetation monitoring plots is located in Table C.3. Stem counts, plant vigor, plant damage, and overall stem density was assessed for each vegetation monitoring plot (Tables C.4 - C.8).

Vegetation Plot 1.—Thirteen planted stems (526 stems per acre) were documented in vegetation plot 1 (VP1) during the MY0 survey, representing ten native woody species originating from both containerized and bare-root nursery stock. Twelve planted stems (486 stems per acre) were recorded in MY1. One dead stem, a river birch (*Betula nigra*), was documented. During the MY2 survey, 11 planted stems (445 stems per acre) were recorded. One dead stem, a dogwood (*Cornus florida*), was observed. The VP1 herbaceous layer is adequate and the planted stem density exceeds year-2 success criteria of 320 stems per acre. Two red maple (*Acer rubrum*) volunteer stems were recorded in VP1 during the MY2 vegetation survey. Including the two volunteer stems, the total stem count was 13 (526 stems per acre) for MY2. During the MY3 survey, 9 planted stems (364 stems per acre) were recorded. One black cherry (*Prunus serotina*) stem was dead, and one bitternet hickory (*Carya cordiformis*) stem was missing in MY3.

Vegetation Plot 2.—Fourteen planted stems were found in vegetation plot 2 (566 stems per acre) in MY0, representing 11 native woody species originating from both containerized and bare-root nursery stock. Plant vigor was good in VP2 with 14 planted stems (566 stems per acre) recorded during MY1. The MY2 stem count documented 14 planted stems (566 stems per acre). The MY3 stem count documented 13 planted stems (526 stems per acre). One river birch (*Betula nigra*) stem was dead in MY3. Four volunteer tulip poplar (*Liriodendron tulipifera*) stems were recorded in MY3.

Vegetation Plot 3.—In vegetation plot 3, 19 planted stems were recorded (769 stems per acre) in MY0 representing 14 native woody species originating from both containerized and bare-root nursery stock. Survival of the original 19 stems in VP3 was documented in MY1. Survival of planted stems remained above the minimum success criteria in VP3 during MY2 with 17 stems (688 stems per acre) recorded. Planted stem density exceeds the minimum success criteria for vegetation performance. One tag alder *Alnus serrulata* volunteer stem was recorded in VP3 during the MY2 survey. Including the single volunteer stems, the total stem count was 18 (728 stems per acre) for MY2. The MY3 stem count documented 18 planted stems (728 stems per acre). One additional white oak (*Quercus alba*) stem that appeared to be planted and four volunteer tulip poplar (*Liriodendron tulipifera*) stems were recorded in MY3.

Vegetation Plot 4.—Sixteen planted stems (648 stems per acre) were documented in vegetation plot 4 during the MY0 survey representing ten native woody species originating from both containerized and bare-root nursery stock. Sixteen stems (648 stems per acre) were recorded again in MY1. Survival of 15 planted stems (607 stems per acre) were recorded in MY2. Including the 40 volunteer stems (38 poplar, 2 black cherry) counted in VP4, the total stem count was 55 (2,226 stems per acre) for MY2. The MY3 stem count documented 16 planted stems (648 stems per acre). One additional sycamore (*Platanus occidentalis*) stem that appeared to be planted, two volunteer oak stems (*Quercus* sp.), and 68 volunteer tulip poplar (*Liriodendron tulipifera*) stems were recorded in MY3.

Vegetation Plot 5.—In vegetation plot 5, 25 planted stems were recorded (1,011 stems per acre) in MY0 representing 14 native tree and shrub species. Planted stems were both container grown and bare-root nursery stock. A total of 24 stems were recorded in MY1. Planted stem density (971 stems per acre) remained high even though one stem was crushed by vehicle encroachment into the easement and VP5 during MY1. A total of 21 planted stems (850 stems per acre) were counted in the MY2 survey. Four volunteer stems (3 tag alder, 1 black cherry) were recorded in the MY2 plot survey, increasing the total stem count to 25 (1,011 stems per acre). The MY3 stem count documented 19 planted stems (769 stems per acre). Two dead stems, one elderberry (*Sambucus canadensis*) and one pignut hickory (*Carya ovata*), and one missing stem, persimmon (*Diospyros virginiana*) were documented in MY3. Four volunteer red chokeberry (*Aronia arbutifolia*), one volunteer sycamore (*Platanus occidentalis*), and one volunteer black locus (*Robinia pseudoacacia*) stems were recorded in MY3.

Vegetation Plot 6.—Fifteen planted stems (607 stems per acre) were documented in vegetation plot 6 during the MY0 survey. The 15 planted stems recorded in VP6 represent 12 native woody species originating from both containerized and bare-root nursery stock. A total of 15 planted stems (607 stems per acre) were documented in VP6 during MY1, the same number as the previous survey. A total of 14 planted stems (567 stems per acre) were recorded in MY2. Volunteer stems (5 poplar) increased the total stem count to 19 (768 stems per acre) in MY2. The MY3 stem count documented 12 planted stems (486 stems per acre). One dead beautyberry

(*Callicarpa america*) stem, one missing flowering dogwood (*Cornus flordia*) stem, and eight volunteer tulip poplar (*Liriodendron tulipifera*) stems were recorded in MY3.

Vegetation Plot 7.—In vegetation plot 7, 18 planted stems were recorded (728 stems per acre) in MY0 representing 14 native tree and shrub species. Planted stems were both container grown and bare-root nursery stock. A total of 17 stems (688 stems per acre) were documented in MY1. Stem density (648 stems per acre) for VP7 remained well above the minimum success criteria in MY2 with 16 planted stems recorded. The MY3 stem count documented 18 planted stems (728 stems per acre). One flowering dogwood (*Cornus flordia*) stem that appeared to be planted, two volunteer tulip poplar (*Liriodendron tulipifera*) stems, and two volunteer sycamore (*Platanus occidentalis*) were recorded in MY3.

Vegetation Plot 8.—Twenty-seven planted stems (1,093 stems per acre) were documented in vegetation plot 8 during the MY0 survey representing 18 native woody species. Seven stems were planted as live stakes in VP8. Live stake species consisted of silky dogwood *Cornus amomum* (4 stems) and silky willow *Salix sericea* (3 stems). The other 20 planted stems were from containerized and bare-root nursery stock. A total of 4 stems were missing (2) or dead (2) in VP8 during MY1, one of which was a silky dogwood live stake. The other missing or dead stems were planted as bare-root stock. Twenty-three planted stems (931 stems per acre) were relocated during the MY1 vegetation plot survey. Six volunteer stems were noted in VP8 which brought the total stem count to 29 (1,173 stems per acre) in MY1. Twenty-two planted stems (890 stems per acre) were recorded during the MY2 survey. Six live stakes were counted and included in the planted stem count for VP8. The MY3 stem count documented 19 planted stems (769 stems per acre). One dead beautyberry (*Callicarpa americana*) stem, one missing persimmon (*Diospyros virginiana*), one missing bitternut hickory (*Carya cordiformis*), one volunteer red maple (*Acer rubrum*) stem, one volunteer tag alder (*Alnus serrulata*) stem, and two volunteer sycamore (*Platanus occidentalis*) were recorded in MY3.

Vegetation Plot 9.—In vegetation plot 9, 16 planted stems were recorded (648 stems per acre) in MY0 representing 13 native tree and shrub species. Planted stems were both container grown and bare-root nursery stock. Two stems were dead in VP9 during MY1. Stems density (567 stems per acre) remained high in VP9 with 14 stems documented. Two more stems were missing and presumed dead in MY2 survey, decreasing the stem count to 12 planted stems (486 stems per acre). The MY3 stem count documented 10 planted stems (405 stems per acre). One dead beautyberry (*Callicarpa americana*) stem, one missing persimmon (*Diospyros virginiana*), one missing black cherry (*Prunus serotina*), and one missing mockernut hickory (*Carya alba*) were recorded in MY3.

Vegetation Plot 10.—Twenty-one planted stems (850 stems per acre) were documented in vegetation plot 10 during the MY0 survey representing 13 native woody species originating from both containerized and bare-root nursery stock. Two stems were missing during the MY1 survey. Stem density of the 19 remaining planted stems was 769 stem per acre. Including one volunteer stem noted in VP10, the total stem count for MY1 was 20 (809 stems per acre). Nineteen planted stems were recorded in VP10 during the MY2 survey. The MY3 stem count documented 14 planted stems (567 stems per acre). One dead beautyberry (*Callicarpa americana*) stem, one dead red bud (*Cercis canadensis*), one missing mockernut hickory (*Carya* *alba*), two missing bitternut hickory (*Carya ovata*), and two volunteer tulip poplar (*Liriodendron tulipifera*) stems were recorded in MY3.

4.3.1 Vegetative Monitoring Plot Photographs

Vegetative monitoring plot photographs were taken during the MY0 vegetation monitoring survey to establish a baseline condition of each plot. Plot photographs will be compared overtime to evaluate the plots performance throughout the monitoring period. The MY0-MY3 vegetation plot photographs reveal the positive performance of planted stem and herbaceous layer growth following construction for all plots (Figure C.1).

4.3.2 Vegetation Problem Areas Table Summary

Areas of dense multiflora rose (*Rosa multiflora*), Chinese privet (*Ligustrum sinense*), oriental bittersweet (*Celastrus orbiculatus*), Japanese honeysuckle (*Lonicera japonica*), and pasture fescue (*Festuca* spp.) along with other less ubiquitous invasive species were chemically treated throughout the project area during the construction period. A follow up treatment of invasive exotic vegetation occurred in the spring of 2012 (MY1), spring of 2013 (MY2), and spring of 2014 (MY3). The 2012 treatments focused on the Mainstem 1, UT1, and UT2 conservation easement areas. The 2013 maintenance of non-native vegetation spot treated the Mainstem 2 reach. In the spring of 2014, the entire Mainstem 3 reach and all of the UT3 reach on the Davis property were treated.

Areas of high infestation were encountered during the initial treatment phase, particularly adjacent to UT2 (right bank), but the majority of problem invasive areas were observed to have only isolated non-native vegetation occurrences during the MY1-MY3 surveys. However, several dense patches of Japanese honeysuckle (*Lonicera japonica*) were found throughout the site during MY3. Additionally, one dense patch of bamboo (*Bambusa* sp.) was observed at the upper end of the Mainstem 2 Bura/Roberson Reach. These are summarized in Table C.10 (Appendix C).

4.3.3 Vegetative Problem Areas Plan View

Vegetation problem areas for MY3 are depicted on Figure D.1.

4.3.4 Vegetative Problem Areas Photographs

Vegetative problem area photographs were taken in MY3. Several dense patches of Japanese honeysuckle (*Lonicera japonica*) were observed in isolated areas of the site. Additionally, one patch of dense bamboo (*Bambusa* sp.) was observed. These areas are depicted on Figure D.1.

4.3.5 Summary of Vegetation Assessment Results

A total of 184 planted stems were counted during the MY0 survey. The average density of planted woody stems recorded in the ten 100 m^2 vegetation plots combined was 749 stems per acre in MY0. Three vegetation plots (VP5=1; VP7=1; VP8=7) included live stake stems. All ten vegetation plots consisted of both native bare-root whips and containerized stock. All ten vegetation plots exceeded the success criteria for vegetation stem density during the as-built baseline survey.

A total of 173 planted stems were counted during the MY1 survey. The average density of the planted woody stems in the ten vegetation plots combined was 700 stems per acre. Three vegetation plots (VP4=12; VP8=6; VP10=1) were noted as having volunteer native woody species during MY1. The volunteer woody stems increased the total stem count for the ten vegetation monitoring plots to 192 (777 stems per acre).

A total of 161 planted stems were counted during the MY2 survey. The average density of the planted woody stems in all the vegetation plots combined was 652 stems per acre. Five vegetation plots (VP1=2; VP3=1; VP4=40; VP5=4; VP6=5) were noted as having volunteer native woody species during MY2. The volunteer woody stems increased the total stem count for the ten vegetation monitoring plots to 213 (862 stems per acre). The vast majority of volunteer stems in VP4 (N=38) are tulip poplars.

A total of 141 planted stems were counted during the MY3 survey, a decrease of 7 stems from MY02. The average density of the planted woody stems in all the vegetation plots combined was 570 stems per acre. All vegetation plots, except VP1 and VP9, were noted as having volunteer native woody species during MY3. The volunteer woody stems increased the total stem count for the ten vegetation monitoring plots to 252 (1020 stems per acre).

Overall, the vegetation condition assessment, in terms of both planted native vegetation and existing non-native invasive vegetation, within the conservation easement was favorable in MY1-MY3 (Table C.11). Several high density areas of Japanese honeysuckle (approximately 1.08 acres total) were observed and are depicted on Figure D.1 (Appendix D). Additionally, one small patch of dense bamboo (*Bambusa* sp.) was observed onsite (approximately 0.07 acres). These areas will continued to be monitored closely and updated during subsequent visits to the site. Planted vegetation across the project site, including both channel banks and the riparian buffers, is vigorous and abundant. Chinese privet, a low to moderate invasive species of concern, was significantly reduced following chemical treatments during project construction (2011) and with follow-up treatments in the early spring of 2012, 2013, and 2014. Scattered stems of Chinese privet remain in the easement but are minimal and below mapping thresholds.

5 Farm Management Plan

The USH mitigation project included livestock best management practices (BMPs) such as livestock exclusionary fencing and developed watering facilities on the Bianculli, Roberson, and Davis properties. The NCEEP funded all livestock BMPs in full through a task order contract with the North Carolina Division of Soil and Water Conservation. The Buncombe County Soil and Water Conservation District designed and managed the installation of the BMPs through a contract independent of the channel and riparian construction contract. Additional details on the locations and quantities of the livestock BMPs are included in the Upper South Hominy Mitigation Plan (NCWRC 2010).

6 Post Construction Project Activities

Storm water run-off from the Roberson pasture and hill slope was entering the conservation easement adjacent to Connie Davis Road following the pre-existing conveyance a roadside depression that directed the outfall of the water to SHC on the upstream side of the Connie Davis Road bridge abutment. During the heavy rain event in November 2011 that resulted in flooding and damage to other parts of the project reach, landowners that rely on the bridge for access to their home requested that the storm conveyance be moved so that it did not enter SHC creek at the bridge. To alleviate the landowners concern of potential erosion to the bridge abutment, the NCEEP requested that the NCWRC design and construct a conveyance channel upstream of the bridge. In the spring of 2012, a topographical survey of the area and a design plan for a floodplain interceptor was submitted to NCEEP for approval. Construction was completed in October 2012, just prior the MY1 survey. The constructed storm flow conveyance channel now outfalls to SHC at station 12+75 (Figure D.1).

Following the flood event on May 5, 2013, several site visits were made by both NCWRC staff and NCEEP staff. During a joint visit with NCEEP to discuss channel bank repairs on the lower end of the Mainstem 2 reach just upstream of the Connie Davis Road bridge, questions were directed towards two large diameter trees growing adjacent to the right bank bridge abutment and conservation easement. A large maple was leaning at more than a 45° angle and its root mass was undercut by at least 5 ft (horizontal) along the right bank. A large cherry with many dead limbs was obviously declining in health.

Recent damage to the right bank, upstream of the two trees, occurred in large part because a leaning cherry tree toppled during the May 5, 2013 flood event. That section of bank had withstood several high water events and was not destabilized until the leaning cherry tree fell. The bank erosion that resulted was fair warning of what could happen if either the maple or cherry fell.

Reducing risk to the bridge crossing and minimizing potential damage to the right bank by removing the two trees was considered integral to project success. The NCWRC obtained permission from the landowner, James Roberson, and contracted with a certified arborist to remove both two trees. The trees were taken down in sections using a chainsaw and crane on April 28, 2014. All tree material and debris were removed from the area.

7 Acknowledgements

K. Jernigan and P. Perkinson of Axiom Environmental, Inc. collected and analyzed the field data reported in this monitoring document. K. Jernigan prepared the plan view drawings for the project report. C. Faquin, G. Lewis, K. Jernigan, and P. Perkinson prepared the monitoring document. Special thanks to the NCEEP staff who improved this document with their thorough review and thoughtful suggestions.

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Appendix A.

General Tables and Figures

Table A.1 Restoration Levels, Mitigation Approaches and Component Summations, Upper South Hominy Mitigation Site.

Upper South Hominy Mitigation Site Project Components							
Project Segment or Stream Reach ID	**Existing Length (lf) or Acres (ac)**	**Mitigation Level[a]**	**Approach[b]**	**Mitigated Length (lf) or Acres (ac)**	**Stationing**	**Mitigation Ratio**	**Mitigation Units**
Bianculli South Hominy Cr.	600	R	P3	630	0+00 to 6+30	1:1	630
Bianculli South Hominy Cr.	169	EII	P3	167	6+30 to 7+97	2.5:1	67
Bianculli Trib North (UT1)	100	P		94	0+00 to 0+94	5:1	19
Bianculli Trib North (UT1)	138	R	P1	183	1+00 to 2+83	1:1	183
Bianculli Trib South (UT2)	44	R	P1	45	6+54 to 6+99	1:1	45
Bianculli Trib South (UT2)	654	EII	SS	654	0+00 to 6+54	2.5:1	262
Bura/Roberson South Hominy Cr	477	R	P3	518	1+00 to 2+25; 7+25 to 10+00; 11+68 to 12+86	1:1	518
Bura/Roberson South Hominy Cr	775	EII	P3	768	0+00 to 1+00; 2+25 to 7+25; 10+00 to 11+68	2.5:1	307
Roberson Abandoned Ch UT2	170	R	P1	191	0+00 to 1+91	1:1	191
Davis South Hominy Cr	500	EI	P3	522	0+00 to 5+22	1.5:1	348
Davis South Hominy Cr	227	EII	P3	215	5+22 to 7+37	2.5:1	86
Davis UT3 upper	775	P		777	0+00 to 7+77	5:1	155
Davis UT3 middle	538	EII	SS	538	7+77 to 13+15	2.5:1	215
Davis UT3 lower	426	R	P1	427	13+15 to 17+42	1:1	427
Davis Springs (north)	144	P		144	0+00 to 1+44	5:1	29
Davis Spring (south)	72	P		78	0+00 to 0+78	5:1	16
Totals	5,809			5,951			3,498

Component Summations						
Mitigation Level (ratio)	Stream Length(lf)	Steam Mitigation Units		Riparian Wetland (Acre)		Wetland Mitigation Units
				Riverine	Non-Riverine	
Restoration (1:1)	1,994	1,994				
Enhancement I (2:1)	522	348			1.11	0.56
Enhancement II (2.5:1)	2,342	937				
Creation						
Preservation (5:1)	1,093	219			0.24	0.05
HQ Preservation						
Totals	**5,951**	**3,498**			**1.35**	**0.61**

R = Restoration P = Preservation C = Creation EI = Enhancement I EII = Enhancement II
P1 = Priority 1 P2 = Priority 2 P3 = Priority 3 S = Stabilization SS = Stream Bank Stabilization
[a]Source: USACE (2003)
[b]Source: Rosgen (2006)

Table A.2 Project Activity and Reporting History, Upper South Hominy Mitigation Site.

Upper South Hominy Mitigation Site Project Activity and Reporting History		
Activity or Report	**Data Collection Complete**	**Actual Completion or Delivery**
Conservation easement acquired (by NCEEP)	11 June 2009	11 June 2009
Mitigation Plan	23 January 2009	30 November 2010
Final Design - 90%	28 February 2010	30 November 2010
Construction	29 June 2011	31 October 2011
Temporary S&E seed mix applied to entire project area	29 June 2011	31 October 2011
Permanent seed mix applied to entire project area	29 June 2011	31 October 2011
As-built physical survey	16 December 2011	1 February 2012
Containerized and bare root plantings installed over entire project area	9 November 2011	20 February 2012
As-built vegetation survey	2 February 2012	22 February 2012
Invasive Species Treatment	--	Spring 2012
Mitigation Plan/As-built (Year 0 Monitoring - baseline)	22 February 2012	28 February 2013
Year 1 Monitoring	16 November 2012	30 September 2013
Invasive Species Treatment	--	Spring 2013
Year 2 Monitoring	30 November 2013	30 May 2014
Invasive Species Treatment	--	Spring 2014
Structure Repair	--	Summer 2014
Year 3 Monitoring	30 November 2014	17 February 2015
Year 4 Monitoring		
Year 5+ Monitoring		

Table A.3 Project Contacts, Upper South Hominy Mitigation Site.

Upper South Hominy Mitigation Site Project Contacts	
Project Owner NC Ecosystem Enhancement Program	**Contact Information** NC Ecosystem Enhancement Program, Harry Tsomides 5 Ravenscroft Dr. Asheville, NC 28801
Designer(s): NC Wildlife Resources Commission Jeff Ferguson Shannon Deaton	**Firm Information/Address:** North Carolina Wildlife Resources Commission 1751Varsity Drive NCSU Centennial Campus Raleigh, NC 27695
Construction Contractor: Suttles Trucking and Grading, Inc.	**Firm Information/Address:** Suttles Trucking and Grading, Inc. 10 Edwards Drive Nebo, NC 28761 (828-659-2104)
Planting Contractor: Suttles Trucking and Grading, Inc.	**Company Information/Address:** Same as above
Seeding Contractor: NC Wildlife Resources Commission **Native Seed Mix Sources** Ernst Conservation Seeds, LLP **Nursery Stock Suppliers** NC Wildlife Resources Commission NC Forest Service	**Company Information/Address:** Same as above **Company and Contact Phone:** 1-800-873-3321 **Company and Contact Phone:** Dan River Prison Farm, Same as above Carolyn Jernigan 919-731-7988
Monitoring Performers (MY0-MY2): Stream Monitoring POC Vegetation Monitoring POC	**Firm Information/Address:** NCWRC, same as above NCWRC, same as above
Monitoring Performers (MY3-MY5):	Firm Information/Address:
Stream Monitoring POC Vegetation Monitoring POC	Axiom Environmental, Inc 218 Snow Avenue Raleigh, NC 27603 (919-215-1693)

Table A.4 Project Attributes, Upper South Hominy Mitigation Site.

Upper South Hominy Mitigation Site Project Attributes				
Project County	Buncombe			
Physiographic Region	Blue Ridge Mountains			
Ecoregion (Reference: USACE 2003)	Southern Crystalline Ridges and Mountains			
Project River Basin	French Broad River			
USGS HUC for Project (14 digit)	06010105060020			
NCDWQ Sub-basin for Project	04-03-02			
Within Extent of EEP Watershed Plan?	Yes			
NCWRC Class (Warm, Cool, Cold)	Cold			
Percent of project Easement Fenced or Demarcated	100%			
Beaver activity Observed During Design Phase?	Yes			
	SHC	UT3 Davis	UT2 Bianculli/Roberson	UT1 Bianculli
Drainage Area (mi^2)	7.1	0.1	<0.1	<0.1
Stream Order	4	1	1	1
Restored Length (ft)	2,820	1,742	890	277
Perennial or Intermittent	Perennial	Perennial	Perennial	Perennial
Watershed Type (Rural, Urban, Developing, etc.)	Developing	Developing	Developing	Developing
Watershed LULC Distribution (e.g.) (percent)				
Residential	<3.0	Included in total	Included in total	Included in total
Ag-Row Crop	0.2	Included in total	Included in total	Included in total
Ag-Livestock	7.2	Included in total	Included in total	Included in total
Forested	89.7	Included in total	Included in total	Included in total
Etc.				
Watershed Impervious Cover (percent)	<1.0	Included in total	Included in total	Included in total
NCDWQ AU/Index Number	6-76-5	N/A	N/A	N/A
NCDWQ Classification	C, Tr	C, Tr	C, Tr	C, Tr
303d Listed?	No	No	No	No
Upstream 303d Listed Segment?	No	No	No	No
Reasons for 303d Listing or Stressor	N/A	N/A	N/A	N/A
NCDWQ 401 Water Quality Certification Number	Buncombe Co. 20110118		Same	Same
USACE 404 Action ID Number	SAW-2011-00076		Same	Same
Total Acreage of Conservation Easement (including stream channel)	16.44	Included in total	Included in total	Included in total
Total (undisturbed) Vegetated Acreage Within Easement	7.5	Included in total	Included in total	Included in total
Total Riparian Buffer Acreage as Part of the Restoration	7.0	Included in total	Included in total	Included in total
Rosgen Stream Classification of Pre-Existing	C4	G5	abandoned	G5
Rosgen Stream Classification of As-built (Design)	C4	B5/C5	C5	E5
Valley Type	VIII	VII	VIII	VIII
Valley Slope	0.00973	0.10480		
Valley Side Slope Range (e.g. 2-3%)	0.09-0.24	0.07-0.29		
Valley Toe Slope Range (e.g. 2-3%)	0.003-0.026	0.02-0.19		
Cowardin Classification (Reference: Cowardin 1979)	N/A	N/A	N/A	N/A
Trout Waters Designation (NCWRC)	No	No	No	No
Species of Concern, Endangered, Etc.? (Y/N)	No	No	No	No
Dominant Soil Series and Characteristics				
Series (dominant)	Iotla Loam	Included in total	Included in total	Included in total
Depth (in)	80			
Clay (%)	15.5			
K	0.15			
T	5			

Figure A.1 Vicinity Map, Upper South Hominy Mitigation Site.

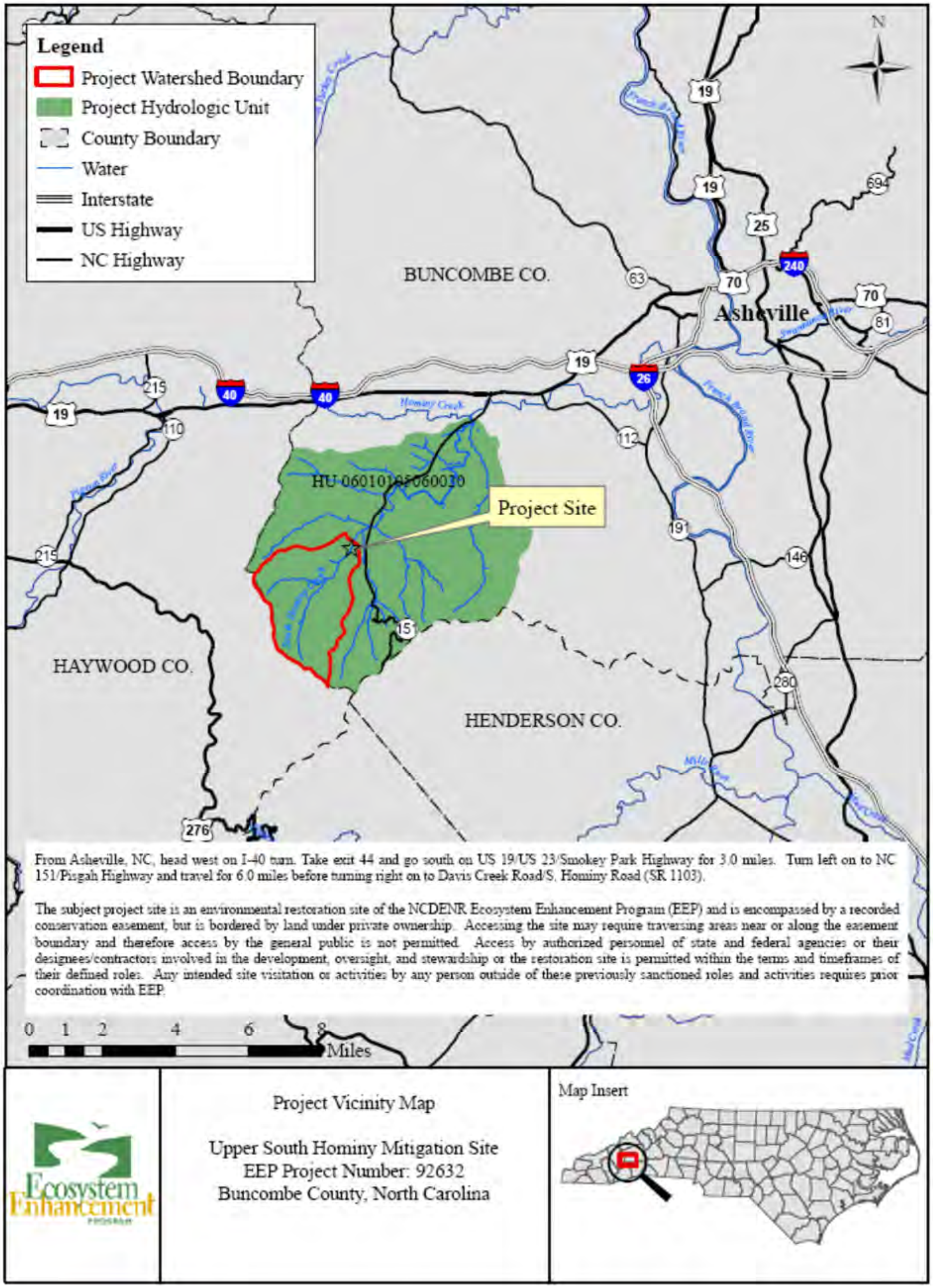
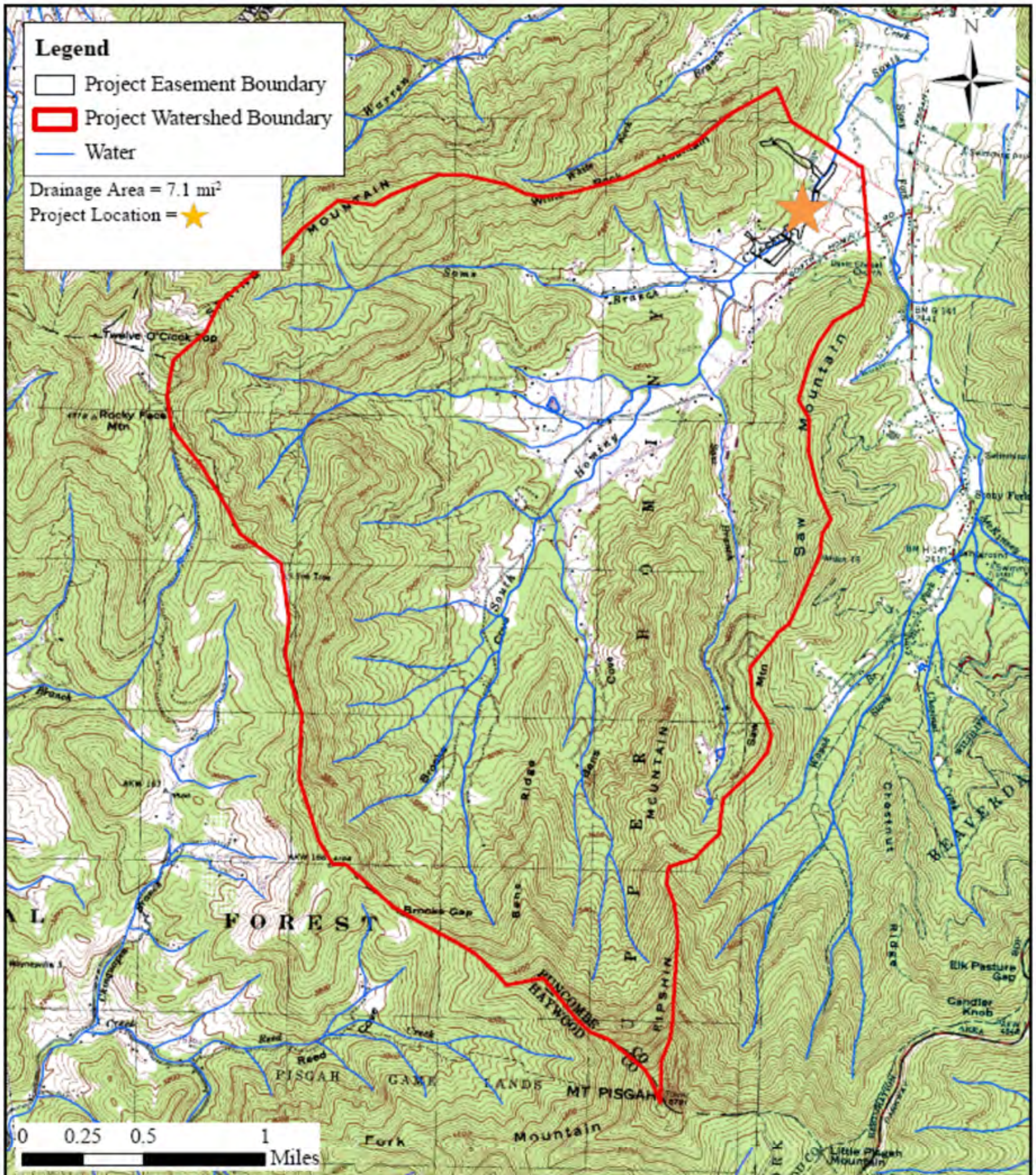


Figure A.2 South Hominy Creek Watershed Boundary and Project Area Map.



Ecosystem Enhancement Program	Project Watershed Boundary Map Upper South Hominy Mitigation Site EEP Project Number: 92632 Buncombe County, North Carolina	Map Insert

Figure A.3 Project Components and Assets Map, Aerial Photography NConemap 2006, Upper South Hominy Mitigation Site.

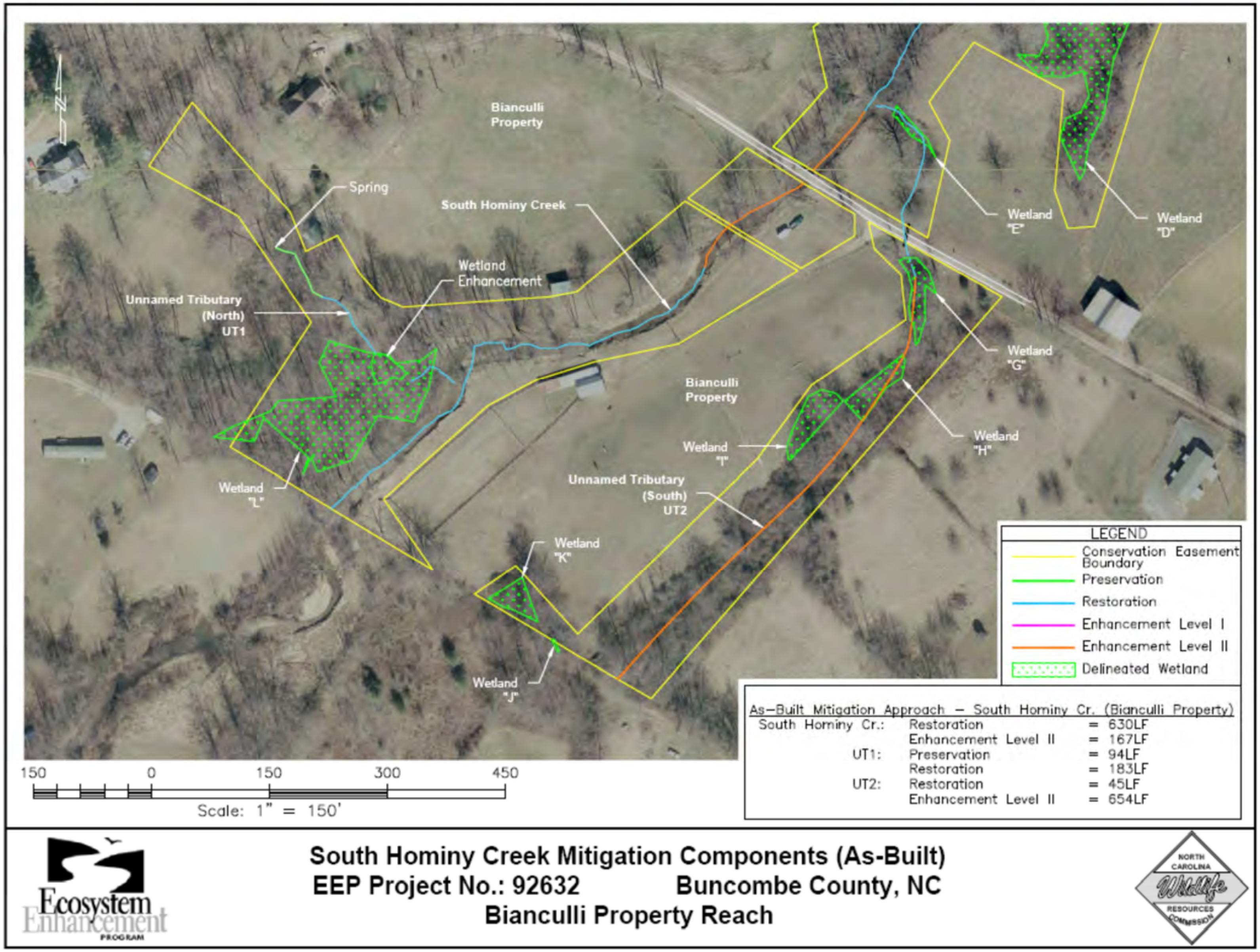


Figure A.3 Continued

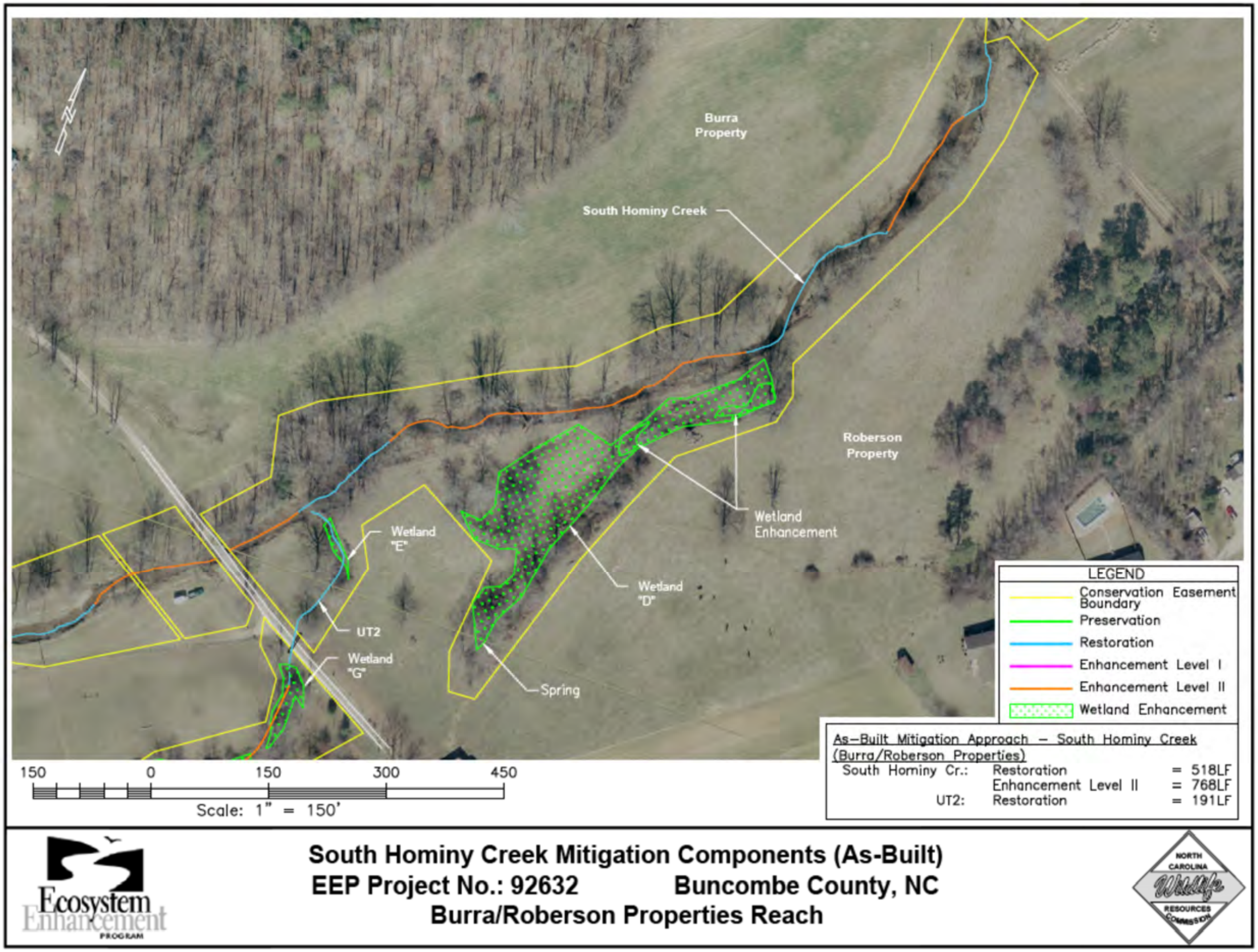


Figure A.3 Continued

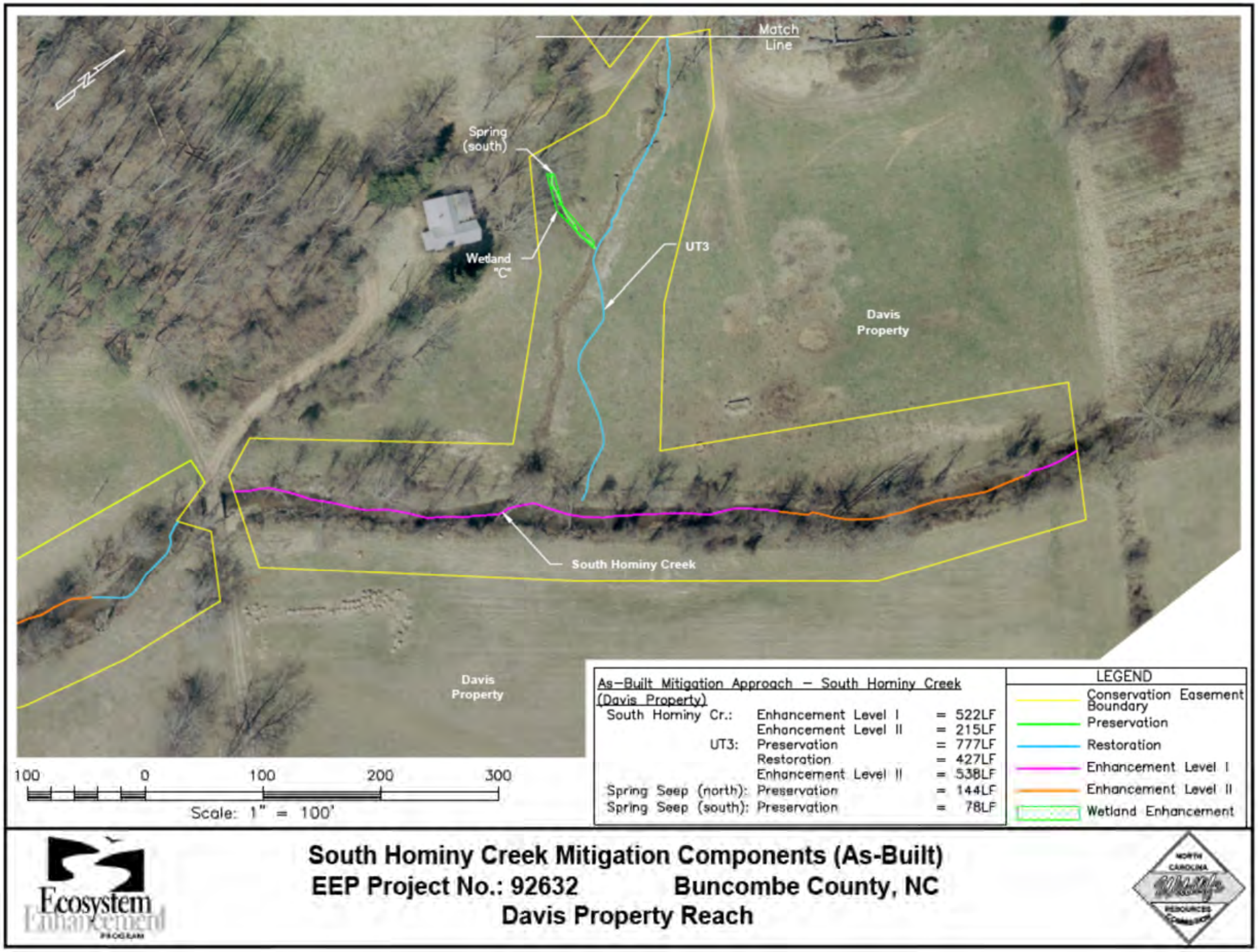
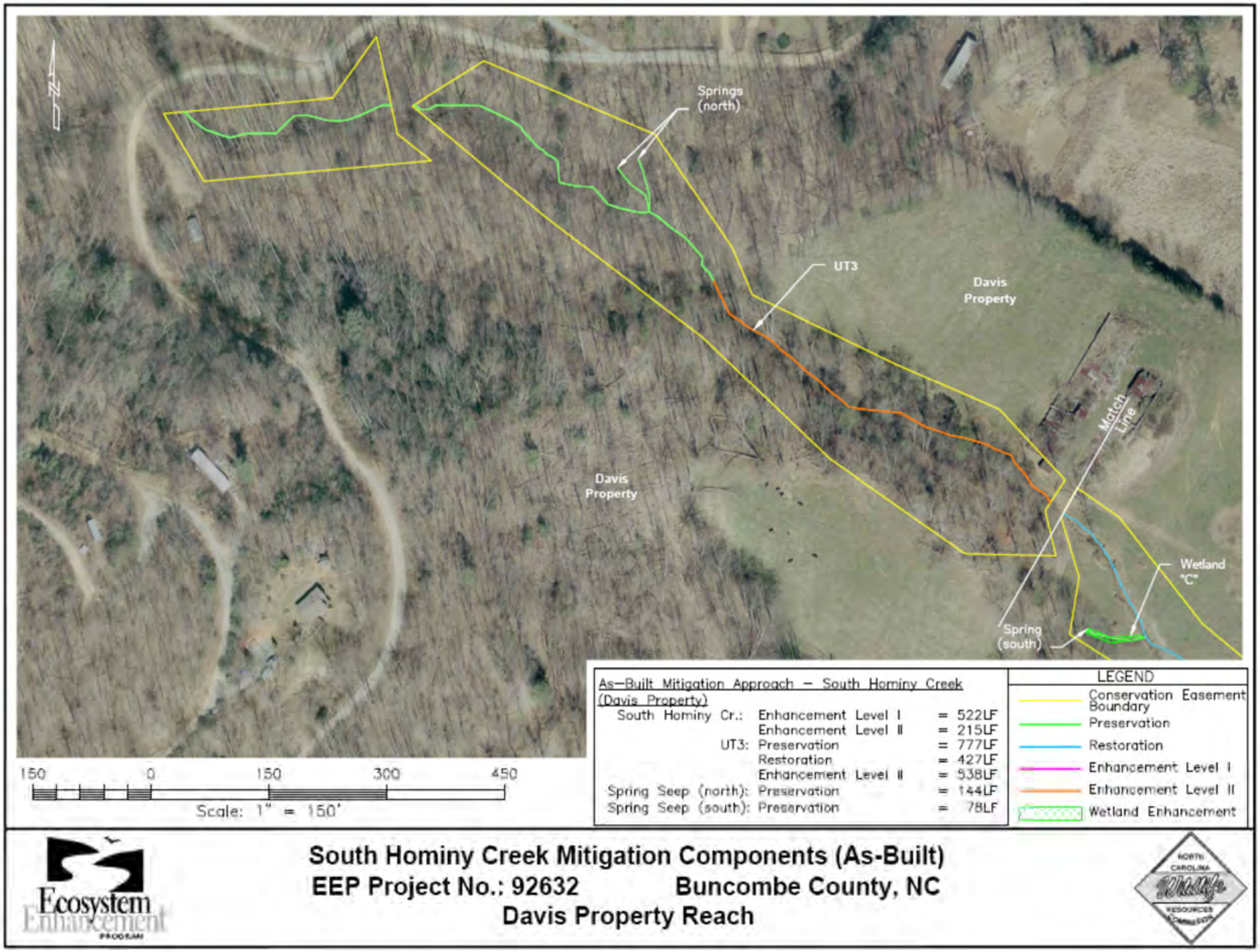


Figure A.3 Continued



Appendix B.

Morphological Summary Data Tables and Plots

Table B.1 Existing, Reference, Design, and As-built Stream Channel Morphology Data Summary for South Hominy Creek (SHC).

Upper South Hominy Mitigation Site Channel Morphology Data Summary																			
Parameter (Riffles Only)	**Gauge**	**Regional Curve Interval**			**(SHC) Pre-Existing Condition**						**Reference Reach(es) Data**						**(SHC) Design**		
Dimension and Substrate		LL	UL	Eq.	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n	Min	Mean	Max
Bankfull Width (ft)				30	27.2	37.3	31.1	32.0	3.6	7	28.1	37.2	30.3	31.2	3.5	5	28.1	30.7	37.2
Floodprone Width (ft)					203.0	370.0	320.0	311.3	55.6	7	64.0	329.0	104.0	146.4	106.9	5	68.4	182.2	296
Bankfull Cross-Sectional Area (ft^2)				70	50.8	81.4	70.2	69.7	9.9	7	43.8	75.5	62.0	60.7	11.6	5	43.8	61.3	75.5
Bankfull Mean Depth (ft)				2.5	1.7	2.6	2.2	2.2	0.4	7	1.5	2.2	2.0	2.0	0.3	5	1.5	2.0	2.2
Bankfull Max Depth (ft)					2.5	3.8	3.2	3.2	0.4	7	2.3	3.3	3.0	2.8	0.4	5	2.0	2.7	3.3
Width/Depth Ratio					10.5	20.1	15.0	15.0	3.5	7	12.7	20.9	16.4	16.3	3.4	5	12.0	15.4	18.6
Entrenchment Ratio					6.6	13.4	9.9	9.8	2.0	7	2.3	11.2	3.4	4.7	3.6	5	2.4	5.9	8.0
Bank Height Ratio					1.1	2.0	1.4	1.5	0.3	7	1.0	2.0	1.0	1.3	0.4	5	1.0	1.3	1.5
Bankfull Wetted Perimeter (ft)					30.0	38.7	32.8	33.8	3.3	7	30.5	38.2	31.6	32.8	3.1	5	30.5	32.8	38.15
Hydraulic Radius (ft)					1.6	2.4	2.1	2.1	0.3	7	1.4	2.1	2.0	1.8	0.3	5	1.4	1.9	2.1
D50 (mm)					17.3	39.2	24.5	26.9	8.1	7	15.2	62.3	46.5	42.6	20.8	4	15.2	42.6	62.3
Pattern																			
Channel Belt Width (ft)					28.2	97.4	46.0	56.8	26.1	6	64.7	240.0	88.0	120.2	81.8	4	53.1	154.7	256.2
Radius of Curvature (ft)					29.7	545.1	294.3	295.8	209.7	6	12.7	105.0	49.6	54.2	38.1	4	10.7	70.7	256.2
Rc:Bankfull Width (ft/ft)					0.9	17.0	9.2	9.2	6.6	6	0.5	3.4	1.6	1.8	1.2	4	0.4	2.3	6.9
Meander Wavelength (ft)					140.0	561.5	307.5	307.0	148.3	6	131.0	350.0	342.5	291.5	107.2	4	108.0	288.9	469.8
Meander Width Ratio					0.9	3.0	1.4	1.8	0.8	6	1.9	11.9	7.9	7.4	5.0	4	1.9	5.0	6.9
Profile																			
Riffle Length (ft)					12.6	85.9	53.7	53.5	21.9	14	27.7	65.0	57.5	51.9	16.8	4	15.8	52.3	86.9
Riffle Slope (ft/ft)					0.01177	0.03597	0.01733	0.01967	0.00709	14	0.01128	0.02103	0.01329	0.01472	0.00433	4	0.00737	0.01703	0.02669
Pool Length (ft)					16.0	84.1	42.2	42.7	19.6	11	27.1	41.0	30.9	32.5	6.2	4	14.7	55.7	96.7
Pool Max Depth (ft)					2.9	7.7	4.4	4.5	1.3	11	3.8	5.3	4.3	4.4	0.7	4	3.6	6.2	8.8
Pool to Pool Spacing (ft)					28.4	537.8	184.4	220.9	173.1	8	41.4	307.9	77.0	125.9	123.0	4	44.2	176.8	309.4

Table B.1 Continued

Upper South Hominy Mitigation Site Channel Morphology Data Summary													
Substrate, Bed and Transport Parameters	**Gauge**	**Regional Curve Interval**			**(SHC) Pre-Existing Condition**							**Reference Reach(es) Data**	**(SHC) Design**
aRi % / Ru % / P % / G % / S %					30		30		20	20			
aSC % / Sa % / G % / C % / B % / Be %					7.6		16.1	29.7	45.4	1.3	0.0		
aD_{16} / D_{35} / D_{50} / D_{84} / D_{95} / Di^p / Di^{sp}					0.23	23.9	56.6	144.4	211.0	98.0	90.0		
Reach Shear Stress (competency) lb/ft[b]					1.0 to 1.3								0.5 to1.2
Max part size (mm) mobilized at bankfull					98								71 to 160
Stream Power (transport capacity) W/m[b]													
Additional Reach Parameters													
Drainage Area (mi^2)					7.1								
Impervious cover estimate (%)					<1.0								
Rosgen Classification					C4								C4
Bankfull Velocity (fps)					4.6								4.6
Bankfull Discharge (cfs)		250		350	322								
Valley Length (ft)					2604.1								
Channel Thalweg Length (ft)					2893.7								2893.7
Sinuosity					1.11								1.11
Water Surface Slope (Channel) (ft/ft)					0.009								0.009
Bankfull Slope (ft/ft)					0.009								0.009
Bankfull Floodplain Area (acres)					0.66								1.26
Proportion Over Wide (%)					5								
Entrenchment Class (ER Range)					Low (>2.2)								
Incision Class (BHR)					Moderately Unstable (1.06-1.3) to Highly Unstable (>1.5)								
BEHI VL% / L% /M% / H% / VH% / E %					NA								
Channel Stability or Habitat Metric					NA								
Biological or Other					NA								

a Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock, (values derived from reach-wide pebble counts). Di^p = max pavement, Di^{sp} = max sub-pavement. Shaded cells indicate that these will typically not be filled in

b Methodology should be cited and described either here or in text

[shaded] = Non-Applicable; NA = Not Available

Table B.1. Continued

Upper South Hominy (EEP project number 92632) Mainstem 1 - Bianculli Reach - 797 feet																								
Parameter - (cross-sections 1&3)	**MY0**						**MY1**						**MY2**						**MY3**					
Dimension and Substrate – Riffles Only	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n
Bankfull Width (ft)	26.9	30.1	28.5	28.5	2.3	2	26.9	30.0	28.5	28.5	2.2	2	27.1	29.6	28.4	28.4	1.8	2	29.2	32.7	31.0	31.0	2.5	2
Floodprone Width (ft)	236.0	362.0	299.0	299.0	89.1	2	236.0	362.0	299.0	299.0	89.1	2	236.0	362.0	299.0	299.0	89.1	2	236.0	350.0	293.0	293.0	80.6	2
Bankfull Cross-Sectional Area (ft²)	54.8	62.9	58.8	58.8	5.7	2	52.9	63.7	58.3	58.3	7.6	2	42.3	62.3	52.3	52.3	14.1	2	59.8	71.4	65.6	65.6	8.2	2
Bankfull Mean Depth (ft)	2.0	2.1	2.1	2.1	0.0	2	2.0	2.1	2.0	2.0	0.1	2	1.6	2.1	1.8	1.8	0.4	2	2.0	2.2	2.1	2.1	0.1	2
Bankfull Max Depth (ft)	2.6	3.2	2.9	2.9	0.4	2	2.7	3.2	2.9	2.9	0.4	2	2.5	4.2	3.3	3.3	1.2	2	3.2	4.2	3.7	3.7	0.7	2
Width/Depth Ratio	13.2	14.4	13.8	13.8	0.9	2	13.6	14.2	13.9	13.9	0.4	2	14.1	17.4	15.7	15.7	2.3	2	14.2	15.0	14.6	14.6	0.6	2
Entrenchment Ratio	8.8	12.0	10.4	10.4	2.3	2	8.8	12.1	10.4	10.4	2.3	2	8.7	12.2	10.5	10.5	2.5	2	8.1	10.7	9.4	9.4	1.8	2
Bank Height Ratio	1.6	1.7	1.7	1.7	0.1	2	1.7	1.7	1.7	1.7	0.0	2	1.6	1.7	1.7	1.7	0.1	2	1.0	1.0	1.0	1.0	0.0	2
Bankfull Wetted Perimeter (ft)	28.8	32.0	30.4	30.4	2.3	2	28.7	31.7	30.2	30.2	2.1	2	29.0	32.1	30.5	30.5	2.2	2	31.5	35.3	33.4	33.4	2.7	2
Hydraulic Radius (ft)	1.9	2.0	1.9	1.9	0.0	2	1.8	2.0	1.9	1.9	0.1	2	1.5	1.9	1.7	1.7	0.3	2	1.9	2.0	2.0	2.0	0.1	2
D50 (mm)	22.1	28.9	25.5	25.5	4.8	2	40.9	46.7	43.8	43.8	4.1	2	32.0	56.4	44.2	44.2	17.2	2	35	40	37	37	5	2
Pattern																								
Channel Beltwidth (ft)			121.0			1			124.1			1			104.5			1			104.5			1
Radius of Curvature (ft)	97.0	247.0	212.0	185.3	106.1	3	61.0	178.0	95.0	107.3	52.2	4	70.3	208.7	79.7	119.6	91.2	3	70.3	208.7	79.7	119.6	91.2	3
Rc:Bankfull width (ft/ft)	3.2	8.2	7.1	6.2	3.5	3	2.0	6.6	3.3	3.8	2.0	4	2.4	7.5	2.6	4.2	3.4	3	2.4	7.5	2.6	4.2	3.4	3
Meander Wavelength (ft)	315.0	329.0	322.0	322.0	9.9	2	293.0	327.0	310.0	310.0	24.0	2	296.9	361.4	329.2	329.2	45.6	2	296.9	361.4	329.2	329.2	45.6	2
Meander Width Ratio			4.0			1	4.1	4.6	4.4	4.4	0.3	2	3.4	3.8	3.6	3.6	0.2	3	3.4	3.8	3.6	3.6	0.2	3
Profile																								
Riffle Length (ft)	32.4	62.9	60.1	52.6	12.9	5	48.2	108.2	51.9	63.5	25.2	5	44.9	85.5	53.9	59.4	17.2	5	12.7	41.5	31.6	28.5	12.0	6
Riffle Slope (ft/ft)	0.01581	0.01107	0.01197	0.01258	0.01525	5	0.01037	0.02020	0.01160	0.01388	0.00438	5	0.00646	0.01798	0.01572	0.01403	0.00448	5	0.00020	0.02730	0.01930	0.01690	0.01110	6
Pool Length (ft)	20.7	34.4	29.1	28.5	5.0	5	18.4	56.7	26.7	33.2	15.8	5	26.7	35.4	29.4	29.7	3.4	5	21.5	86.3	54.7	54.3	21.4	10
Pool Max depth (ft)	4.7	5.9	5.4	5.3	0.5	5	4.2	5.4	5.1	4.8	0.6	5	4.4	5.8	5.2	5.1	0.5	5	4.8	4.8	4.8	4.8	0.0	1
Pool to Pool Spacing (ft)	86.7	217.6	114.3	133.2	59.6	4	98.1	240.4	104.1	136.7	69.4	4	58.9	297.0	89.1	133.5	110.5	4	37.0	122.2	61.0	73.1	30.9	10
Substrate (reach-wide)	Values determined from pooled reach-wide pebble counts based on the proportions of the number of riffles and pools																							
D50 (mm)			35.0						38.5						52.2						48			
D84 (mm)			81.6						94.7						104.6						96			

Table B1. Continued

Upper South Hominy (EEP project number 92632) Mainstem 2 - Bura/Roberson - 1,286 feet																								
Parameter - (cross-sections 5&7)	**MY0**						**MY1**						**MY2**						**MY3**					
Dimension and Substrate – Riffles Only	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n
Bankfull Width (ft)	30.5	37.5	34.0	34.0	5.0	2	30.5	37.4	33.9	33.9	4.9	2	30.5	37.1	33.8	33.8	4.7	2	29.5	38.3	33.9	33.9	6.2	2
Floodprone Width (ft)	282.0	337.0	309.5	309.5	38.9	2	282.0	337.0	309.5	309.5	38.9	2	282.0	337.0	309.5	309.5	38.9	2	282.0	337.0	309.5	309.5	38.9	2
Bankfull Cross-Sectional Area (ft^2)	62.2	65.2	63.7	63.7	2.1	2	61.6	65.4	63.5	63.5	2.7	2	61.8	62.2	62.0	62.0	0.3	2	64.6	65.0	64.8	64.8	0.3	2
Bankfull Mean Depth (ft)	1.7	2.0	1.9	1.9	0.2	2	1.8	2.0	1.9	1.9	0.2	2	1.7	2.0	1.9	1.9	0.2	2	1.7	2.2	2.0	2.0	0.4	2
Bankfull Max Depth (ft)	2.7	3.2	3.0	3.0	0.3	2	2.7	3.1	2.9	2.9	0.3	2	2.7	3.0	2.9	2.9	0.3	2	2.7	3.3	3.0	3.0	0.4	2
Width/Depth Ratio	14.9	21.6	18.3	18.3	4.7	2	15.1	21.4	18.2	18.2	4.4	2	15.0	22.1	18.6	18.6	5.0	2	13.4	22.7	18.1	18.1	6.6	2
Entrenchment Ratio	7.5	11.1	9.3	9.3	2.5	2	7.5	11.1	9.3	9.3	2.5	2	7.6	11.1	9.3	9.3	2.5	2	7.4	11.4	9.4	9.4	2.8	2
Bank Height Ratio	1.2	1.2	1.2	1.2	0.0	2	1.2	1.2	1.2	1.2	0.0	2	1.2	1.2	1.2	1.2	0.0	2	1.0	1.0	1.0	1.0	0.0	2
Bankfull Wetted Perimeter (ft)	31.8	38.3	35.0	35.0	4.6	2	31.6	38.2	34.9	34.9	4.7	2	31.7	37.9	34.8	34.8	4.3	2	30.9	39.1	35.0	35.0	5.8	2
Hydraulic Radius (ft)	1.7	2.0	1.8	1.8	0.2	2	1.7	2.0	1.8	1.8	0.2	2	1.6	2.0	1.8	1.8	0.2	2	1.7	2.1	1.9	1.9	0.3	2
D50 (mm)	31.4	49.4	40.4	40.4	12.7	2	16.7	18.6	17.7	17.7	1.4	2	28.9	32.0	30.4	30.4	2.2	2	22.0	23.0	23.0	23.0	1.0	2
Pattern																								
Channel Beltwidth (ft)	93.0	193.0	143.0	143.0	70.7	2	83.0	172.0	90.0	115.0	49.5	3	54.6	68.2	59.0	60.6	6.9	3	54.6	68.2	59.0	60.6	6.9	3
Radius of Curvature (ft)	90.0	137.0	114.0	113.7	23.5	3	61.0	131.0	83.5	89.8	29.5	4	60.1	113.7	97.3	90.4	27.5	3	60.1	113.7	97.3	90.4	27.5	3
Rc:Bankfull width (ft/ft)	3.0	4.6	3.8	3.8	0.8	3	2.0	4.3	2.2	2.7	1.1	4	2.4	3.4	3.1	3.0	0.5	3	2.4	3.4	3.1	3.0	0.5	3
Meander Wavelength (ft)	214.0	343.0	229.0	262.0	70.5	3	164.0	233.0	200.0	199.3	28.3	4	186.6	229.3	222.0	212.6	22.8	3	186.6	229.3	222.0	212.6	22.8	3
Meander Width Ratio	3.1	6.4	4.8	4.8	2.3	2	4.4	7.6	5.4	5.7	1.4	4	1.8	2.3	2.0	2.0	0.3	3	1.8	2.3	2.0	2.0	0.3	3
Profile																								
Riffle Length (ft)	47.6	77.8	70.9	68.8	12.3	5	27.1	82.2	70.4	63.1	21.7	5	44.2	83.3	65.2	65.3	14.1	5	5.4	82.9	20.7	29.7	24.9	13
Riffle Slope (ft/ft)	0.00719	0.01452	0.01287	0.01192	0.00280	5	0.00735	0.02459	0.01110	0.01293	0.00679	5	0.00414	0.01899	0.00582	0.01022	0.00739	5	0.00060	0.04570	0.01090	0.01590	0.01290	13
Pool Length (ft)	32.8	78.5	56.3	54.1	17.5	5	44.4	87.1	63.5	61.8	17.2	5	41.1	56.7	47.9	48.3	5.8	5	24.1	121.2	48.7	55.9	27.6	16
Pool Max depth (ft)	3.5	4.4	5.9	4.7	4.5	5	3.9	6.3	4.8	5.0	0.9	5	3.7	5.4	4.2	4.5	0.7	5	3.5	5.2	4.4	4.4	0.9	2
Pool to Pool Spacing (ft)	69.1	469.9	271.8	270.7	218.4	4	65.1	466.6	283.4	274.6	213.5	4	128.4	455.8	254.2	273.1	140.6	4	37.6	150.1	63.3	75.5	37.3	16
Substrate (reach-wide)	Values determined from pooled reach-wide pebble counts based on the proportions of the number of riffles and pools																							
D50 (mm)			35.0						38.5						52.2						23			
D84 (mm)			81.6						94.7						104.6						81			

Table B1. Continued

Upper South Hominy (EEP project number 92632) Mainstem 3 - Davis Project Reach - 737 feet																								
Parameter - (cross-sections 8&10)	**MY0**						**MY1**						**MY2**						**MY3**					
Dimension and Substrate – Riffles Only	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n
Bankfull Width (ft)	25.5	30.1	27.8	27.8	3.3	2	25.7	30.1	27.9	27.9	3.1	2	26.1	29.9	28.0	28.0	2.7	2	27.4	29.6	28.5	28.5	1.6	2
Floodprone Width (ft)	292.0	549.0	420.5	420.5	181.7	2	292.0	549.0	420.5	420.5	181.7	2	292.0	549.0	420.5	420.5	181.7	2	292.0	549.0	420.5	420.5	181.7	2
Bankfull Cross-Sectional Area (ft²)	53.4	65.1	59.2	59.2	8.2	2	53.7	66.0	59.8	59.8	8.7	2	59.4	64.3	61.9	61.9	3.5	2	61.2	62.3	61.8	61.8	0.8	2
Bankfull Mean Depth (ft)	2.1	2.2	2.1	2.1	0.0	2	2.1	2.2	2.1	2.1	0.1	2	2.2	2.3	2.2	2.2	0.1	2	2.1	2.2	2.2	2.2	0.1	2
Bankfull Max Depth (ft)	3.1	3.1	3.1	3.1	0.0	2	3.0	3.1	3.1	3.1	0.0	2	3.1	3.4	3.3	3.3	0.2	2	3.0	3.4	3.2	3.2	0.3	2
Width/Depth Ratio	12.1	13.9	13.0	13.0	1.3	2	12.4	13.8	13.1	13.1	1.0	2	11.5	13.9	12.7	12.7	1.7	2	12.2	14.1	13.2	13.2	1.3	2
Entrenchment Ratio	9.7	21.6	15.6	15.6	8.4	2	9.7	21.3	15.5	15.5	8.2	2	9.8	21.0	15.4	15.4	7.9	2	9.9	20.1	15.0	15.0	7.2	2
Bank Height Ratio	1.2	1.4	1.3	1.3	0.1	2	1.2	1.4	1.3	1.3	0.1	2	1.1	1.3	1.2	1.2	0.1	2	1.0	1.0	1.0	1.0	0.0	2
Bankfull Wetted Perimeter (ft)	26.6	31.3	29.0	29.0	3.3	2	26.9	31.3	29.1	29.1	3.1	2	27.6	31.4	29.5	29.5	2.6	2	29.1	31.0	30.1	30.1	1.3	2
Hydraulic Radius (ft)	2.0	2.1	2.0	2.0	0.1	2	2.0	2.1	2.1	2.1	0.1	2	2.1	2.2	2.1	2.1	0.1	2	2.0	2.1	2.1	2.1	0.1	2
D50 (mm)	33.5	47.7	40.6	40.6	10.0	2	25.0	37.9	31.4	31.4	9.1	2	16.0	29.2	22.6	22.6	9.3	2	14	24	19	19	5	2
Pattern																								
Channel Beltwidth (ft)	39.0	50.0	47.0	45.3	5.7	3	38.0	56.2	44.3	46.2	9.2	3	31.8	39.0	35.4	35.4	5.1	2	31.8	39.0	35.4	35.4	5.1	2
Radius of Curvature (ft)	102.0	187.0	144.5	144.5	60.1	2	73.4	166.7	120.1	120.1	66.0	2	125.4	238.7	182.1	182.1	80.1	2	125.4	238.7	182.1	182.1	80.1	2
Rc:Bankfull width (ft/ft)	3.4	6.2	4.8	4.8	2.0	2	2.4	6.5	4.5	4.5	2.9	2	3.9	6.1	5.0	5.0	1.5	2	3.9	6.1	5.0	5.0	1.5	2
Meander Wavelength (ft)	188.0	382.0	268.0	279.3	97.5	3	186.8	304.0	222.4	237.7	60.1	3	192.8	202.4	197.6	197.6	6.8	2	192.8	202.4	197.6	197.6	6.8	2
Meander Width Ratio	1.6	1.7	1.6	1.6	0.1	3	1.5	2.2	1.5	1.7	0.4	3	1.0	1.3	1.2	1.2	0.2	2	1.0	1.3	1.2	1.2	0.2	2
Profile																								
Riffle Length (ft)	22.0	60.8	37.2	40.4	17.0	5	30.4	58.5	32.1	40.6	12.9	5	29.1	60.5	48.0	46.7	11.5	5	9.0	59.6	19.9	27.0	20.2	8
Riffle Slope (ft/ft)	0.00856	0.02029	0.01368	0.01399	0.00501	5	0.01021	0.01909	0.01284	0.01465	0.00396	5	0.00361	0.01529	0.01067	0.01085	0.00476	5	0.00610	0.03420	0.01040	0.01370	0.00920	8
Pool Length (ft)	13.2	38.5	22.4	25.2	10.9	5	17.1	55.6	45.8	38.9	16.6	5	17.5	43.0	23.5	26.3	10.0	5	30.1	111.6	40.8	56.5	27.4	8
Pool Max depth (ft)	3.9	5.1	4.4	4.5	0.5	5	3.6	4.8	4.6	4.4	0.5	5	3.8	4.2	3.9	4.0	0.2	5	0.0	0.0	2.5	2.5	0.0	1
Pool to Pool Spacing (ft)	65.6	258.1	174.8	168.3	94.7	4	64.2	225.1	170.5	157.6	80.1	4	42.2	229.7	100.8	118.4	82.0	4	39.0	112.0	74.0	78.0	24.0	8
Substrate (reach-wide)	Values determined from pooled reach-wide pebble counts based on the proportions of the number of riffles and pools																							
D50 (mm)			35.0						38.5						52.2						19			
D84 (mm)			81.6						94.7						104.6						55			

Table B.1.1 Existing, Reference, Design, and As-built Stream Channel Morphology Data Summary for Roberson UT2 and Davis UT3, Riffles Only.

Upper South Hominy Mitigation Site Channel Morphology Data Summary (EEP Project Number 92632)														
Parameter (Riffles Only)	**(UT3 Davis) Pre-Existing Condition**						**Reference Reach Basin Cr (C)**	**Reference Reach North Br (Ba)[c]**	**(UT3-upper, Ba) Design**			**(UT3-lower, C) Design**		
Dimension and Substrate	Min	Max	Med	Mean	SD	n	Mean	Mean	Min	Mean	Max	Min	Mean	Max
Bankfull Width (ft)	3.9	10.0	4.4	6.1	3.4	3	30.7	8.0	8.0	10.0	12.0	8.0	10.0	12.0
Floodprone Width (ft)	6.0	15.3	14.0	11.8	5.0	3	85.0	11.6	15.0	20.0	25.0	27.7	40.0	54.0
Bankfull Cross-Sectional Area (ft^2)	4.5	7.4	6.5	6.1	1.5	3	57.4	4.2	6.0	6.9	7.5	8.6	9.2	9.9
Bankfull Mean Depth (ft)	0.7	1.5	1.2	1.1	0.4	3	1.87	0.5	0.4	0.5	0.6	0.5	0.6	0.7
Bankfull Max Depth (ft)	1.1	1.8	1.4	1.4	0.4	3	2.4	0.8	1.0	1.2	1.4	0.9	1.6	2.2
Width/Depth Ratio	3.0	13.8	3.3	6.7	6.1	3	16.4	15.4	16.0	18.0	20.0	16.0	16.6	17.1
Entrenchment Ratio	1.5	3.1	1.6	2.1	0.9	3	2.8	1.5	1.9	2.2	2.5	3.5	4.0	4.5
Bank Height Ratio	3.4	3.7	3.6	3.6	0.1	3	1.0	1.0		1.0			1.0	
Bankfull Wetted Perimeter (ft)	6.0	10.4	6.7	7.7	2.4	3	32.6	N/A	10.4	10.7	10.9	10.6	11.1	11.6
Hydraulic Radius (ft)	0.7	1.0	0.8	0.8	0.2	3	1.76	N/A	0.8	1.0	1.1	0.9	1.0	1.1
D50 (mm)	N/A						38.5	27.0		20-30			10-20	
Pattern														
Channel Belt Width (ft)	6.8	39.5	23.8	24.7	14.5	7	105.0	17.0	13.8	16.8	22.3	23.6	26.8	29.7
Radius of Curvature (ft)	45.5	146.8	81.6	86.4	39.2	7	106.0	13.0	33.0	56.4	71.9	30.1	38.4	43.6
Rc:Bankfull Width (ft/ft)	5.4	17.4	9.7	10.2	4.7	7	3.5	1.6	4.1	5.6	6.0	3.0	3.8	4.4
Meander Wavelength (ft)	8.5	180.3	37.6	52.8	58.1	7	350	29.0	70.0	76.9	89.7	97.6	102.1	106.8
Meander Width Ratio	0.8	4.7	2.8	2.9	1.7	7	3.4	2.1	1.7	1.9	1.2	2.5	2.7	2.9
Profile[b]														
Riffle Length (ft)							65.0	N/A	1.8	2.0	2.2	10.0	14.0	18.0
Riffle Slope (ft/ft)							0.02103	0.14200	0.09500	0.10000	0.12000	0.01861	0.03747	0.05634
Pool Length (ft)							70.0	N/A	4.0	4.4	4.8	13.4	22.8	32.3
Pool Max Depth (ft)							5.3	0.95	1.8	2.0	2.2	1.0	1.6	2.2
Pool to Pool Spacing (ft)							90.1	68.0	22.8	23.0	23.2	22.3	27.7	33.1

[a] Only a single riffle was surveyed for the Basin Creek (6.8 mi^2) reference reach, 1998.

[b] Channel impacts and low flow precluded meaningful channel feature evaluation.

[c] Only a single riffle was surveyed for the North Branch reference reach, Wolf Creek Engineering, PLLC, 2008..

Table B.1.1. Continued

Upper South Hominy (EEP project number 92632) UT2 - Roberson Project Reach - 236 feet																								
Parameter - (cross-section 1)	**MY0**						**MY1**						**MY2**						**MY3**					
Dimension and Substrate – Riffles Only	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n
Bankfull Width (ft)			22.6			1			22.0			1			21.9			1			22.6			1
Floodprone Width (ft)			282.3			1			282.3			1			282.3			1			282.3			1
Bankfull Cross-Sectional Area (ft)			14.2			1			13.9			1			13.7			1			14.2			1
Bankfull Mean Depth (ft)			0.6			1			0.6			1			0.6			1			0.6			1
Bankfull Max Depth (ft)			1.4			1			1.4			1			1.4			1			1.4			1
Width/Depth Ratio			35.8			1			34.9			1			34.8			1			35.8			1
Entrenchment Ratio			12.5			1			12.8			1			12.9			1			12.5			1
Bank Height Ratio			1.2			1			1.3			1			1.4			1			1.2			1
Bankfull Wetted Perimeter (ft)			22.9			1			22.3			1			22.2			1			22.9			1
Hydraulic Radius (ft)			0.6			1			0.6			1			0.6			1			0.6			1
D50 (mm)			NA						NA						NA						NA			
Pattern																								
Channel Beltwidth (ft)			45.0			1			45.3			1			41.4			1			41.4			1
Radius of Curvature (ft)			46.0			1			116.4			1			50.8			1			50.8			1
Rc:Bankfull width (ft/ft)			2			1			5.3			1			3.9			1			3.9			1
Meander Wavelength (ft)			134.0			1			187.7			1			135.1			1			135.1			1
Meander Width Ratio			1.9			1			2.1			1			3.2			1			3.2			1
Profile																								
Riffle Length (ft)	12.3	31.8	27.5	23.9	10.2	3	13.8	21.9	20.4	18.7	4.3	3	22.3	29.5	24.3	25.4	3.7	3	3.5	56.6	7.9	14.3	18.8	7
Riffle Slope (ft/ft)	0.00857	0.01177	0.01119	0.01051	0.00171	3	0.00683	0.01602	0.01594	0.01293	0.00528	3	0.01211	0.01799	0.01400	0.01470	0.00300	3	0.01040	0.07500	0.02200	0.03450	0.02550	7
Pool Length (ft)	10.7	23.1	21.7	18.5	6.8	3	17.1	23.1	20.1	20.1	4.2	2	12.3	15.4	13.9	13.9	2.2	2	6.6	29.0	12.3	14.6	9.1	6
Pool Max depth (ft)	0.8	1.3	1.2	1.1	0.3	3	0.9	1.0	0.9	0.9	0.1	2	0.9	1.0	1.0	1.0	0.1	2	0.9	1.0	1.0	1.0	0.1	2
Pool to Pool Spacing (ft)	50.6	69.2	59.9	59.9	13.1	2	57.4	57.4	57.4	57.4	0.0	1	54.7	54.7	54.7	54.7	0.0	1	11.2	63.7	28.8	30.0	18.9	6
Substrate (reach-wide)	Values determined from pooled reach-wide pebble counts based on the proportions of the number of riffles and pools																							
D50 (mm)			NA						NA						NA						NA			
D84 (mm)			NA						NA						NA						NA			

Table B.1.1. Continued

Upper South Hominy (EEP project number 92632) UT3 Upper - Davis Project Reach - 201 feet																								
Parameter - (cross-section 1)	**MY0**						**MY1**						**MY2**						**MY3**					
Dimension and Substrate – Riffles Only	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n
Bankfull Width (ft)			12.9			1			13.0			1			12.9			1			13.0			1
Floodprone Width (ft)			500.0			1			500.0			1			500.0			1			500.0			1
Bankfull Cross-Sectional Area (ft)			10.3			1			10.6			1			9.9			1			10.6			1
Bankfull Mean Depth (ft)			0.8			1			0.8			1			0.8			1			0.8			1
Bankfull Max Depth (ft)			1.3			1			1.3			1			1.3			1			1.3			1
Width/Depth Ratio			16.1			1			16.1			1			16.7			1			16.1			1
Entrenchment Ratio			38.8			1			38.5			1			38.8			1			38.5			1
Bank Height Ratio			1.0			1			1.0			1			1.0			1			1.0			1
Bankfull Wetted Perimeter (ft)			13.2			1			13.4			1			13.2			1			13.4			1
Hydraulic Radius (ft)			0.8			1			0.8			1			0.8			1			0.8			1
D50 (mm)			NA						NA						NA						NA			
Pattern																								
Channel Beltwidth (ft)			47.0			1			46.0			1			27.9			1			27.9			1
Radius of Curvature (ft)			133.0			1			116.4			1			122.8			1			122.8			1
Rc:Bankfull width (ft/ft)			11.1			1			9.0			1			11.0			1			11.0			1
Meander Wavelength (ft)			138.0			1			187.7			1			187.9			1			187.9			1
Meander Width Ratio			3.9			1			3.5			1			2.5			1			2.5			1
Profile																								
Riffle Length (ft)	13.7	26.4	15.9	17.8	5.0	5	13.3	25.1	15.8	17.5	4.8	5	17.7	26.5	19.2	20.3	3.6	5	11.7	60.5	39.7	35.9	21.5	5
Riffle Slope (ft/ft)	0.05368	0.10273	0.09392	0.08727	0.01924	5	0.05493	0.10620	0.08549	0.08231	0.02063	5	0.05789	0.09222	0.09022	0.08375	0.01457	5	0.05330	0.09460	0.08980	0.07830	0.01850	5
Pool Length (ft)	2.9	5.1	4.6	4.3	0.9	5	2.2	5.0	2.7	3.1	1.1	5	2.4	4.5	3.9	3.7	0.9	5	6.0	7.4	6.6	6.6	0.6	4
Pool Max depth (ft)	1.5	2.0	1.8	1.8	0.2	5	1.3	1.8	1.7	1.7	0.2	5	1.8	2.4	2.2	2.2	0.2	5	1.8	2.4	2.2	2.2	0.2	5
Pool to Pool Spacing (ft)	21.2	24.2	23.1	22.9	1.2	4	20.0	27.1	23.4	23.5	3.0	4	18.6	48.3	36.7	35.1	14.8	4	18.0	66.4	52.8	47.5	21.2	4
Substrate (reach-wide)	Values determined from pooled reach-wide pebble counts based on the proportions of the number of riffles and pools																							
D50 (mm)			NA						NA						NA						NA			
D84 (mm)			NA						NA						NA						NA			

Table B.1.1. Continued

Upper South Hominy (EEP project number 92632) UT3 Lower - Davis Project Reach - 226 feet																								
Parameter - (cross-sections 2)	**MY0**						**MY1**						**MY2**						**MY3**					
Dimension and Substrate – Riffles Only	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n	Min	Max	Med	Mean	SD	n
Bankfull Width (ft)			9.9						9.9			1			10.2			1			9.9			1
Floodprone Width (ft)			232.0						232.0			1			232.0			1			232.0			1
Bankfull Cross-Sectional Area (ft)			7.6						7.4			1			7.3			1			7.6			1
Bankfull Mean Depth (ft)			0.8						0.8			1			0.7			1			0.8			1
Bankfull Max Depth (ft)			1.4						1.4			1			1.3			1			1.4			1
Width/Depth Ratio			12.8						13.2			1			14.4			1			12.8			1
Entrenchment Ratio			23.5						23.5			1			22.7			1			23.5			1
Bank Height Ratio			1.0						1.0			1			1.0			1			1.0			1
Bankfull Wetted Perimeter (ft)			10.3						10.4			1			10.6			1			10.3			1
Hydraulic Radius (ft)			0.7						0.7			1			0.7			1			0.7			1
D50 (mm)			NA						NA			0			NA						NA			
Pattern																								
Channel Beltwidth (ft)	23.0	42.0	27.0	30.7	10.0	3	24.1	30.2	28.0	27.4	3.1	3	22.7	28.9	22.7	24.8	3.6	3	22.7	28.9	22.7	24.8	3.6	3
Radius of Curvature (ft)	20.0	39.0	30.0	29.8	8.1	4	28.8	44.3	34.9	35.7	8.0	4	31.8	40.0	37.6	36.5	4.2	3	31.8	40.0	37.6	36.5	4.2	3
Rc:Bankfull width (ft/ft)	1.7	3.3	2.6	2.5	0.7	4	2.9	4.1	2.9	3.3	0.7	3	2.8	4.5	4.0	3.8	0.9	3	2.8	4.5	4.0	3.8	0.9	3
Meander Wavelength (ft)	87.0	113.0	104.0	101.3	13.2	3	85.4	106.6	100.1	97.4	10.9	3	83.9	87.3	85.3	85.5	1.7	3	83.9	87.3	85.3	85.5	1.7	3
Meander Width Ratio	1.9	3.5	2.3	2.6	0.8	3	2.4	3.1	2.8	2.8	0.3	3	2.3	2.7	2.5	2.5	0.2	3	2.3	2.7	2.5	2.5	0.2	3
Profile																								
Riffle Length (ft)	10.8	28.7	27.3	23.5	8.6	4	8.8	28.8	23.7	21.2	8.6	4	12.5	28.1	23.0	21.7	6.7	4	6.9	51.2	11.7	20.2	16.1	7
Riffle Slope (ft/ft)	0.01319	0.06560	0.03791	0.03865	0.02231	4	0.00773	0.05708	0.02228	0.02734	0.02134	4	0.01173	0.05760	0.04394	0.03930	0.02067	4	0.01200	0.12830	0.04830	0.05190	0.04010	7
Pool Length (ft)	16.0	19.7	19.0	18.2	1.9	3	17.8	27.4	19.6	21.6	5.1	3	12.1	22.4	15.7	16.7	5.2	3	5.4	23.0	11.5	13.1	6.5	6
Pool Max depth (ft)	1.3	1.8	1.8	1.7	0.3	3	1.5	2.0	1.8	1.8	0.3	3	1.6	2.3	1.6	1.8	0.4	3	0.0	0.0	1.7	0.0	0.0	1
Pool to Pool Spacing (ft)	47.6	63.4	55.5	55.5	11.2	2	46.7	63.3	55.0	55.0	11.7	2	47.6	53.4	50.5	50.5	4.1	2	17.8	69.8	29.3	34.8	20.3	6
Substrate (reach-wide)	Values determined from pooled reach-wide pebble counts based on the proportions of the number of riffles and pools																							
D50 (mm)			NA						NA						NA						NA			
D84 (mm)			NA						NA						NA						NA			

Table B2.–Morphology and Hydraulic Monitoring Summary (Dimensional Parameters – Cross-sections).

Upper South Hominy (EEP project number 92632)

Mainstem

	Cross Section 1 (Riffle)						Cross Section 2 (Pool)						Cross Section 3 (Riffle)					
Dimension and Substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																		
Bankfull Width (ft)	26.9	26.9	27.1	29.2			28.2	28.9	29.8	29.9			30.1	30.8	29.6	32.7		
Floodprone Width (ft)	236.0	236.0	236.0	236.0			299.0	299.0	299.0	NA			362.0	362.0	362.0	350.0		
Bankfull Cross-sectional Area (ft^2)	54.8	52.9	42.3	59.8			58.8	57.6	68.6	64.4			62.9	69.2	62.3	71.4		
Bankfull Mean Depth (ft)	2.0	2.0	1.6	2.0			2.1	2.0	2.3	2.2			2.1	2.3	2.1	2.2		
Bankfull Max Depth (ft)	2.6	2.7	2.5	3.2			3.8	3.8	4.7	4.8			3.2	3.4	4.2	4.2		
Bankfull Width/Depth Ratio	13.2	13.6	17.4	14.2			13.5	14.5	13.0	NA			14.4	13.7	14.1	15.0		
Bankfull Entrenchment Ratio	8.8	8.8	8.7	8.1			10.6	10.3	10.0	NA			12.0	11.7	12.2	10.7		
Bankfull Bank Height Ratio	1.6	1.7	1.7	1.0			1.4	1.5	1.4	NA			1.7	1.6	1.6	1.0		
Based on current/developing bankfull feature																		
Bankfull Width (ft)																		
Floodprone Width (ft)																		
Bankfull Cross-sectional Area (ft^2)																		
Bankfull Mean Depth (ft)																		
Bankfull Max Depth (ft)																		
Bankfull Width/Depth Ratio																		
Bankfull Entrenchment Ratio																		
Bankfull Bank Height Ratio																		
Cross-sectional Area between end pins (ft^2)																		
D50(mm)	22.1	40.9	32.0	35			33.1	7.7	39.6	NA			28.9	46.7	56.4	40		
	Cross Section 4 (Pool)						**Cross Section 5 (Riffle)**						**Cross Section 6 (Pool)**					
Dimension and Substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																		
Bankfull Width (ft)	27.4	27.2	27.1	27.7			30.5	30.5	30.5	29.5			37.4	38.5	38.5	41.5		
Floodprone Width (ft)	350.0	350.0	350.0	NA			337.0	337.0	337.0	337.0			310.0	310.0	310.0	NA		
Bankfull Cross-sectional Area (ft^2)	73.3	71.3	67.5	62.4			62.2	61.6	61.8	65.0			69.6	66.1	63.4	66.7		
Bankfull Mean Depth (ft)	2.7	2.6	2.5	2.3			2.0	2.0	2.0	2.2			1.9	1.7	1.7	1.6		
Bankfull Max Depth (ft)	3.8	3.8	3.9	3.5			3.2	3.1	3.0	3.3			4.5	4.8	5.1	5.2		
Bankfull Width/Depth Ratio	10.3	10.4	10.9	NA			14.9	15.1	15.0	13.4			20.1	22.4	23.3	NA		
Bankfull Entrenchment Ratio	12.8	12.9	12.9	NA			11.1	11.1	11.1	11.4			8.3	8.1	8.1	NA		
Bankfull Bank Height Ratio	1.4	1.4	1.4	NA			1.2	1.2	1.2	1.0			1.4	1.4	1.4	NA		
Based on current/developing bankfull feature																		
Bankfull Width (ft)																		
Floodprone Width (ft)																		
Bankfull Cross-sectional Area (ft^2)																		
Bankfull Mean Depth (ft)																		
Bankfull Max Depth (ft)																		
Bankfull Width/Depth Ratio																		
Bankfull Entrenchment Ratio																		
Bankfull Bank Height Ratio																		
Cross-sectional Area between end pins (ft^2)																		
D50(mm)	36.6	1.8	22.6	NA			49.38	16.66	28.9	22			19.3	3.41	12.34	NA		

Table B2. Continued.

Upper South Hominy (EEP project number 92632) Mainstem																		
	Cross Section 7 (Riffle)						Cross Section 8 (Riffle)						Cross Section 9 (Pool)					
Dimension and Substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																		
Bankfull Width (ft)	37.5	37.4	37.1	38.3			30.1	30.1	29.9	29.6			35.0	36.7	37.0	39.4		
Floodprone Width (ft)	282.0	282.0	282.0	282			292.0	292.0	292.0	292.0			421.0	421.0	421.0	NA		
Bankfull Cross-sectional Area (ft^2)	65.2	65.4	62.2	64.6			65.1	66.0	64.3	62.3			69.9	74.8	61.1	60.1		
Bankfull Mean Depth (ft)	1.7	1.8	1.7	1.7			2.2	2.2	2.2	2.1			2.0	2.0	1.7	1.5		
Bankfull Max Depth (ft)	2.7	2.7	2.7	2.7			3.1	3.1	3.1	3.0			4.2	4.2	2.6	2.5		
Bankfull Width/Depth Ratio	21.6	21.4	22.1	22.7			13.9	13.8	13.9	14.1			17.5	18.0	22.4	NA		
Bankfull Entrenchment Ratio	7.5	7.5	7.6	7.4			9.7	9.7	9.8	9.9			12.0	11.5	11.4	NA		
Bankfull Bank Height Ratio	1.2	1.2	1.2	1			1.4	1.4	1.3	1.0			1.3	1.2	1.4	NA		
Based on current/developing bankfull feature																		
Bankfull Width (ft)																		
Floodprone Width (ft)																		
Bankfull Cross-sectional Area (ft^2)																		
Bankfull Mean Depth (ft)																		
Bankfull Max Depth (ft)																		
Bankfull Width/Depth Ratio																		
Bankfull Entrenchment Ratio																		
Bankfull Bank Height Ratio																		
Cross-sectional Area between end pins (ft^2)																		
D50(mm)	31.4	18.6	32.0	23			47.7	37.9	29.2	24			14.7	6.7	34.3	NA		
	Cross Section 10 (Riffle)						Cross Section						Cross Section					
Dimension and Substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																		
Bankfull Width (ft)	25.5	25.7	26.1	27.4														
Floodprone Width (ft)	549.0	549.0	549.0	549														
Bankfull Cross-sectional Area (ft^2)	53.4	53.7	59.4	61.2														
Bankfull Mean Depth (ft)	2.1	2.1	2.3	2.2														
Bankfull Max Depth (ft)	3.1	3.0	3.4	3.4														
Bankfull Width/Depth Ratio	12.1	12.4	11.5	12.2														
Bankfull Entrenchment Ratio	21.6	21.3	21.0	20.1														
Bankfull Bank Height Ratio	1.2	1.2	1.1	1														
Based on current/developing bankfull feature																		
Bankfull Width (ft)																		
Floodprone Width (ft)																		
Bankfull Cross-sectional Area (ft^2)																		
Bankfull Mean Depth (ft)																		
Bankfull Max Depth (ft)																		
Bankfull Width/Depth Ratio																		
Bankfull Entrenchment Ratio																		
Bankfull Bank Height Ratio																		
Cross-sectional Area between end pins (ft^2)																		
D50(mm)	33.5	25.0	16.0	14														

Table B2.─Morphology and Hydraulic Monitoring Summary (Dimensional Parameters – Cross-sections).

Upper South Hominy (EEP project number 92632)

UT2 Roberson and UT3 Upper and UT3 Lower Davis

	UT2 Cross Section 1 Roberson (Riffle)						Cross Section						Cross Section					
Dimension and Substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																		
Bankfull Width (ft)	22.6	22.0	21.9	22.6														
Floodprone Width (ft)	282.0	282.0	282.0	282.0														
Bankfull Cross-sectional Area (ft^2)	14.2	13.9	13.7	14.4														
Bankfull Mean Depth (ft)	0.6	0.6	0.6	0.6														
Bankfull Max Depth (ft)	1.4	1.4	1.4	1.4														
Bankfull Width/Depth Ratio	35.8	34.9	34.8	35.6														
Bankfull Entrenchment Ratio	12.5	12.8	12.9	12.5														
Bankfull Bank Height Ratio	1.2	1.3	1.4	1.0														
Based on current/developing bankfull feature																		
Bankfull Width (ft)																		
Floodprone Width (ft)																		
Bankfull Cross-sectional Area (ft^2)																		
Bankfull Mean Depth (ft)																		
Bankfull Max Depth (ft)																		
Bankfull Width/Depth Ratio																		
Bankfull Entrenchment Ratio																		
Bankfull Bank Height Ratio																		
Cross-sectional Area between end pins (ft^2)																		
D50(mm)	NA	NA	NA	NA														

	UT3 Cross Section 1 Davis Upper (Riffle)						UT3 Cross Section 2 Davis Lower (Riffle)						UT3 Cross Section 3 Davis Lower (Pool)					
Dimension and Substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																		
Bankfull Width (ft)	12.9	13.0	12.9	14.4			9.9	9.9	10.2	9.9			11.6	11.2	11.7	12.5		
Floodprone Width (ft)	500.0	500.0	500.0	5000.0			232.0	232.0	232.0	232.0			500.0	500.0	500.0	NA		
Bankfull Cross-sectional Area (ft^2)	10.3	10.6	9.9	8.9			7.6	7.4	7.3	6.7			10.0	9.6	10.0	10.8		
Bankfull Mean Depth (ft)	0.8	0.8	0.8	0.6			0.8	0.8	0.7	0.7			0.9	0.9	0.9	0.9		
Bankfull Max Depth (ft)	1.3	1.3	1.3	1.1			1.4	1.4	1.3	1.2			1.5	1.6	1.6	1.7		
Bankfull Width/Depth Ratio	16.1	16.5	16.7	23.0			12.8	13.2	14.4	14.5			13.5	13.0	13.7	NA		
Bankfull Entrenchment Ratio	38.8	38.5	38.8	34.8			23.5	23.5	22.7	23.5			43.0	44.6	42.8	NA		
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.0			1.0	1.0	1.0	1.0			1.2	1.2	1.2	NA		
Based on current/developing bankfull feature																		
Bankfull Width (ft)																		
Floodprone Width (ft)																		
Bankfull Cross-sectional Area (ft^2)																		
Bankfull Mean Depth (ft)																		
Bankfull Max Depth (ft)																		
Bankfull Width/Depth Ratio																		
Bankfull Entrenchment Ratio																		
Bankfull Bank Height Ratio																		
Cross-sectional Area between end pins (ft^2)																		
D50(mm)	NA	NA	NA	NA			NA	NA	NA	NA			NA	NA	NA	NA		

Table B.3 Verification of Bankfull Events, Upper South Hominy Mitigation Site.

Upper South Hominy (EEP project number 92632)			
Date of Data Collection	**Date of Occurrence**	**Method**	**Photo Number (if available)**
5 Dec 2011	28 Nov 2011	Wrack line observation	Figure B.5, Photo 1-3
6 May 2013	5 May 2013	Wrack line observation	Figure B.5, Photo 4-6
28 October 2014	14 October 2014	Wrack line observation	Figure B.5, Photo 7

Table B.4 Categorical Stream Feature Visual Stability Assessment.

Upper South Hominy (EEP project number 92632)							
Mainstem 1 - Bianculli Reach – 797 feet – MY1							
Major Channel Category	**Channel Sub-Category**	**Metric**	**Number Stable, Performing as Intended**	**Total Number in As-built**	**Number of Unstable Segments**	**Amount of Unstable Footage**	**% Stable, Performing as Intended**
1. Bed	1. Vertical Stability (Riffle & Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			1	50	95
		2. Degradation – Evidence of down cutting			1	20	98
	2. Riffle Condition	1. Texture/Substrate - Riffle (constructed) maintains coarser substrate	4	4			100
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth / Mean Pool Depth $\geq$ 1.6)	1	2			50
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	1	2			50
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	1	2			50
		2. Thalweg centering at downstream of meander (Glide)	1	2			50
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			2	100	87
	2. Undercut	Bank undercut/overhanging to the extent that mass wasting appears likely. Does not include undercuts that are modest, appear sustainable and are providing habitat			0	0	100
	3. Mass Wasting	Bank slumping, calving, or collapsing			0	0	100
				Totals	2	100	87
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	5	6			83
	2. Grade Control	Grade control structures exhibiting maintenance of grade across sill	5	6			83
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	5	6			83
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15% (see guidance for this table in EEP monitoring guidance document)	5	6			83
	4. Habitat	Pool forming structures maintaining - Max Pool Depth : Mean Pool Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow	6	7			86

Table B.4 Continued

Upper South Hominy (EEP project number 92632)							
Mainstem 2 - Bura/Roberson Reach – 1,286 feet – MY1							
Major Channel Category	**Channel Sub-Category**	**Metric**	**Number Stable, Performing as Intended**	**Total Number in As-built**	**Number of Unstable Segments**	**Amount of Unstable Footage**	**% Stable, Performing as Intended**
1. Bed	1. Vertical Stability (Riffle & Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			3	75	94
		2. Degradation – Evidence of down cutting			0	0	100
	2. Riffle Condition	1. Texture/Substrate - Riffle (constructed) maintains coarser substrate	6	6			100
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth / Mean Pool Depth $\geq$ 1.6)	4	5			80
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	4	5			80
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	4	5			80
		2. Thalweg centering at downstream of meander (Glide)	4	5			80
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100
	2. Undercut	Bank undercut/overhanging to the extent that mass wasting appears likely. Does not include undercuts that are modest, appear sustainable and are providing habitat			0	0	100
	3. Mass Wasting	Bank slumping, calving, or collapsing			0	0	100
				Totals	0	0	100
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	5	5			100
	2. Grade Control	Grade control structures exhibiting maintenance of grade across sill	5	5			100
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	5	5			100
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15% (see guidance for this table in EEP monitoring guidance document)	5	5			100
	4. Habitat	Pool forming structures maintaining - Max Pool Depth : Mean Pool Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow	8	9			88.8

Table B.4 Continued

Upper South Hominy (EEP project number 92632)							
Mainstem 3 -Davis Reach – 737 feet – MY1							
Major Channel Category	**Channel Sub-Category**	**Metric**	**Number Stable, Performing as Intended**	**Total Number in As-built**	**Number of Unstable Segments**	**Amount of Unstable Footage**	**% Stable, Performing as Intended**
1. Bed	1. Vertical Stability (Riffle & Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			3	65	92.2
		2. Degradation – Evidence of down cutting			0	0	100
	2. Riffle Condition	1. Texture/Substrate - Riffle (constructed) maintains coarser substrate	3	3			100
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth / Mean Pool Depth ≥ 1.6)	0	0			0
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	0	0			0
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	0	0			0
		2. Thalweg centering at downstream of meander (Glide)	0	0			0
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100
	2. Undercut	Bank undercut/overhanging to the extent that mass wasting appears likely. Does not include undercuts that are modest, appear sustainable and are providing habitat			0	0	100
	3. Mass Wasting	Bank slumping, calving, or collapsing			0	0	100
				Totals	0	0	100
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	4	4			100
	2. Grade Control	Grade control structures exhibiting maintenance of grade across sill	4	4			100
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	4	4			100
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15% (see guidance for this table in EEP monitoring guidance document)	4	4			100
	4. Habitat	Pool forming structures maintaining - Max Pool Depth : Mean Pool Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow	1	4			25

Table B.4 Continued

Upper South Hominy (EEP project number 92632)							
Mainstem 1 - Bianculli Reach – 797 feet – MY2							
Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended
1. Bed	1. Vertical Stability (Riffle & Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			2	100	87
		2. Degradation – Evidence of down cutting			1	20	97
	2. Riffle Condition	1. Texture/Substrate - Riffle (constructed) maintains coarser substrate	4	4			100
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth / Mean Pool Depth ≥ 1.6)	1	2			50
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	1	2			50
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	1	2			50
		2. Thalweg centering at downstream of meander (Glide)	1	2			50
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			2	100	87
	2. Undercut	Bank undercut/overhanging to the extent that mass wasting appears likely. Does not include undercuts that are modest, appear sustainable and are providing habitat			0	0	100
	3. Mass Wasting	Bank slumping, calving, or collapsing			1	25	97
				Totals	3	125	84
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	3	6			50
	2. Grade Control	Grade control structures exhibiting maintenance of grade across sill	4	6			67
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	4	6			67
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15% (see guidance for this table in EEP monitoring guidance document)	4	6			67
	4. Habitat	Pool forming structures maintaining - Max Pool Depth : Mean Pool Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow	5	7			71

Table B.4 Continued

Upper South Hominy (EEP project number 92632)							
Mainstem 2 - Bura/Roberson Reach – 1,286 feet – MY2							
Major Channel Category	**Channel Sub-Category**	**Metric**	**Number Stable, Performing as Intended**	**Total Number in As-built**	**Number of Unstable Segments**	**Amount of Unstable Footage**	**% Stable, Performing as Intended**
1. Bed	1. Vertical Stability (Riffle & Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			2	75	94
		2. Degradation – Evidence of down cutting			0	0	100
	2. Riffle Condition	1. Texture/Substrate - Riffle (constructed) maintains coarser substrate	6	6			100
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth / Mean Pool Depth ≥ 1.6)	4	5			80
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	4	5			80
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	4	5			80
		2. Thalweg centering at downstream of meander (Glide)	4	5			80
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			1	50	96
	2. Undercut	Bank undercut/overhanging to the extent that mass wasting appears likely. Does not include undercuts that are modest, appear sustainable and are providing habitat			1	50	96
	3. Mass Wasting	Bank slumping, calving, or collapsing			1	50	96
				Totals	1	50	96
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	4	5			80
	2. Grade Control	Grade control structures exhibiting maintenance of grade across sill	4	5			80
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	4	5			80
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15% (see guidance for this table in EEP monitoring guidance document)	4	5			80
	4. Habitat	Pool forming structures maintaining - Max Pool Depth : Mean Pool Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow	7	9			78

Table B.4 Continued

Upper South Hominy (EEP project number 92632)							
Mainstem 3 -Davis Reach – 737 feet – MY2							
Major Channel Category	**Channel Sub-Category**	**Metric**	**Number Stable, Performing as Intended**	**Total Number in As-built**	**Number of Unstable Segments**	**Amount of Unstable Footage**	**% Stable, Performing as Intended**
1. Bed	1. Vertical Stability (Riffle & Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			3	60	92
		2. Degradation – Evidence of down cutting			0	0	100
	2. Riffle Condition	1. Texture/Substrate - Riffle (constructed) maintains coarser substrate	4	4			100
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth / Mean Pool Depth $\geq$ 1.6)	0	0			0
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	0	0			0
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	0	0			0
		2. Thalweg centering at downstream of meander (Glide)	0	0			0
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100
	2. Undercut	Bank undercut/overhanging to the extent that mass wasting appears likely. Does not include undercuts that are modest, appear sustainable and are providing habitat			0	0	100
	3. Mass Wasting	Bank slumping, calving, or collapsing			0	0	100
				Totals	0	0	100
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	4	4			100
	2. Grade Control	Grade control structures exhibiting maintenance of grade across sill	4	4			100
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	4	4			100
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15% (see guidance for this table in EEP monitoring guidance document)	4	4			100
	4. Habitat	Pool forming structures maintaining - Max Pool Depth : Mean Pool Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow	1	4			25

Upper South Hominy (EEP project number 92632)							
Mainstem 1 - Bianculli Reach – 797 feet – MY3							
Major Channel Category	**Channel Sub-Category**	**Metric**	**Number Stable, Performing as Intended**	**Total Number in As-built**	**Number of Unstable Segments**	**Amount of Unstable Footage**	**% Stable, Performing as Intended**
1. Bed	1. Vertical Stability (Riffle & Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			2	80	90
		2. Degradation – Evidence of down cutting			0	0	100
	2. Riffle Condition	1. Texture/Substrate - Riffle (constructed) maintains coarser substrate	4	4			100
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth / Mean Pool Depth $\geq$ 1.6)	1	2			50
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	1	2			50
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	1	2			50
		2. Thalweg centering at downstream of meander (Glide)	1	2			50
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			2	140	82
	2. Undercut	Bank undercut/overhanging to the extent that mass wasting appears likely. Does not include undercuts that are modest, appear sustainable and are providing habitat			0	0	100
	3. Mass Wasting	Bank slumping, calving, or collapsing			0	0	100
				Totals	2	140	82
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	5	6			83
	2. Grade Control	Grade control structures exhibiting maintenance of grade across sill	5	6			83
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	5	6			83
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15% (see guidance for this table in EEP monitoring guidance document)	5	6			83
	4. Habitat	Pool forming structures maintaining - Max Pool Depth : Mean Pool Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow	5	7			71

Upper South Hominy (EEP project number 92632)							
Mainstem 2 - Bura/Roberson Reach – 1,286 feet – MY3							
Major Channel Category	**Channel Sub-Category**	**Metric**	**Number Stable, Performing as Intended**	**Total Number in As-built**	**Number of Unstable Segments**	**Amount of Unstable Footage**	**% Stable, Performing as Intended**
1. Bed	1. Vertical Stability (Riffle & Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			1	35	97
		2. Degradation – Evidence of down cutting			0	0	100
	2. Riffle Condition	1. Texture/Substrate - Riffle (constructed) maintains coarser substrate	6	6			100
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth / Mean Pool Depth $\geq$ 1.6)	4	5			80
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	4	5			80
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	4	5			80
		2. Thalweg centering at downstream of meander (Glide)	4	5			80
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100
	2. Undercut	Bank undercut/overhanging to the extent that mass wasting appears likely. Does not include undercuts that are modest, appear sustainable and are providing habitat			0	0	100
	3. Mass Wasting	Bank slumping, calving, or collapsing			0	0	100
				Totals	0	0	100
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	4	5			80
	2. Grade Control	Grade control structures exhibiting maintenance of grade across sill	5	5			100
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	5	5			100
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15% (see guidance for this table in EEP monitoring guidance document)	5	5			100
	4. Habitat	Pool forming structures maintaining - Max Pool Depth : Mean Pool Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow	7	9			78

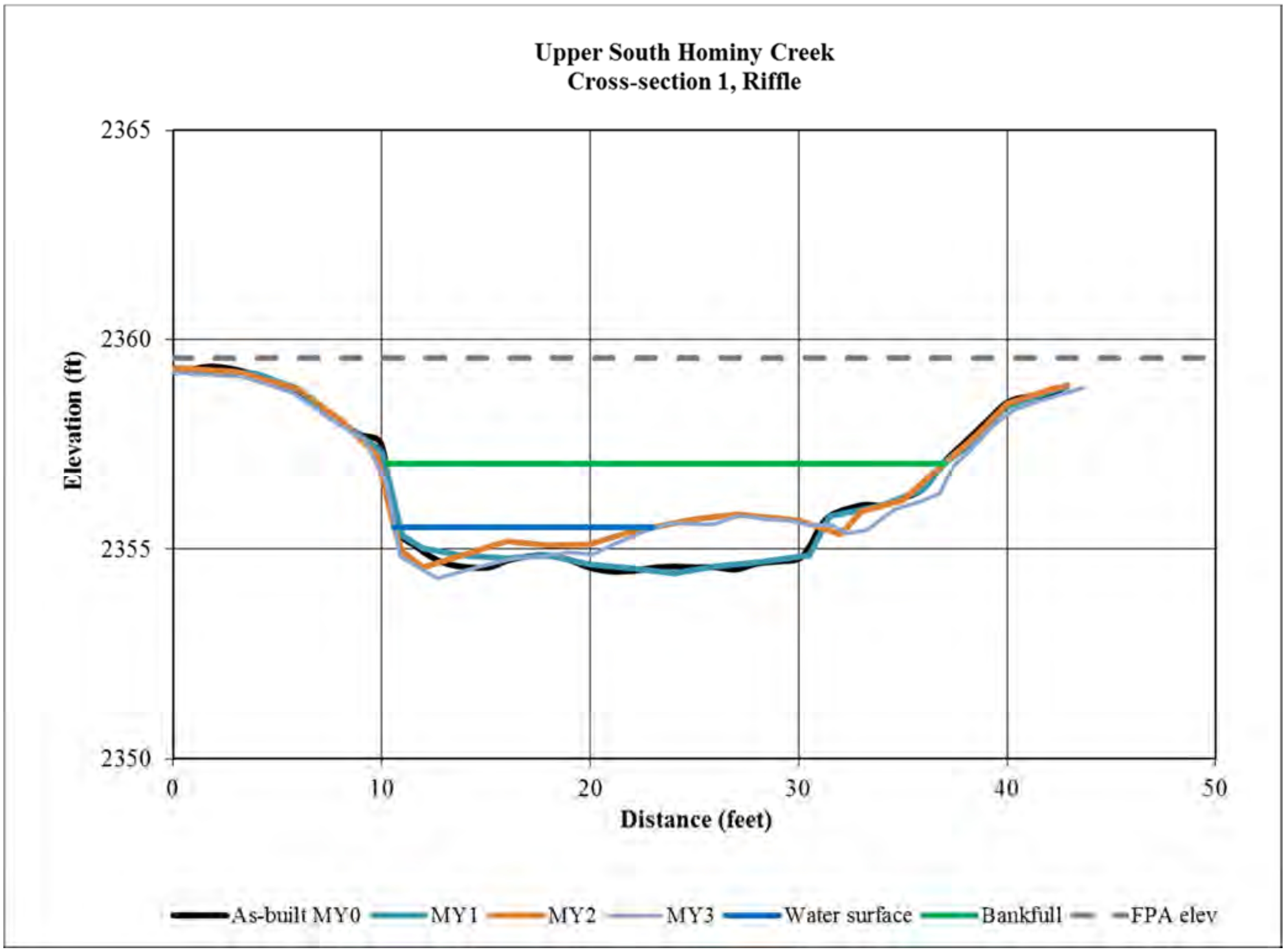
Upper South Hominy (EEP project number 92632)							
Mainstem 3 -Davis Reach – 737 feet – MY3							
Major Channel Category	**Channel Sub-Category**	**Metric**	**Number Stable, Performing as Intended**	**Total Number in As-built**	**Number of Unstable Segments**	**Amount of Unstable Footage**	**% Stable, Performing as Intended**
1. Bed	1. Vertical Stability (Riffle & Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100
		2. Degradation – Evidence of down cutting			0	0	100
	2. Riffle Condition	1. Texture/Substrate - Riffle (constructed) maintains coarser substrate	4	4			100
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth / Mean Pool Depth $\geq$ 1.6)	0	0			0
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	0	0			0
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	0	0			0
		2. Thalweg centering at downstream of meander (Glide)	0	0			0
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100
	2. Undercut	Bank undercut/overhanging to the extent that mass wasting appears likely. Does not include undercuts that are modest, appear sustainable and are providing habitat			0	0	100
	3. Mass Wasting	Bank slumping, calving, or collapsing			0	0	100
				Totals	0	0	100
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	4	4			100
	2. Grade Control	Grade control structures exhibiting maintenance of grade across sill	4	4			100
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	4	4			100
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15% (see guidance for this table in EEP monitoring guidance document)	4	4			100
	4. Habitat	Pool forming structures maintaining - Max Pool Depth : Mean Pool Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow	4	4			100

Table B.5 Stream Problem Areas, Upper South Hominy Mitigation Site.

Stream Problem Areas Upper South Hominy (EEP project number 92632)			
Feature*	**Issue**	**Reach / Station**	**Suspected Cause/Date**
Problem Area 1	Engineered Rock-vane Structure	Mainstem 1 - 1+50	flood event / 28 Nov 2011
Problem Area 2	Right Bank Instability	Mainstem 1 - 1+45 to 2+75	flood event / 28 Nov 2011
Problem Area 3	Aggradation/Bar Formation below J-hook	Mainstem 1 - 2+25 to 2+50	flood event / 28 Nov 2011
Problem Area 4	Aggradation/Bar Formation below J-hook	Mainstem 2 - 9+20 to 9+50	flood event / 28 Nov 2011
Problem Area 6	Right Bank Scour/Erosion	Mainstem 1 - 6+25 to 6+50	flood event / 5 May 2013
Problem Area 8	Aggradation/Bar Formation	Mainstem 1 - 4+00 to 4+50	flood event / 5 May 2013
Problem Area 10	Aggradation throughout step-pool structure	UT-3 - 0+00 to 2+00	low flow velocity and dense herbaceous layer

*All Problem Area photographs can be found in Figure B.6. Previously noted Problem Areas 5, 7, and 9 are no longer considered issues and therefore have been removed from this table.

Figure B.1 Monitoring Cross-Section Plots, Upper South Hominy Mitigation Site.



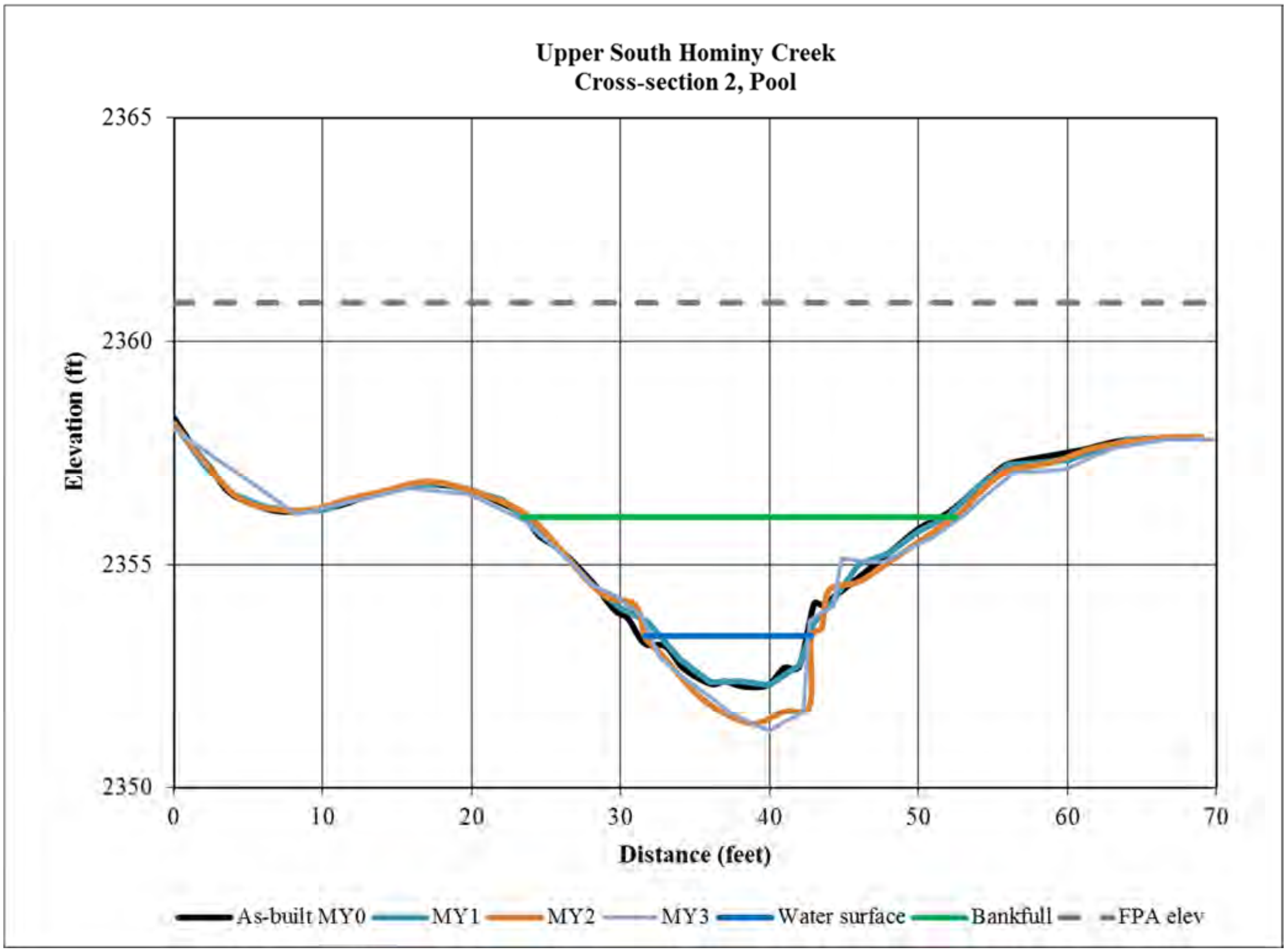

Cross-section 1, facing downstream, 31 January 2012, MY0.


Cross-section 1, facing downstream, 24 October 2012, MY1.

Cross-section 1, facing downstream, 31 October 2013, MY2.

Cross-section 1, facing downstream, 12 November 2014, MY3.

Figure B.1 Continued.



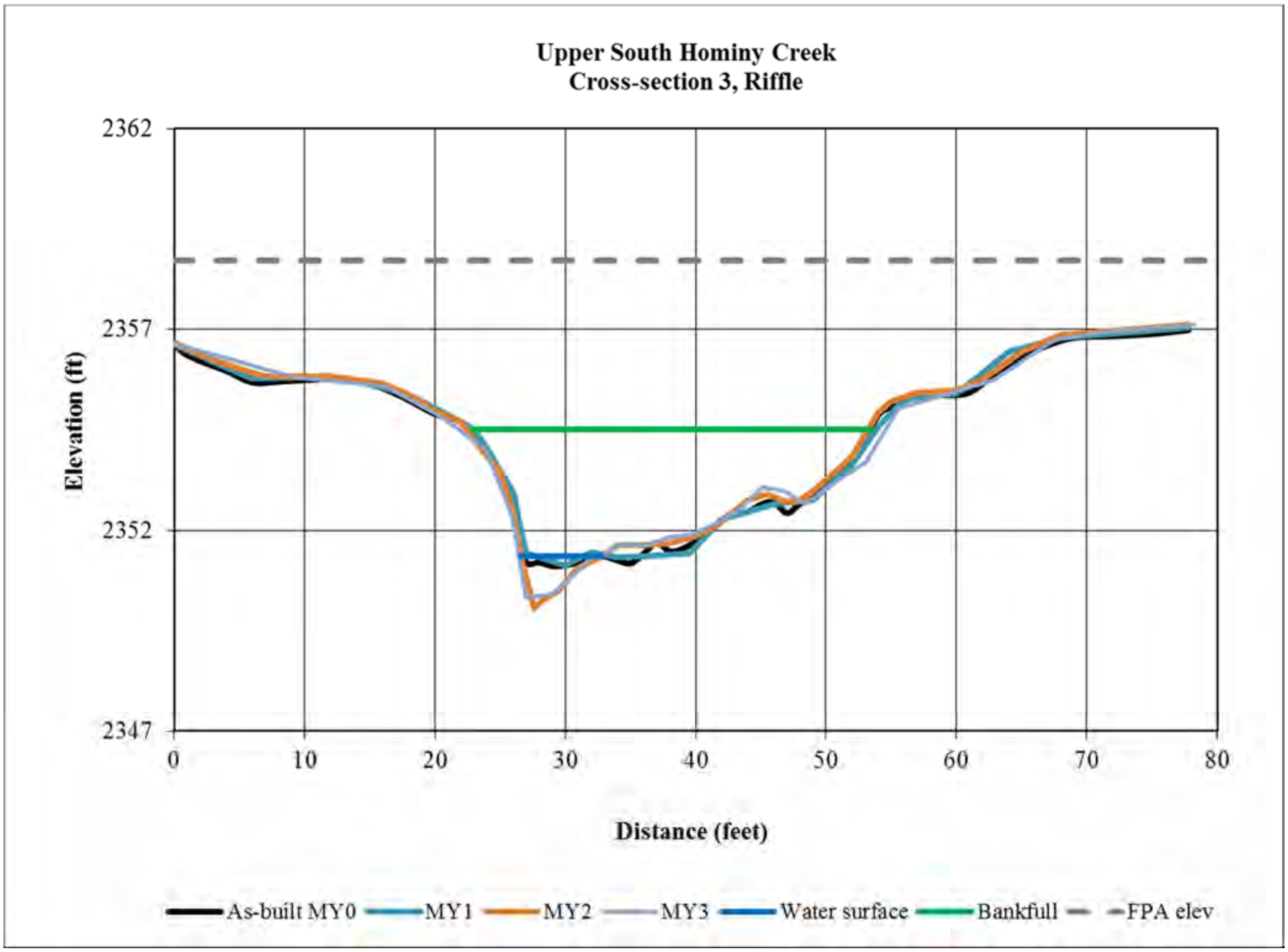
Cross-section 2, facing downstream, 31 January 2012, MY0.

Cross-section 2, facing downstream, 24 October 2012, MY1.


Cross-section 2, facing downstream, 31 October 2013, MY2.


Cross-section 2, facing downstream, 12 November 2014, MY3.

Figure B.1 Continued.



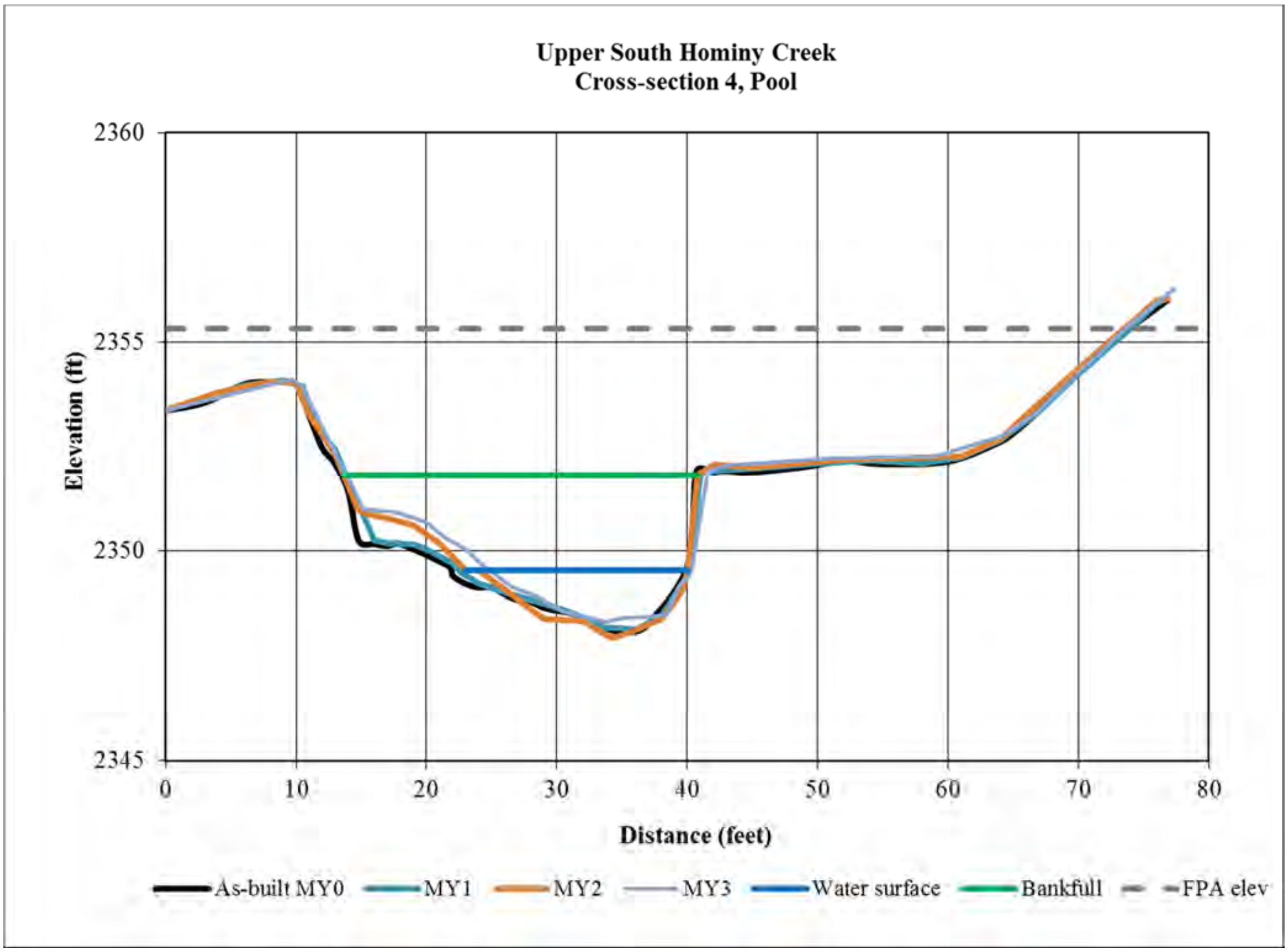
Cross-section 3, facing downstream, 31 January 2012, MY0.

Cross-section 3, facing downstream, 24 October 2012, MY1.

Cross-section 3, facing downstream, 31 October 2013, MY2.

Cross-section 3, facing downstream, 12 November 2014, MY3.

Figure B.1 Continued.



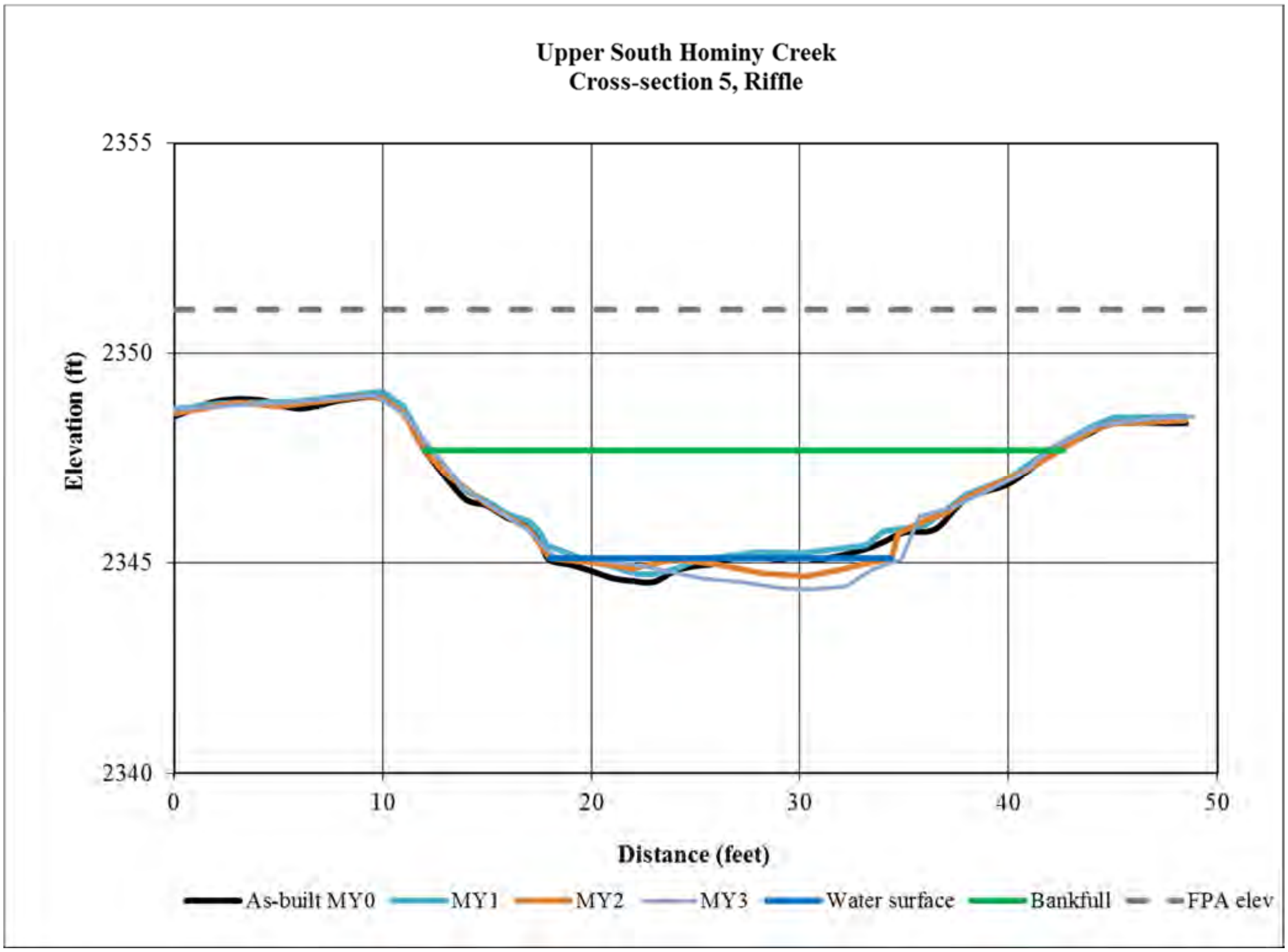
Cross-section 4, facing downstream, 31 January 2012, MY0.

Cross-section 4, facing downstream, 24 October 2012, MY1.

Cross-section 4, facing downstream, 31 October 2013, MY2.

Cross-section 4, facing downstream, 12 November 2014, MY3.

Figure B.1 Continued.



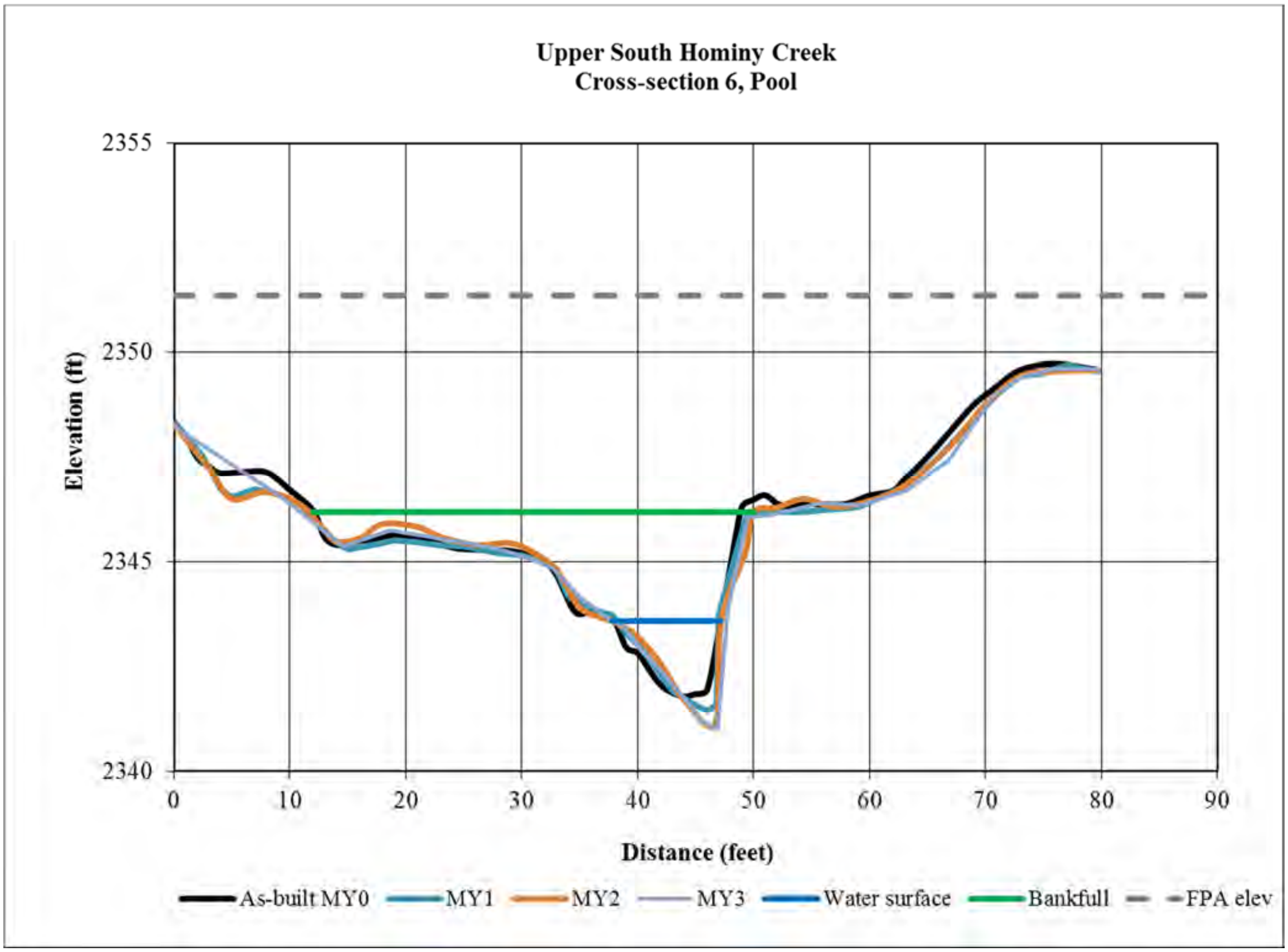
Cross-section 5, facing downstream, 31 January 2012, MY0.

Cross-section 5, facing downstream, 24 October 2012, MY1.

Cross-section 5, facing downstream, 31 October 2013, MY2.

Cross-section 5, facing downstream, 12 November 2014, MY3.

Figure B.1 Continued.



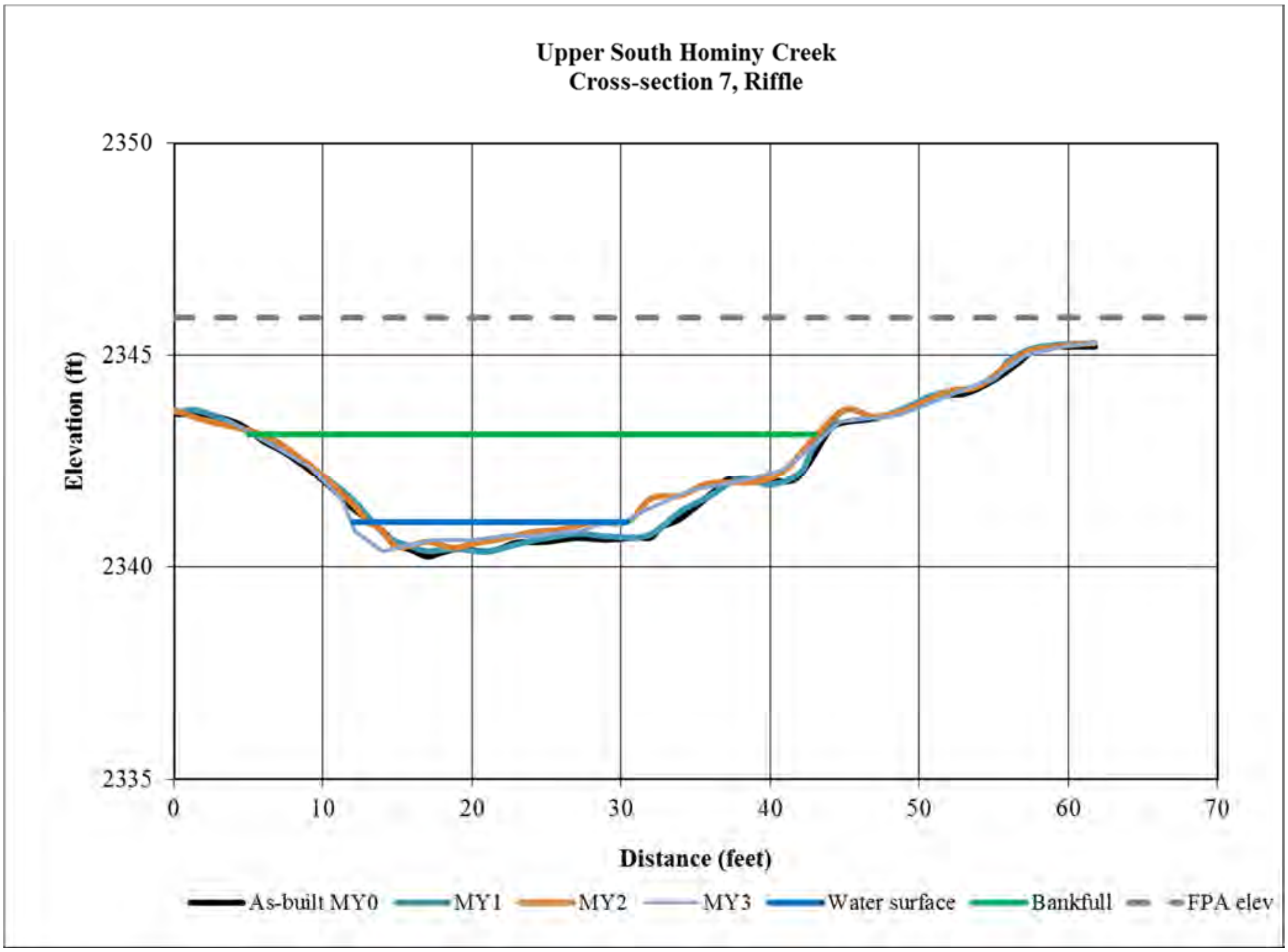

Cross-section 6, facing downstream, 31 January 2012, MY0.


Cross-section 6, facing downstream, 24 October 2012, MY1.

Cross-section 6, facing downstream, 31 October 2013, MY2.

Cross-section 6, facing downstream, 12 November 2014, MY.

Figure B.1 Continued.



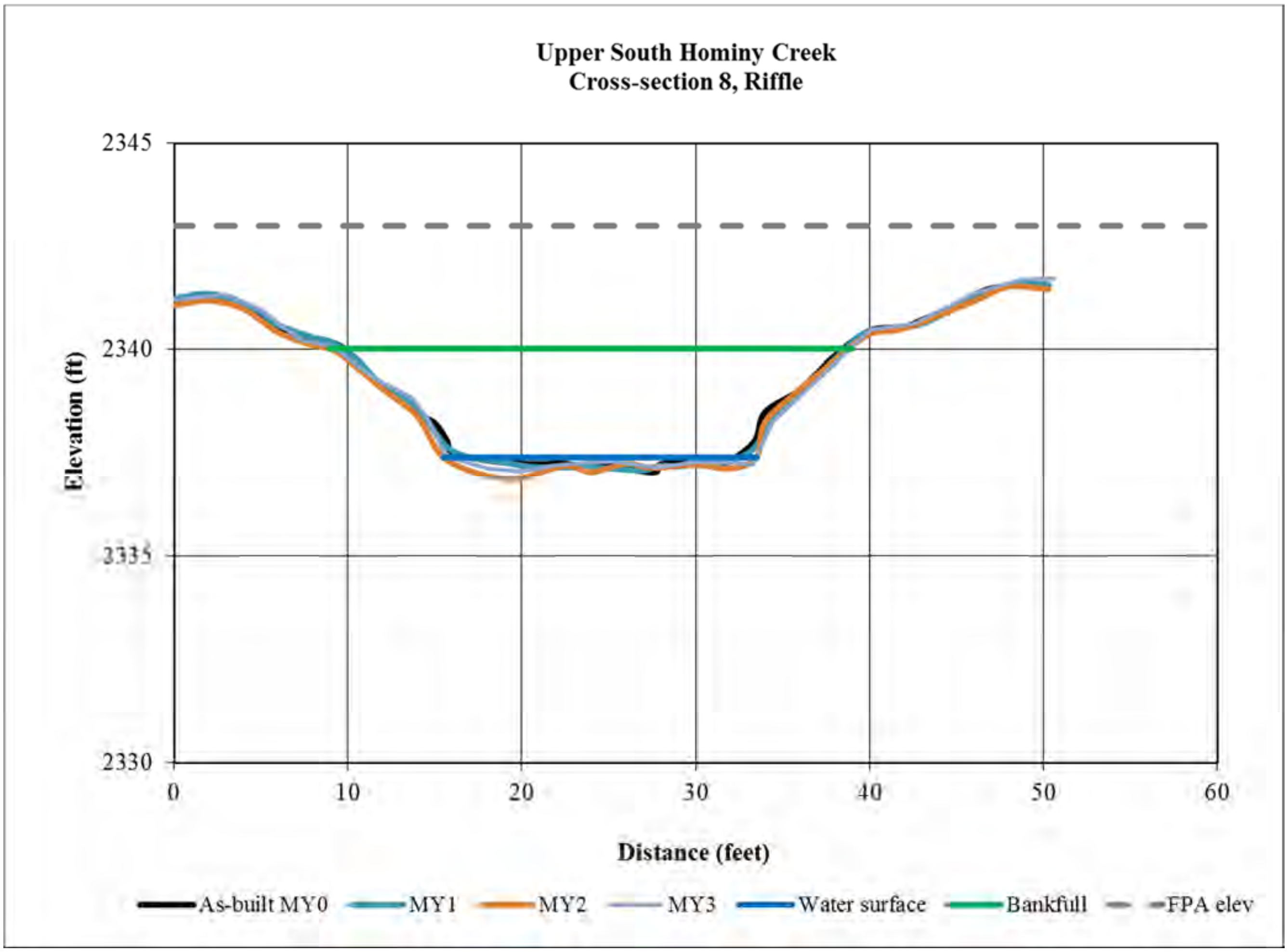
Cross-section 7, facing downstream, 31 January 2012, MY0.

Cross-section 7, facing downstream, 24 October 2012, MY1.

Cross-section 7, facing downstream, 31 October 2013, MY2.

Cross-section 7, facing downstream, 12 November 2014, MY3.

Figure B.1 Continued.



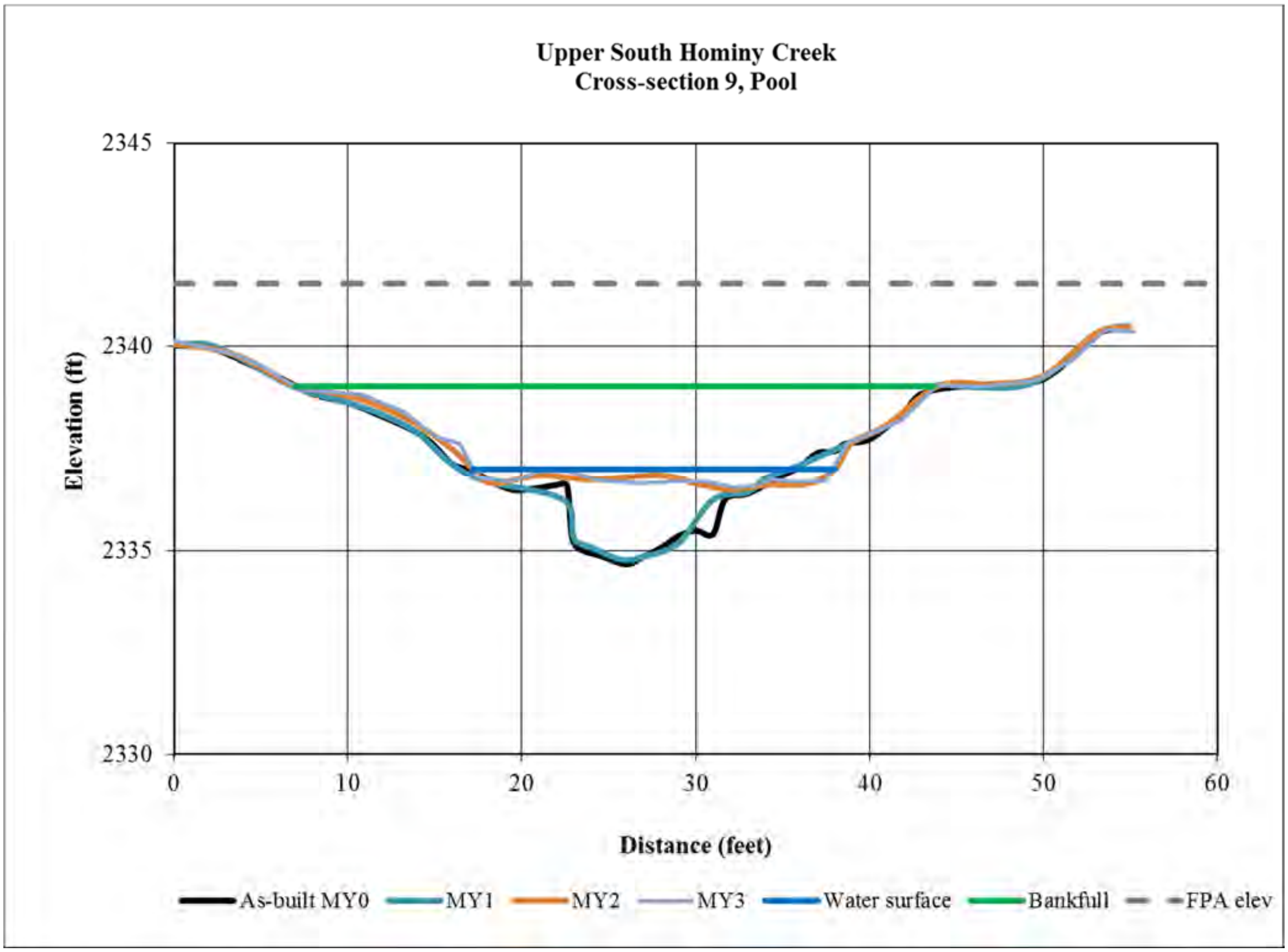
Cross-section 8, facing downstream, 31 January 2012, MY0.

Cross-section 8, facing downstream, 24 October 2012, MY1.

Cross-section 8, facing downstream, 31 October 2013, MY2.

Cross-section 8, facing downstream, 12 November 2014, MY3.

Figure B.1 Continued.



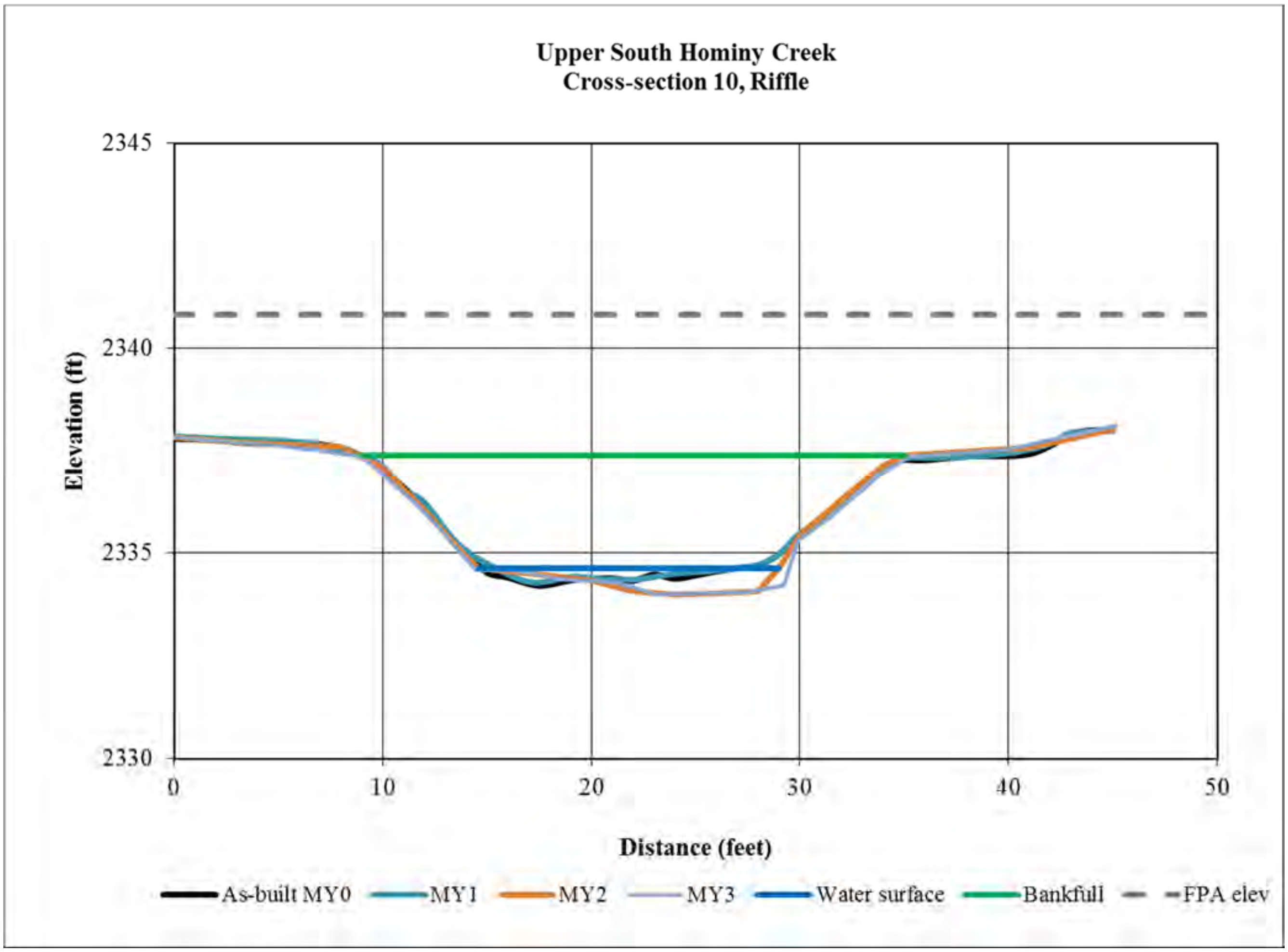

Cross-section 9, facing downstream, 31 January 2012, MY0.


Cross-section 9, facing downstream, 24 October 2012, MY1.

Cross-section 9, facing downstream, 31 October 2013, MY2.

Cross-section 9, facing downstream, 12 November 2014, MY3.

Figure B.1 Continued.



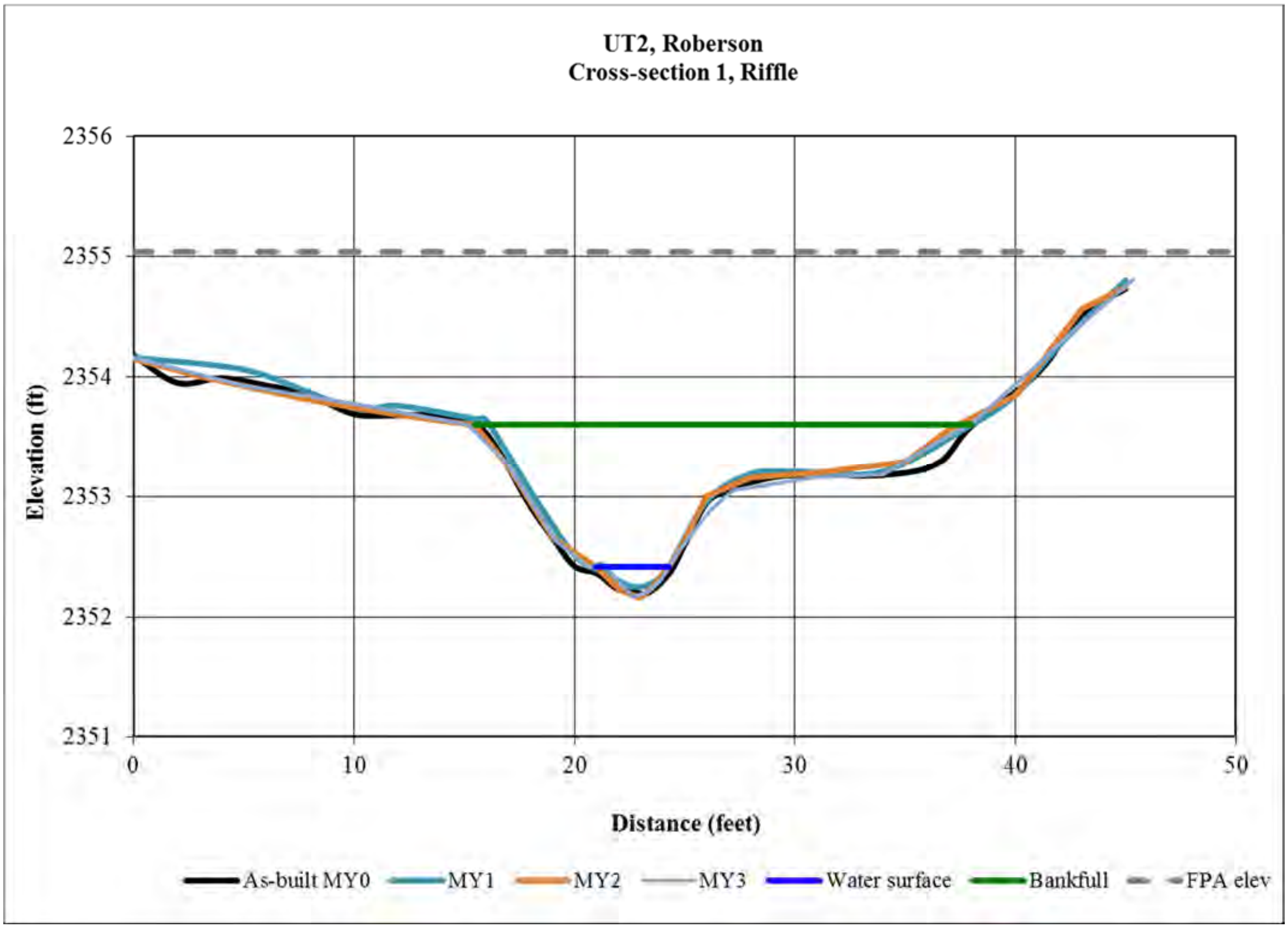
Cross-section 10, facing downstream, 31 January 2012, MY0.

Cross-section 10, facing downstream, 24 October 2012, MY1.

Cross-section 10, facing downstream, 31 October 2013, MY2.

Cross-section 10, facing downstream, 12 November 2014, MY3.

Figure B.1 Continued.



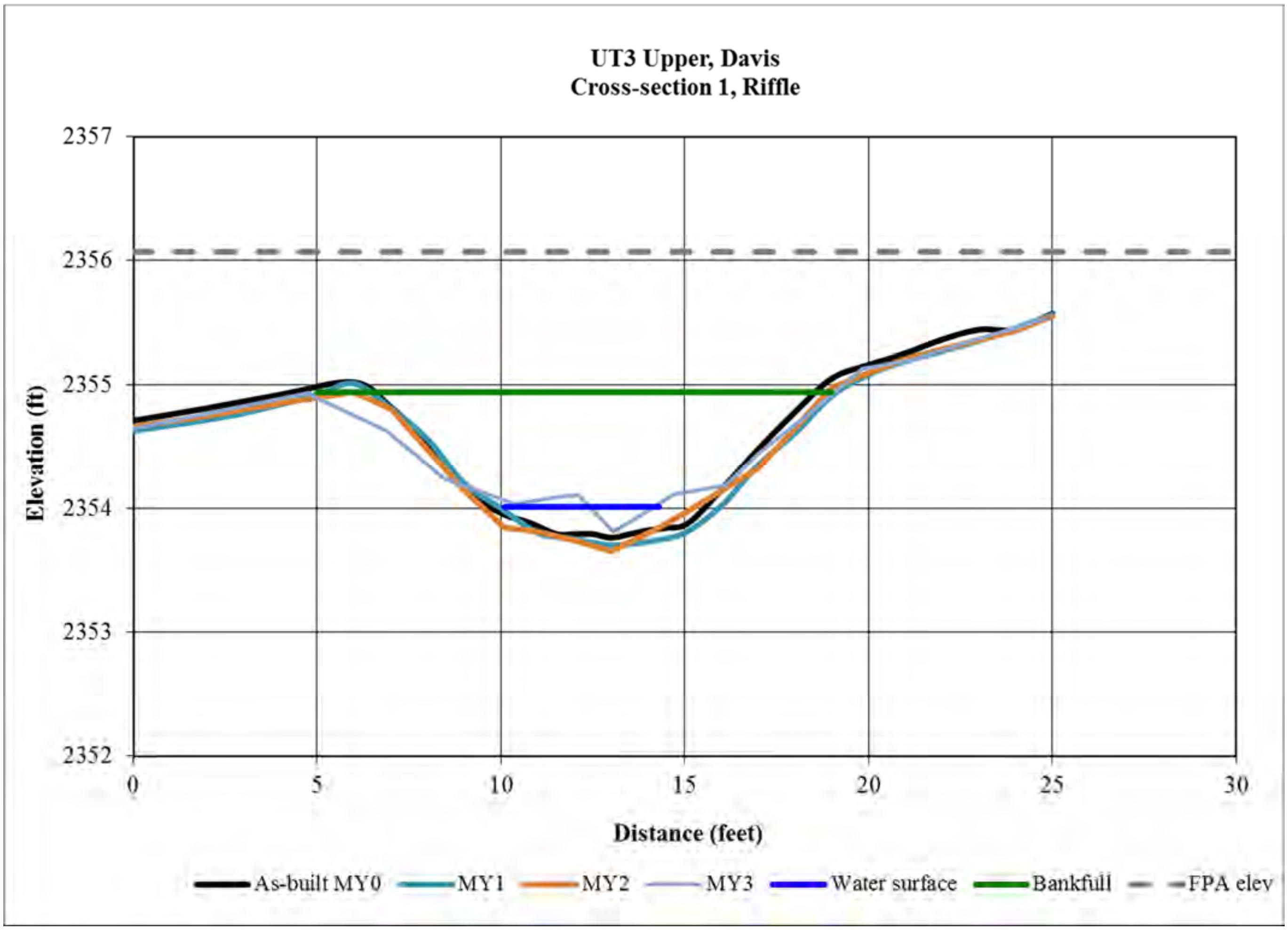
Cross-section 1, UT2 facing downstream, 2 February 2012, MY0.

Cross-section 1, UT2 facing downstream, 24 October 2012, MY1.

Cross-section 1, UT2 facing downstream, 31 October 2013, MY2.

Cross-section 1, UT2 facing downstream, 12 Nov 2014, MY3.

Figure B.1 Continued.



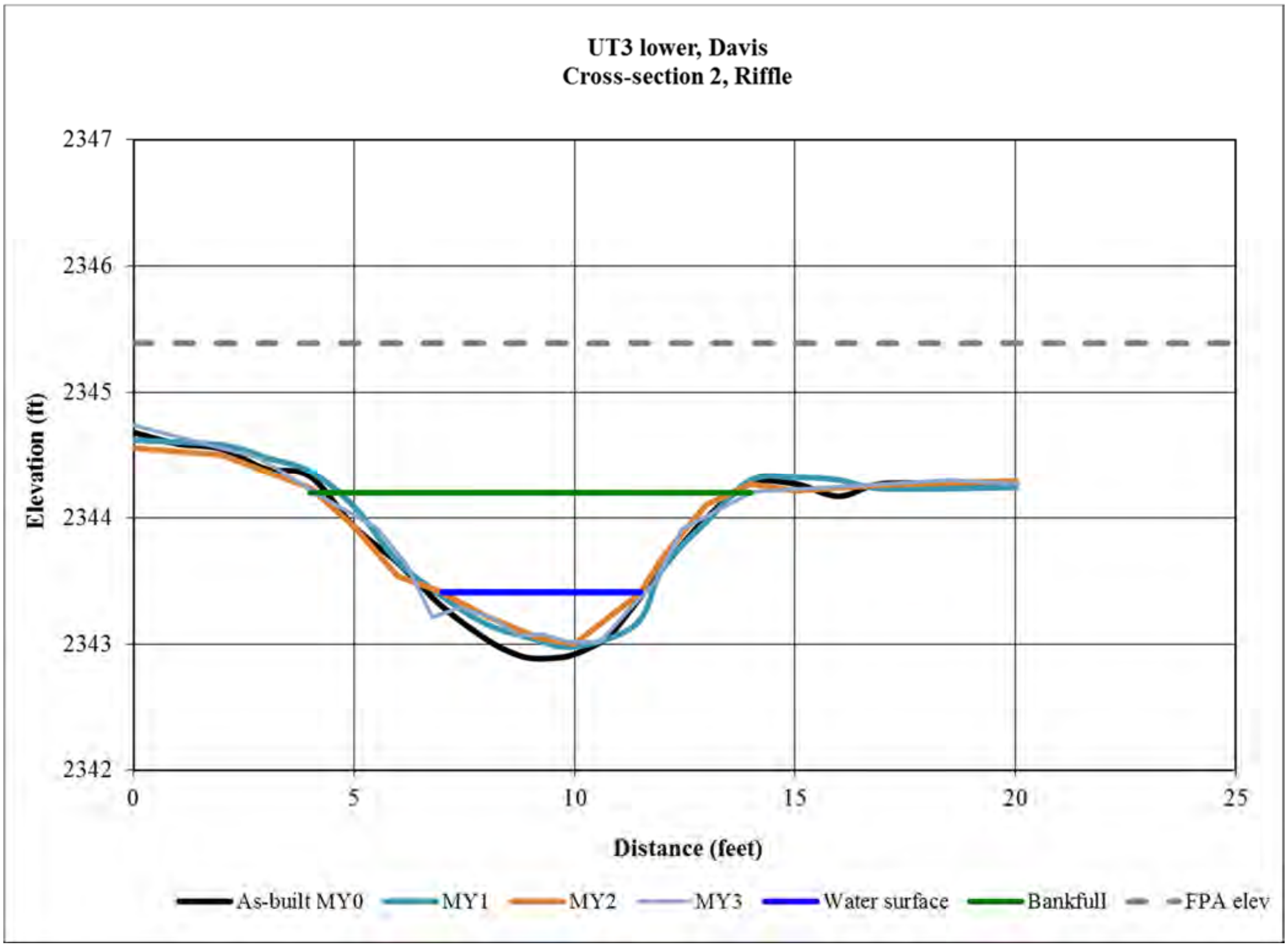
Cross-section 1, UT3 facing downstream, 2 February 2012, MY0.

Cross-section 1, UT3 facing downstream, 24 October 2012, MY1.


Cross-section 1, UT3 facing downstream, 31 October 2013, MY2.


Cross-section 1, UT3 facing downstream, 12 Nov 2014, MY3.

Figure B.1 Continued.



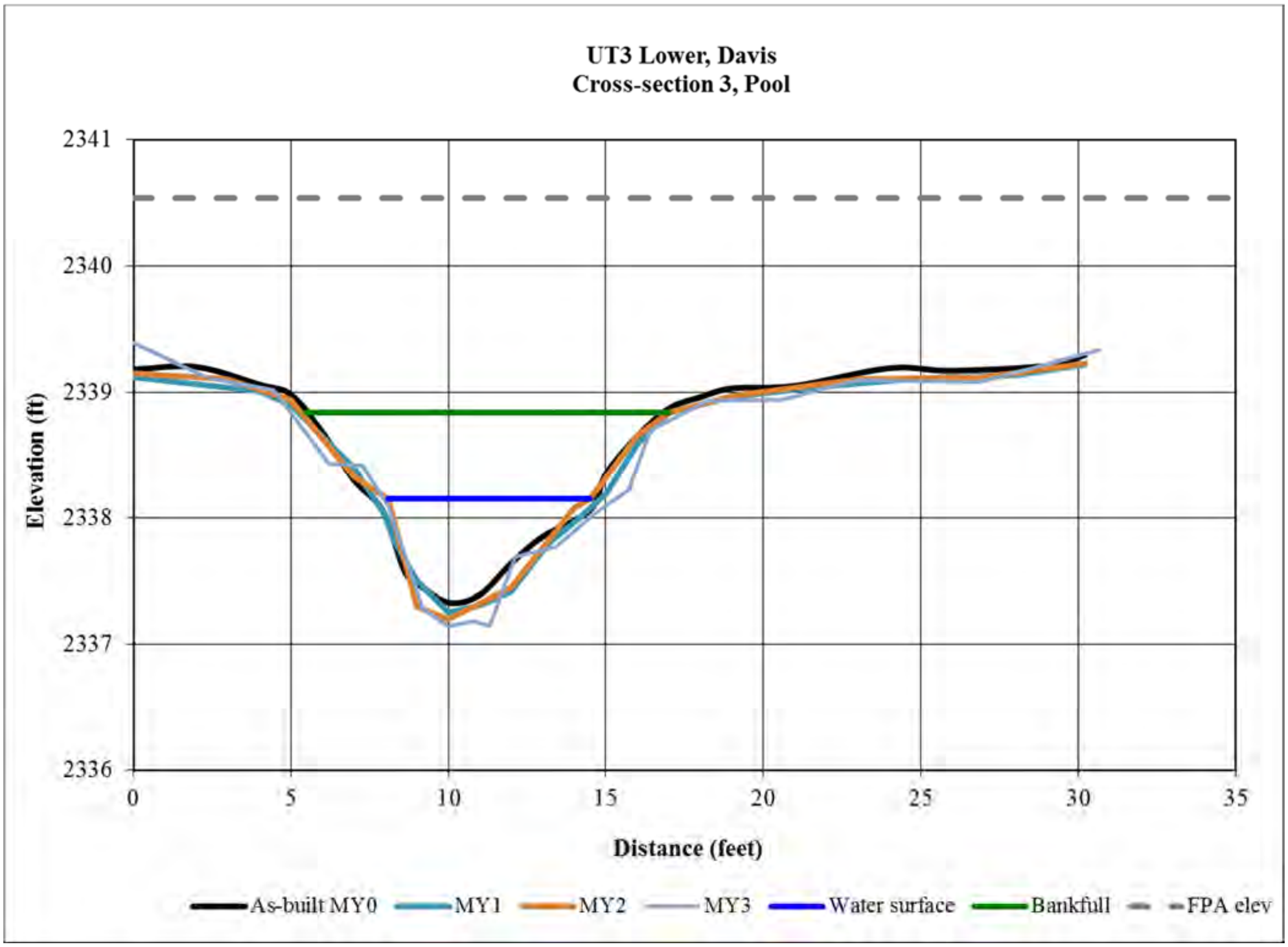
Cross-section 2, UT3 facing downstream, 2 February 2012, MY0.

Cross-section 2, UT3 facing downstream, 24 October 2012, MY1.

Cross-section 2, UT3 facing downstream, 31 October 2013, MY2.

Cross-section 2, UT3 facing downstream, 12 Nov 2014, MY3.

Figure B.1 Continued.



Cross-section 3, UT3 facing downstream, 2 February 2012, MY0.

Cross-section 3, UT3 facing downstream, 24 October 2012, MY1.

Cross-section 3, UT3 facing downstream, 31 October 2013, MY2.

Cross-section 3, UT3 facing downstream, 12 Nov 2014, MY3.

Figure B.2 As-built Longitudinal Profile Data, Upper South Hominy Mitigation Site.

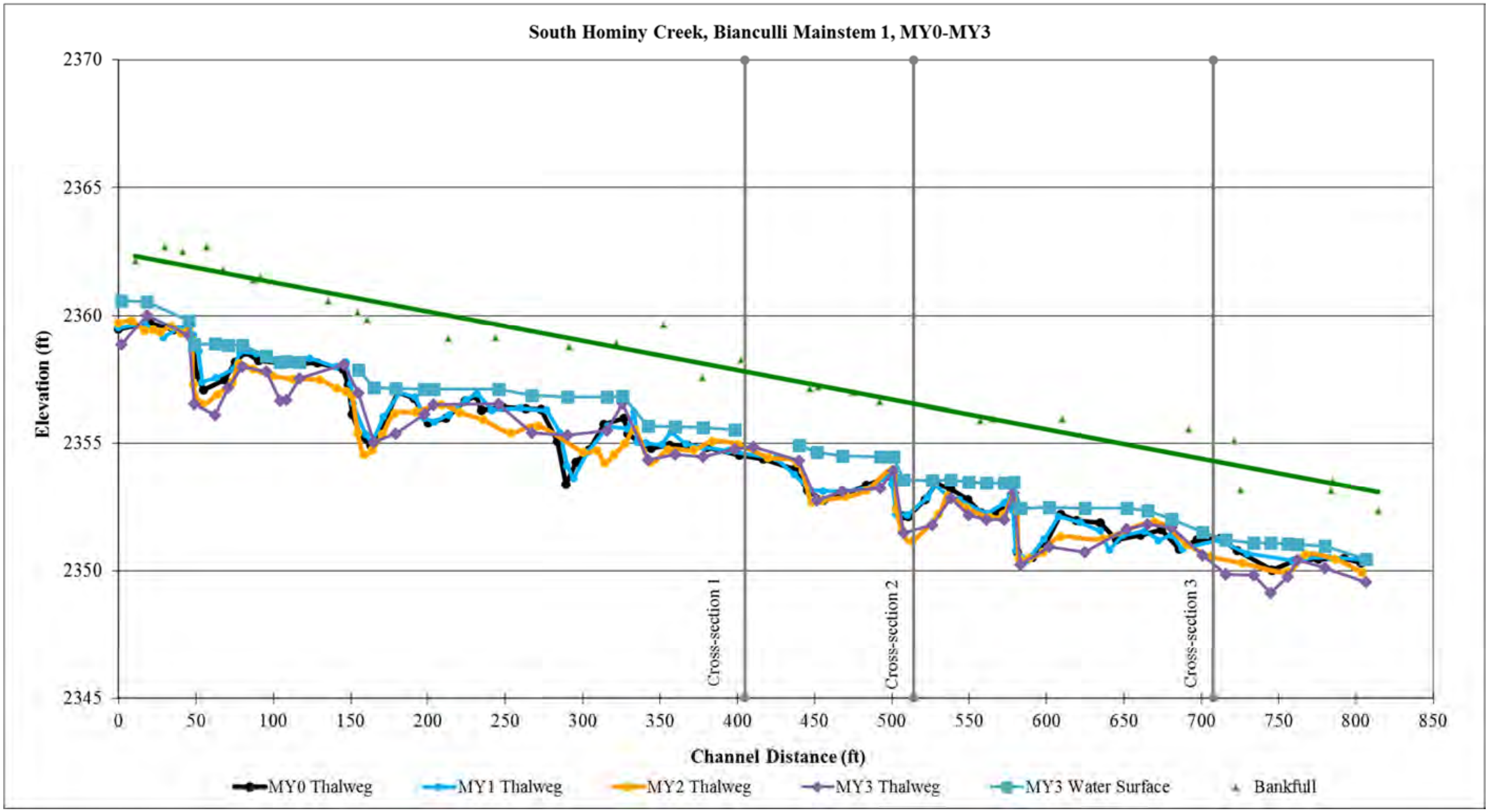


Figure B.2 Continued

1

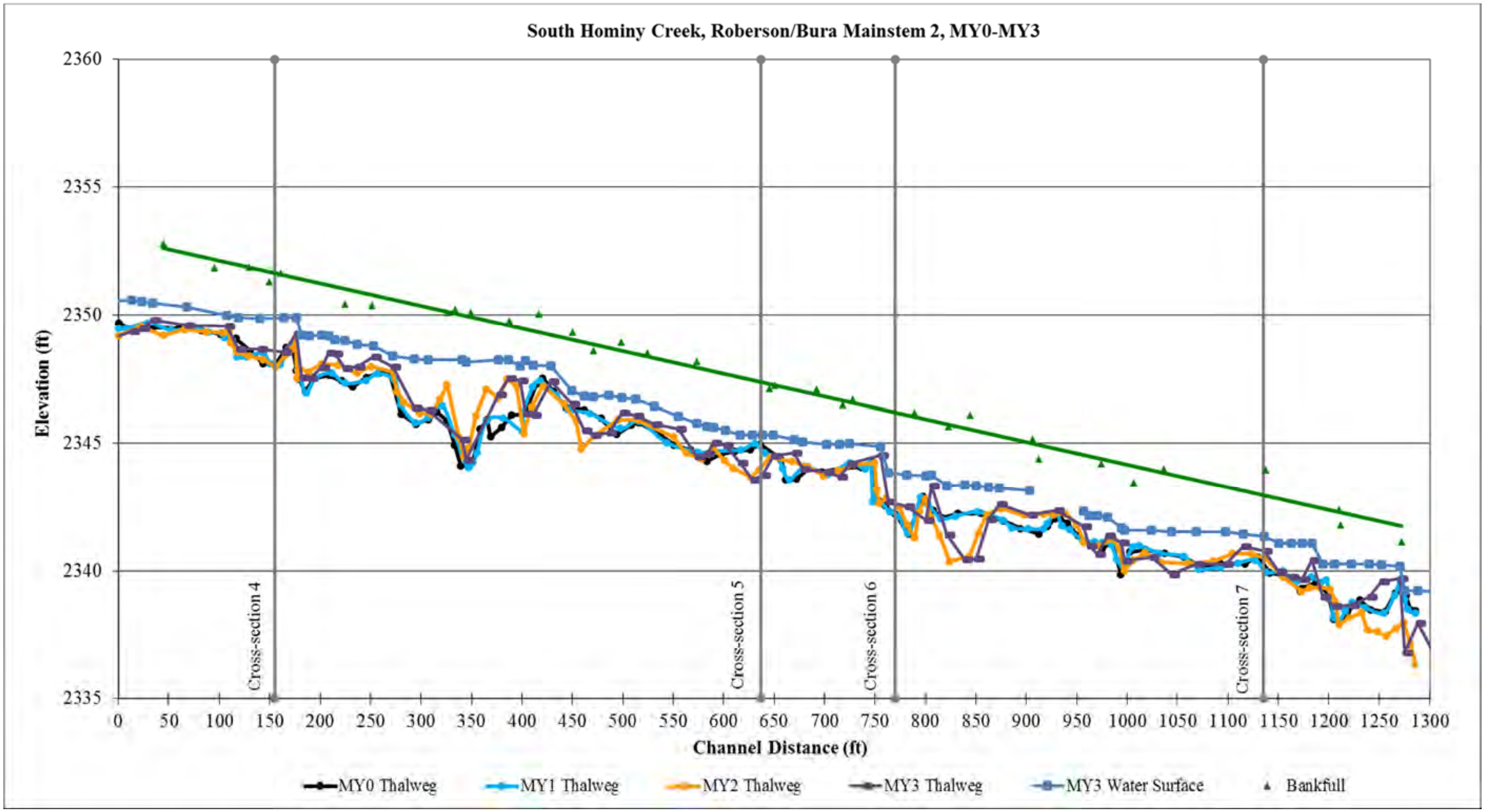


Figure B.2 Continued

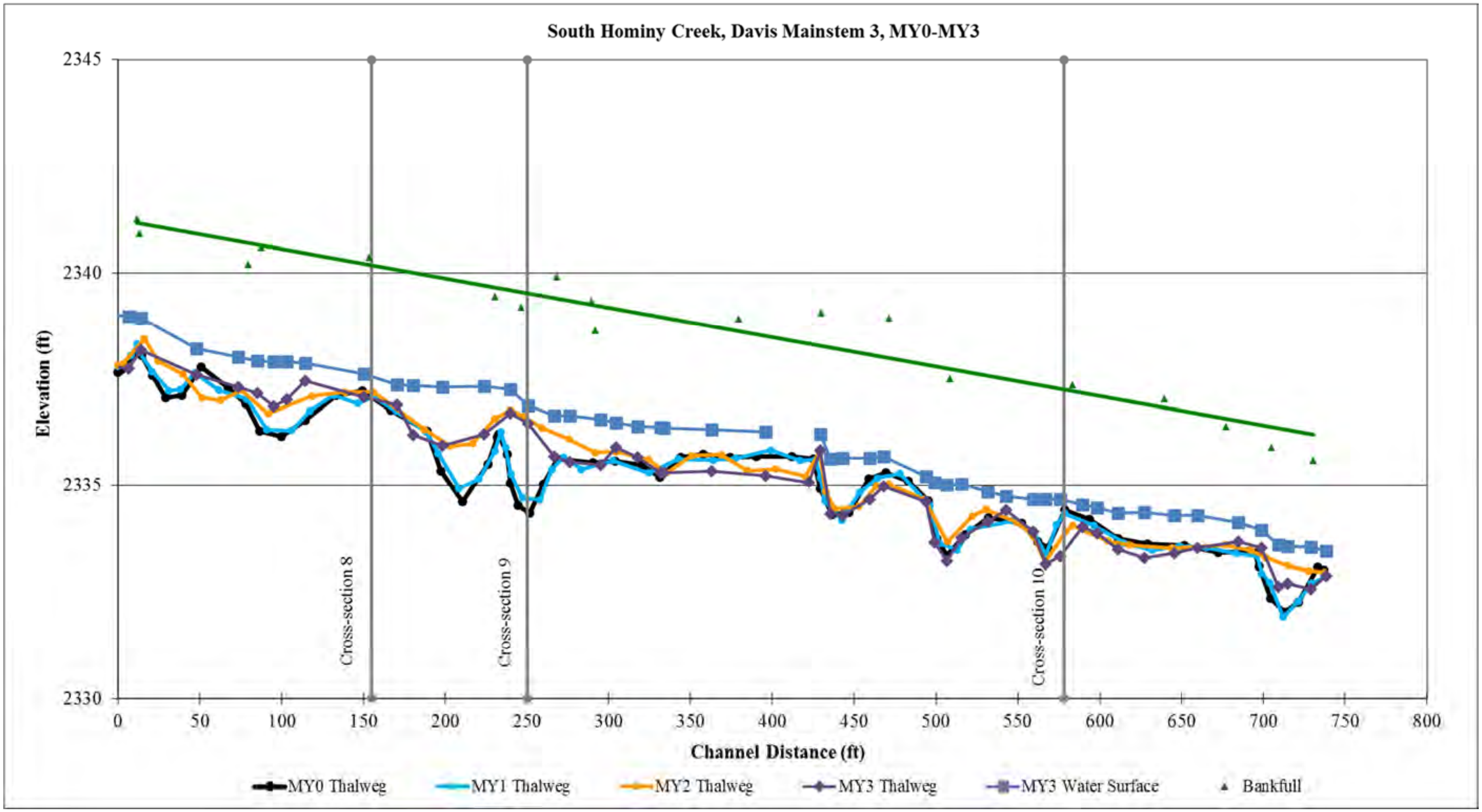


Figure B.2 Continued

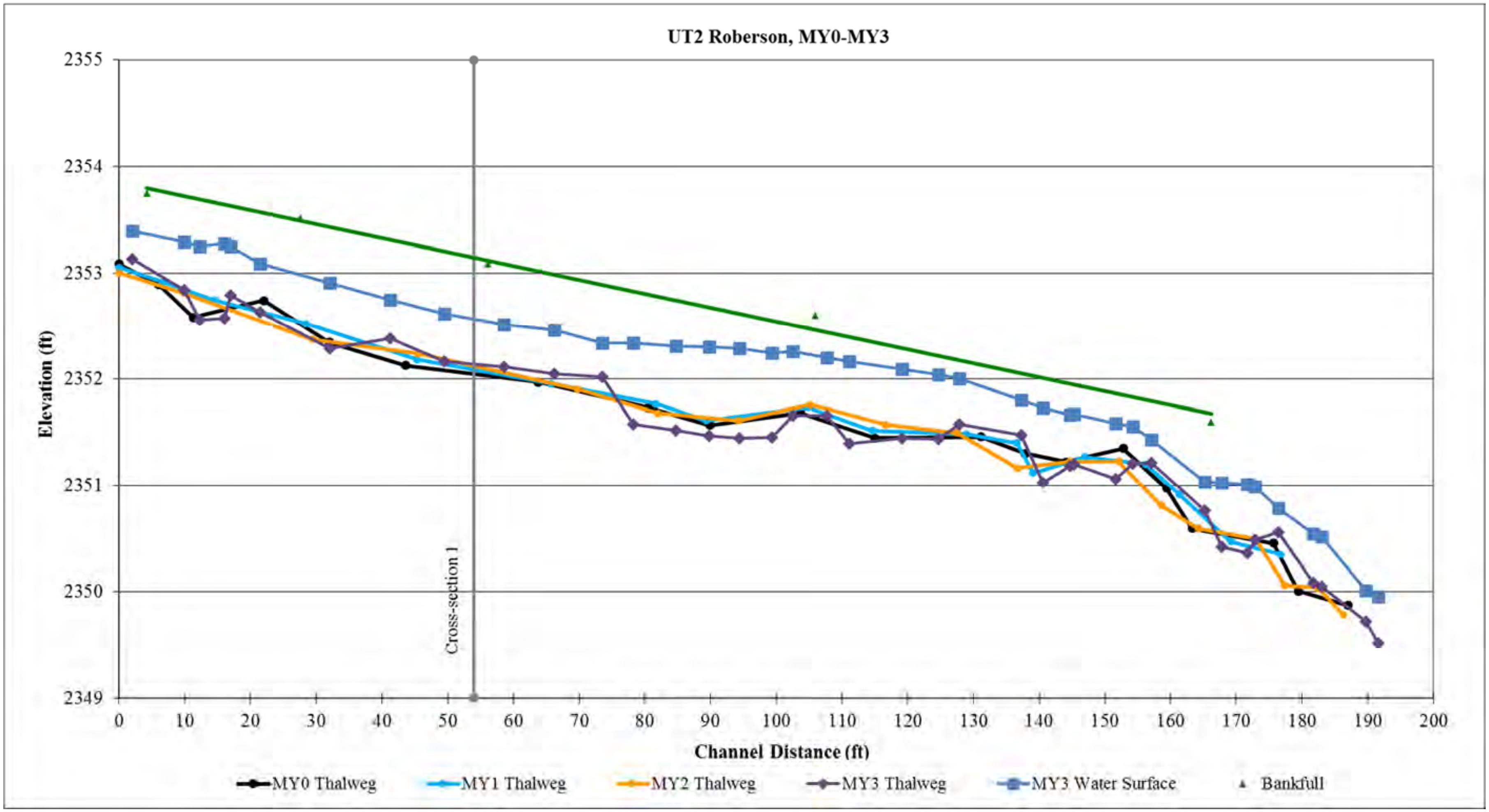


Figure B.2 Continued

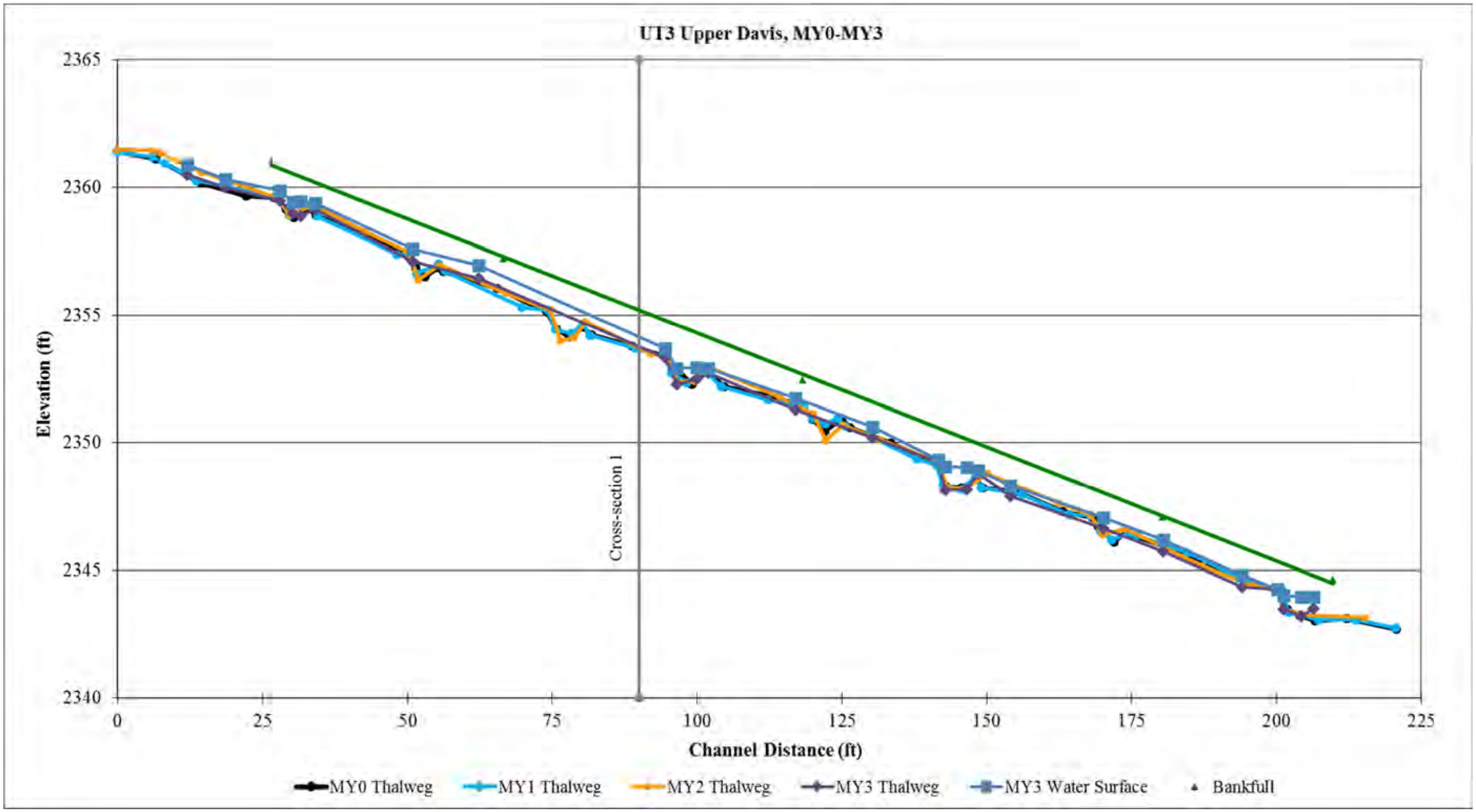


Figure B.2 Continued

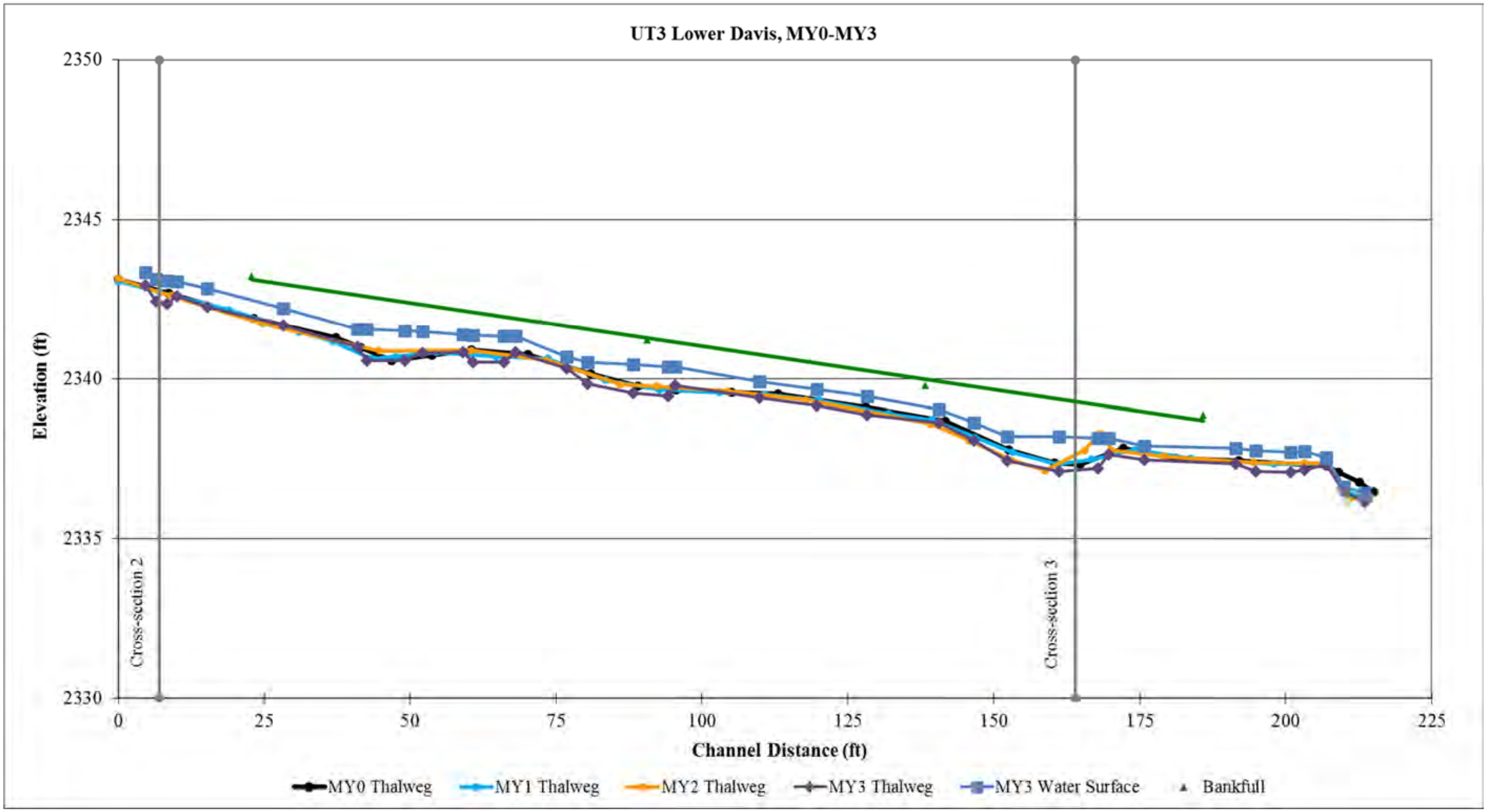
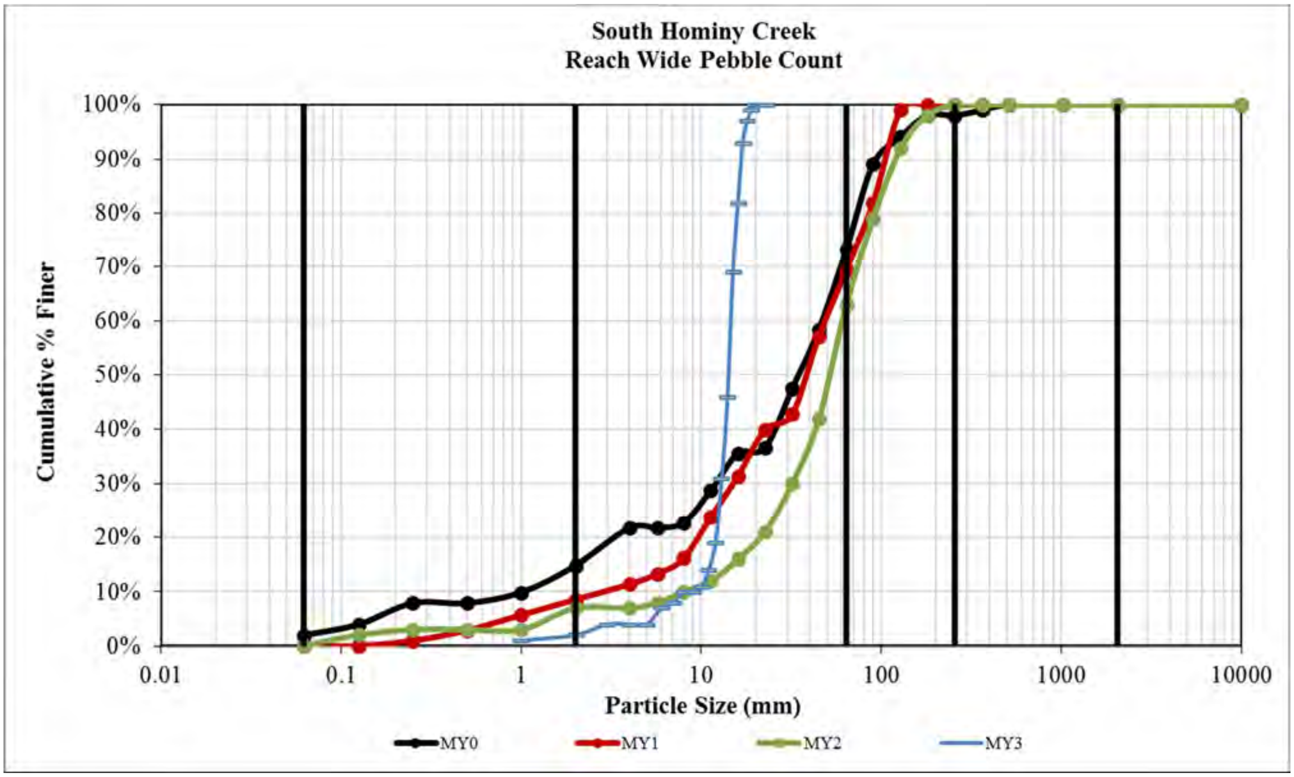
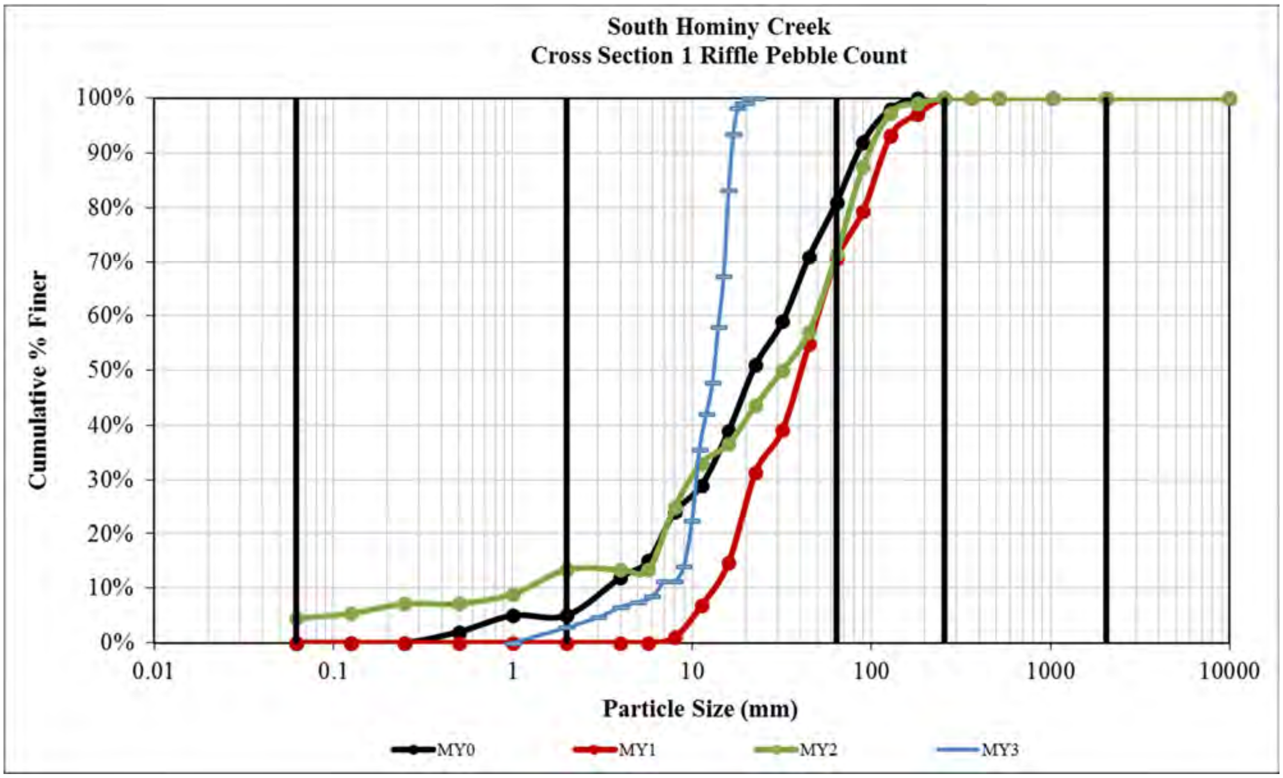


Figure B.3 Pebble Count Cumulative Frequency Distribution Plots, Particle Sizes by Category, and Percent Bed Material by Category, Upper South Hominy Mitigation Site.



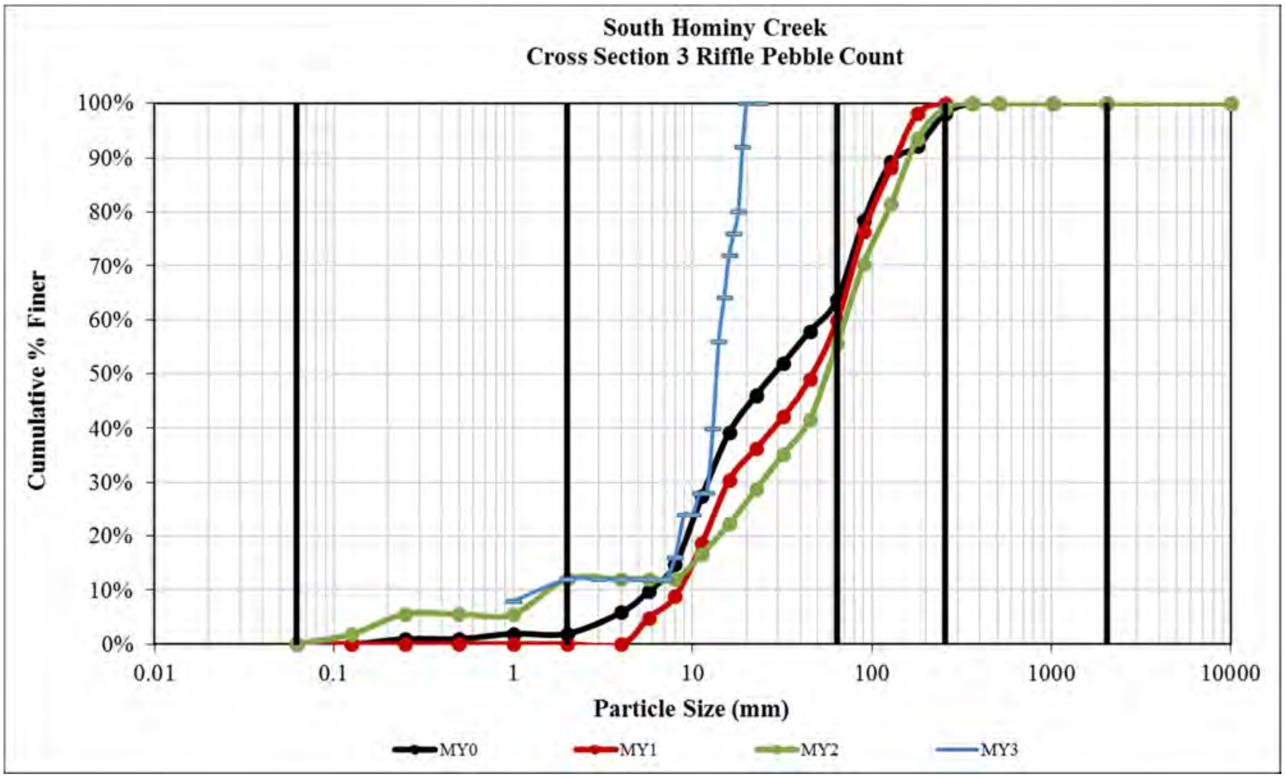
USH Reach-Wide Pebble Count							
	Particle Size by Category						
Category	Existing	MY0	MY1	MY2	MY3	MY4	MY5
D16 (mm)	0.2	2.3	7.9	16.0	18		
D35 (mm)	23.9	15.6	18.8	37.4	35		
D50 (mm)	56.6	35.0	38.5	52.2	48		
D84 (mm)	144.4	81.6	94.7	104.6	96		
D95 (mm)	211.0	140.3	119.0	154.0	152		
	Percent (%) Bed Material by Category						
Category	Existing	MY0	MY1	MY2	MY3	MY4	MY5
Silt/Clay	8.0	2.0	0.0	0.0	1		
Sand	16.0	13.0	9.0	7.0	6		
Gravel	30.0	58.0	61.0	56.0	62		
Cobble	45.0	25.0	30.0	37.0	30		
Boulder	1.0	2.0	0.0	0.0	1		
Bedrock	0.0	0.0	0.0	0.0	0		

Figure B.3 Continued



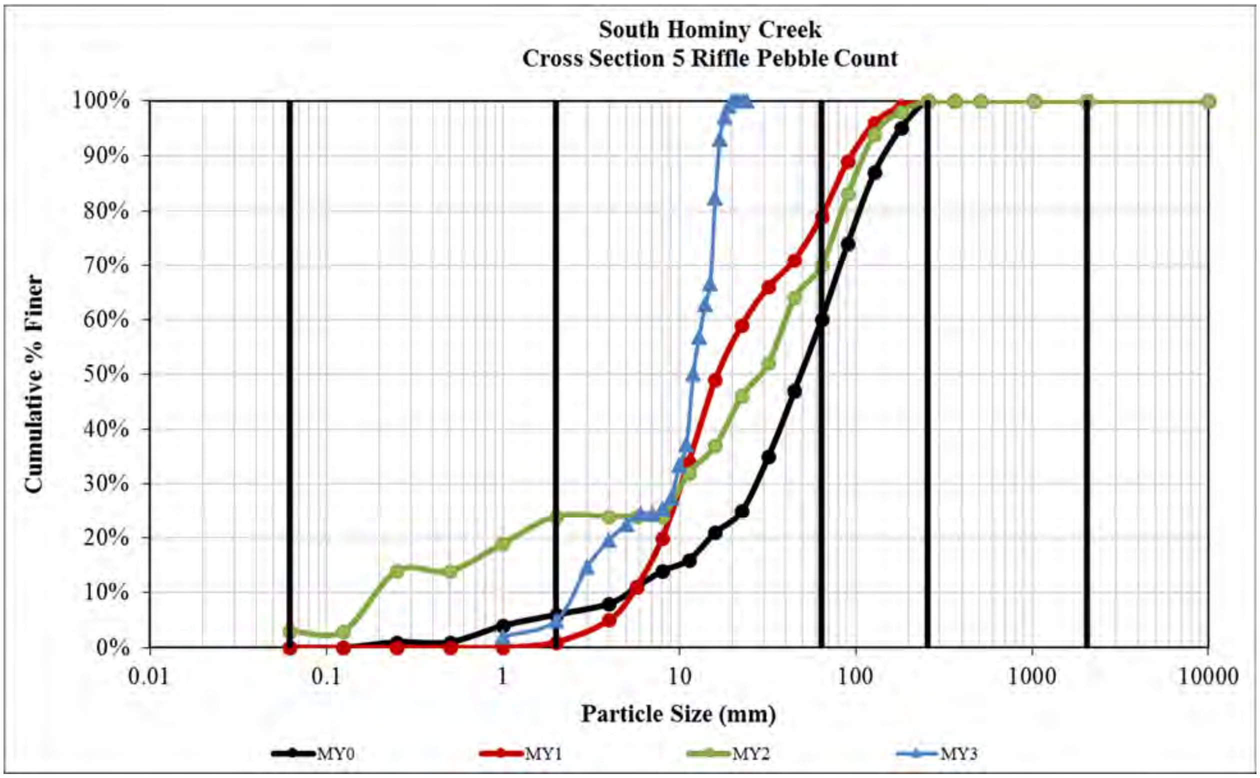
USH Bianculli Cross Section 1 Riffle Pebble Count							
	Particle Size by Category						
Category	Existing	MY0	MY1	MY2	MY3	MY4	MY5
D16 (mm)	6.6	6.0	16.5	6.2	9		
D35 (mm)	11.4	14.1	27.0	13.9	16		
D50 (mm)	21.2	22.1	40.9	32.0	35		
D84 (mm)	89.7	71.1	102.7	84.3	93		
D95 (mm)	124.2	109.0	152.7	119.0	143		
	Percent (%) Bed Material by Category						
Category	Existing	MY0	MY1	MY2	MY3	MY4	MY5
Silt/Clay	2.0	0.0	0.0	4.0	0		
Sand	8.0	5.0	0.0	9.0	8		
Gravel	66.0	76.0	71.0	58.0	59		
Cobble	23.0	19.0	29.0	29.0	32		
Boulder	1.0	0.0	0.0	0.0	1		
Bedrock	0.0	0.0	0.0	0.0	0		

Figure B.3 Continued



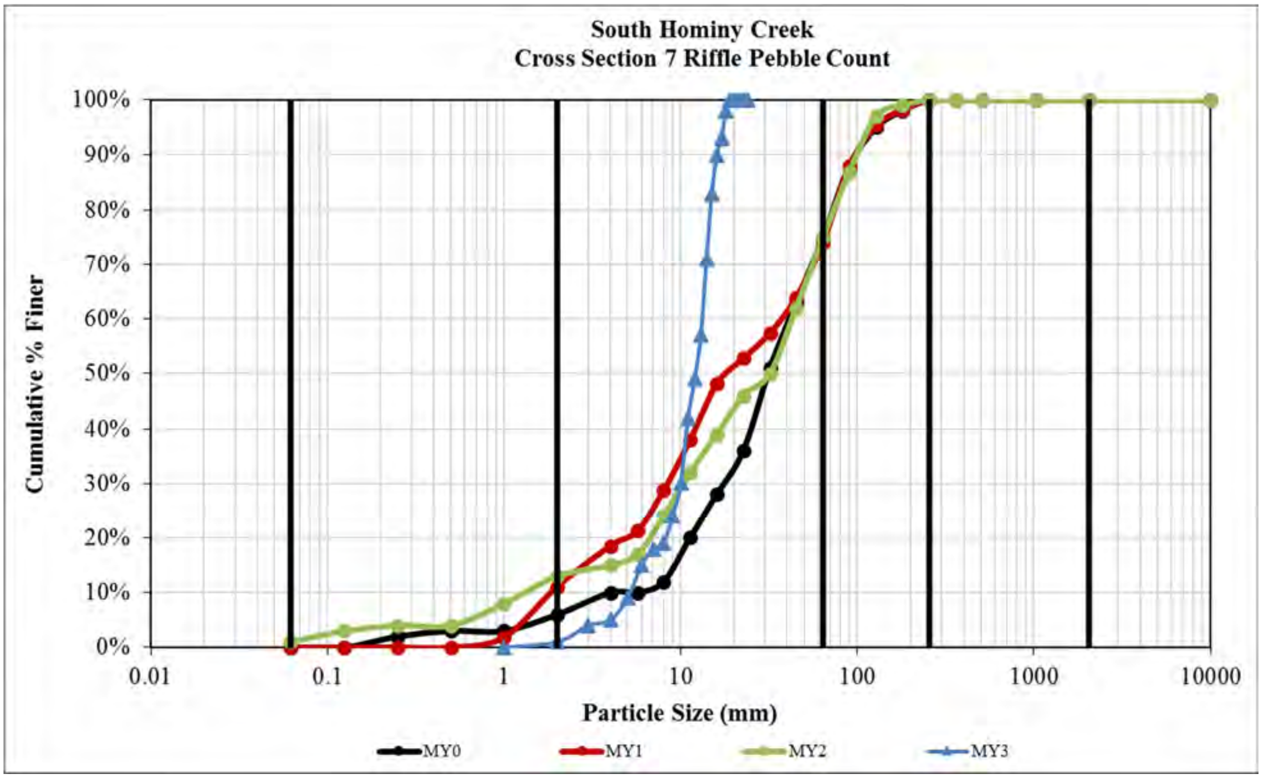
USH Bianculli Cross Section 3 Riffle Pebble Count							
	Particle (%) Size by Category						
Category	Existing	MY0	MY1	MY2	MY3	MY4	MY5
D16 (mm)	5.1	8.3	10.4	10.8	6		
D35 (mm)	11.0	14.3	21.2	31.7	27		
D50 (mm)	21.0	28.9	46.7	56.4	40		
D84 (mm)	80.9	109.6	114.3	138.9	202		
D95 (mm)	120.2	216.7	163.9	200.3	292		
	Percent Bed Material by Category						
Category	Existing	MY0	MY1	MY2	MY3	MY4	MY5
Silt/Clay	0.0	0.0	0.0	0.0	8		
Sand	11.0	2.0	0.0	12.0	4		
Gravel	67.0	62.0	60.0	44.0	52		
Cobble	22.0	34.0	40.0	44.0	28		
Boulder	0.0	2.0	0.0	1.0	8		
Bedrock	0.0	0.0	0.0	0.0	0		

Figure B.3 Continued



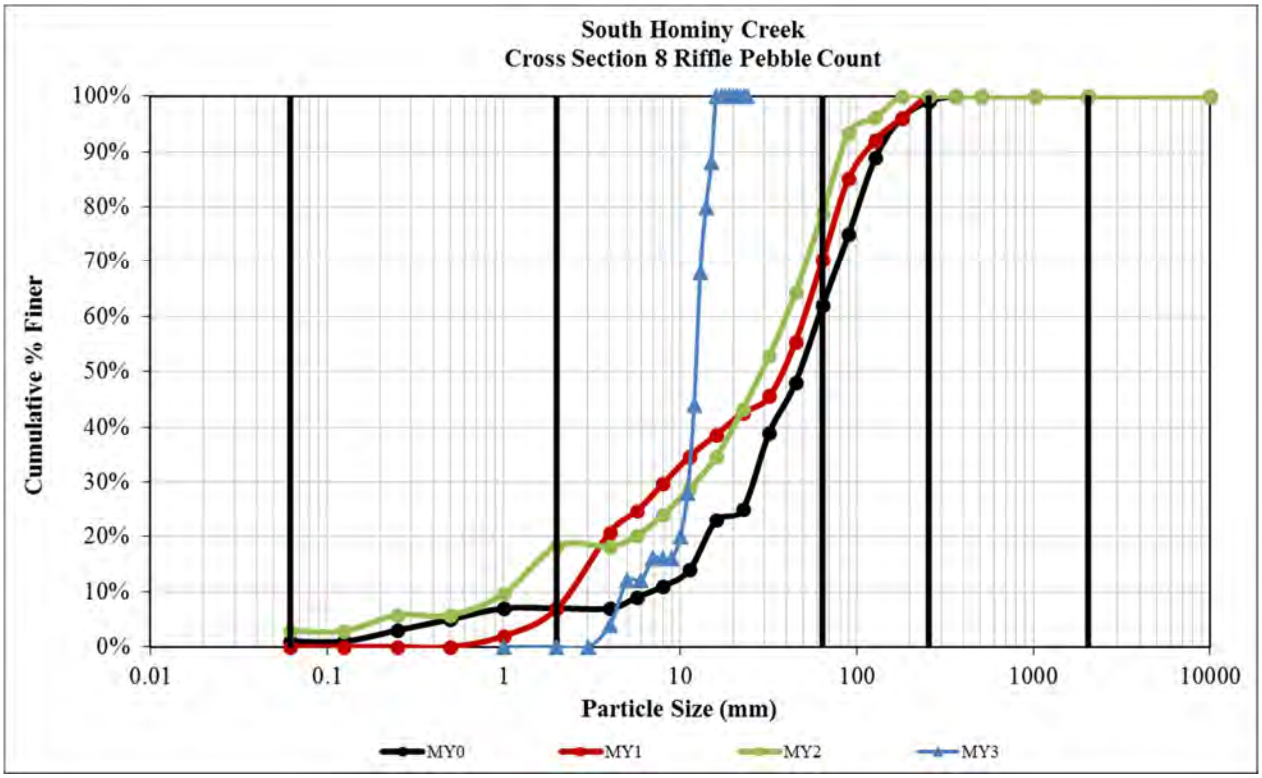
USH Bianculli Cross Section 5 Riffle Pebble Count							
	Particle Size by Category						
Category	Existing	MY0	MY1	MY2	MY3	MY4	MY5
D16 (mm)	6.1	11.3	7.0	0.7	0.3		
D35 (mm)	14.6	32.0	11.6	14.1	13		
D50 (mm)	30.0	49.4	16.7	28.9	22		
D84 (mm)	106.2	119.2	77.0	93.5	95		
D95 (mm)	179.6	180.0	122.6	141.0	151		
	Percent (%) Bed Material by Category						
Category	Existing	MY0	MY1	MY2	MY3	MY4	MY5
Silt/Clay	0.0	0.0	0.0	3.0	2		
Sand	15.0	6.0	1.0	21.0	23		
Gravel	55.0	54.0	78.0	46.0	42		
Cobble	30.0	40.0	21.0	30.0	32		
Boulder	1.0	0.0	0.0	0.0	1		
Bedrock	0.0	0.0	0.0	0.0	0		

Figure B.3 Continued



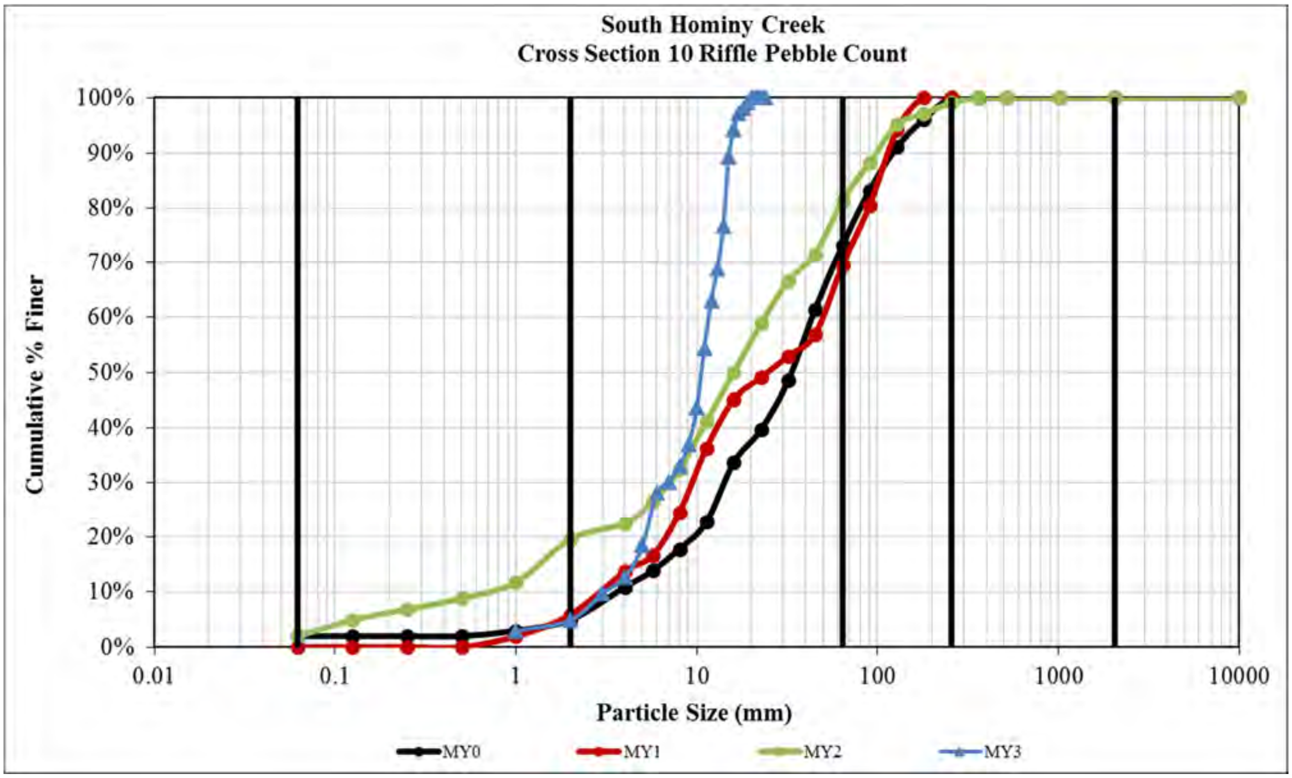
USH Bianculli Cross Section 7 Riffle Pebble Count							
	Particle Size by Category						
Category	**Existing**	**MY0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
D16 (mm)	5.5	9.7	3.3	4.9	2.5		
D35 (mm)	12.9	21.8	10.3	13.3	13		
D50 (mm)	24.5	31.4	18.6	32.0	23		
D84 (mm)	104.0	82.0	82.6	83.5	67		
D95 (mm)	164.4	128.0	126.1	120.4	147		
	Percent (%) Bed Material by Category						
Category	**Existing**	**MY0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
Silt/Clay	0.0	0.0	0.0	1.0	0		
Sand	12.0	6.0	11.0	12.0	15		
Gravel	64.0	69.0	63.0	62.0	68		
Cobble	24.0	25.0	26.0	25.0	17		
Boulder	1.0	0.0	0.0	0.0	0		
Bedrock	0.0	0.0	0.0	0.0	0		

Figure B.3 Continued



USH Bianculli Cross Section 8 Riffle Pebble Count							
	Particle Size by Category						
Category	**Existing**	**MY0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
D16 (mm)	1.0	12.3	3.3	1.7	8		
D35 (mm)	22.6	29.3	11.7	16.3	18		
D50 (mm)	35.3	47.7	37.9	29.2	24		
D84 (mm)	96.3	114.4	88.0	73.3	54		
D95 (mm)	245.1	172.6	166.3	112.8	78		
	Percent (%) Bed Material by Category						
Category	**Existing**	**MY0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
Silt/Clay	0.0	1.0	0.0	3.0	0		
Sand	16.0	6.0	7.0	15.0	12		
Gravel	58.0	55.0	63.0	61.0	76		
Cobble	22.0	37.0	30.0	21.0	12		
Boulder	4.0	1.0	0.0	0.0	0		
Bedrock	0.0	0.0	0.0	0.0	0		

Figure B.3 Continued



USH Bianculli Cross Section 10 Riffle Pebble Count							
	Particle Size by Category						
Category	Existing	MY0	MY1	MY2	MY3	MY4	MY5
D16 (mm)	0.6	6.9	5.3	1.5	0.7		
D35 (mm)	6.9	17.5	10.9	9.0	7		
D50 (mm)	17.3	33.5	25.0	16.0	14		
D84 (mm)	79.4	94.0	100.0	74.0	55		
D95 (mm)	118.0	169.1	135.8	127.5	99		
	Percent (%) Bed Material by Category						
Category	Existing	MY0	MY1	MY2	MY3	MY4	MY5
Silt/Clay	10.0	2.0	0.0	2.0	3		
Sand	17.0	3.0	6.0	18.0	25		
Gravel	50.0	68.0	64.0	62.0	61		
Cobble	24.0	27.0	30.0	18.0	10		
Boulder	0.0	0.0	0.0	1.0	1		
Bedrock	0.0	0.0	0.0	0.0	0		

Figure B.4 Photographic Stations Log, Upper South Hominy Mitigation Site.
Bianculli Property, South Hominy Creek – (Restoration)

Photo Station 1

Mid channel bar, sta. 0+50, facing downstream, pre-construction. 30 September 2008.

Cross vane, sta. 0+50, facing downstream, 14 August 2011.

Cross vane, sta. 0+50, facing downstream, 20 November 2012.

Cross vane, sta. 0+50, facing downstream, 29 October 2013.

Cross vane, sta. 0+50, facing downstream, 12 November 2014.

Figure B.4 Continued

Photo Station 2

Channel blockage, sta.2+50, facing downstream, pre-construction, 30 September 2008.

J-hook, sta. 2+50, facing downstream, 5 September 2011.

J-hook, sta. 2+50, facing downstream, 20 November 2012.

J-hook, sta. 2+50, facing downstream, 29 October 2013.

J-hook, sta. 2+50, facing downstream, 12 November 2014.

Figure B.4 Continued

Photo Station 3

Right bank erosion, sta. 5+50, pre-construction, 30 September 2008.

J-hook, sta. 5+00, facing downstream, 5 December 2011.

J-hook, sta. 5+00, facing downstream, 20 November 2012.

J-hook, sta. 5+00, facing downstream, 29 October 2013.

J-hook, sta. 5+00, facing downstream, 12 November 2014.

Figure B.4 Continued

Bianculli Property, South Hominy Creek – (Enhancement II)

Photo Station 4

Sta. 6+50 to 8+00, right bank facing upstream, 5 December 2011.

Sta. 6+50 to 8+00, right bank facing upstream, 20 November 2012.

Sta. 6+50 to 8+00, right bank facing upstream, 29 October 2013.

Sta. 6+50 to 8+00, right bank facing upstream, 12 Nov 2014.

Figure B.4 Continued

Bianculli Property, Tributary North, UT1 - (Preservation)

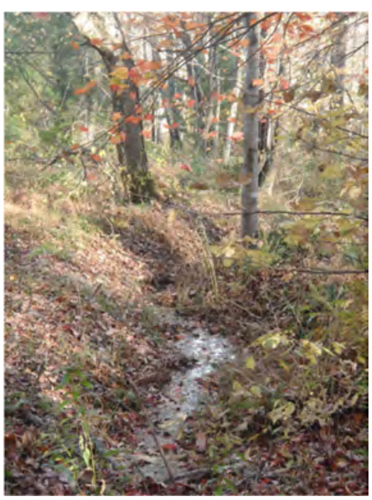
Photo Station 5

UT1 facing downstream, adjacent to small barn, 28 July 2009.

MY0-2011 no photo taken.

UT1 facing downstream, adjacent to small barn, 20 Nov 2012

UT1 facing downstream, adjacent to small barn, 29 October 2013.



UT1 facing downstream, adjacent to small barn, 20 Nov 2012.

Figure B.4 Continued

Bianculli Property, Tributary North, UT1 – (Restoration)

Photo Station 6

UT1 facing downstream, pre-construction 28 July 2009.

UT1, above vernal pond, 5 September 2011.

UT1 Priority I construction, above vernal pond, 20 November 2012.

UT1 Priority I construction, above vernal pond, 29 October 2013.

UT1 Priority I construction, above vernal pond, 12 Nov 2014.

Figure B.4 Continued

Bianculli Property, Tributary South, UT2 – (Enhancement II)

Photo Station 7

UT2 facing downstream, pre-construction, 30 November 2007.

UT2 facing downstream, post invasive removal, 5 Dec 2011.

UT2 facing downstream, post invasive removal, 20 Nov 2012.

UT2 facing downstream, post invasive removal, 29 Oct 2013.

UT2, no photo taken MY03 2014

Figure B.4 Continued

Bianculli Property, Tributary South, UT2 – (Restoration)

Photo Station 8


UT2 routed from original channel to a road ditch, pre-construction, 30 November 2007.


UT2 re-connected under Canterfield Lane to abandoned channel, sta. 0+00 to 0+50, 5 December 2011.


UT2 re-connected under Canterfield Lane to abandoned channel, sta. 0+00 to 0+50, 20 November 2012.


UT2 re-connected to abandoned channel, sta. 0+00 to 0+50, 29 October 2013.


UT2 re-connected under Canterfield Lane to abandoned channel, sta. 0+00 to 0+50, 12 Nov 2014.

Figure B.4 Continued

Roberson Property, Tributary South Abandoned Channel, UT2 – (Restoration)

Photo Station 9

Abandoned UT2 channel east of Canterfield Lane, 26 April 2010.

UT2 restored portion, east of Canterfield Lane, 5 September 2011.

UT2 restored portion, east of Canterfield Lane, 20 November 2012.

UT2 restored portion, east of Canterfield Lane, 29 October 2013.

UT2 restored portion, east of Canterfield Lane, 12 Nov 2014.

Figure B.4 Continued

Photo Station 10

Lower portion of UT2 abandoned channel at confluence with SHC, Pre-construction, facing downstream, 26 April 2010.

Lower portion of UT2 at confluence with SHC, facing upstream, 5 September 2011.

Lower portion of UT2 at confluence with SHC, facing downstream, 20 November 2012.

Lower portion of UT2, facing downstream, 29 October 2013.

Lower portion of UT2, facing downstream, 12 Nov 2014.

Figure B.4 Continued

Bura Property Left Bank, Roberson Property Right Bank, South Hominy Creek – (Restoration)

Photo Station 11

Livestock access right bank, sta. 1+00 to 1+50, facing downstream. 22 January 2009.

Log vane sta. 1+00 to 1+50, facing downstream

Log vane sta. 1+00 to 1+50, facing downstream, 20 November 2012.

Log vane sta. 1+00 to 1+50, facing downstream, 29 October 2013.

Log vane sta. 1+00 to 1+50, facing downstream, 12 Nov 2014.

Figure B.4 Continued

Photo Station 12

Mid channel aggradation, sta. 1+50 to 2+50, facing downstream.
22 January 2009.

Log vane at sta. 1+50 to 2+50, facing downstream,
5 December 2011.

Log vane sta. 1+50 to 2+50, facing downstream, 20 November 2012.

Log vane sta. 1+50 to 2+50, facing downstream, 29 October 2013.

Log vane sta. 1+50 to 2+50, facing downstream, 12 Nov 2014.

Figure B.4 Continued

Bura Left Bank, Roberson Right Bank, South Hominy Creek – (Enhancement II)

Photo Station 13

Typical features along channel in enhancement II reach, downstream, 22 January 2009.

Fence and invasive removal, bank sloping, sta. 5+00, facing downstream, 22 September 2011.

Fence and invasive removal, bank sloping, sta. 5+00, facing downstream, 20 November 2012.

Fence and invasive removal, bank sloping, sta. 5+00, facing downstream, 29 October 2013.

Sta. 5+00, facing downstream, 12 Nov 2014.

Figure B.4 Continued

Bura Left Bank, Roberson Right Bank, South Hominy Creek – (Restoration)

Photo Station 14

Outside meander bend bank stress, sta. 7+25 to 8+00,
facing downstream, 22 January 2009.

Log vane, root wad, and bank shaping, sta. 7+25 to 8+00,
22 September 2011.

Log vane, root wad, and bank shaping, sta. 7+25 to 8+00,
20 November 2012.

Log vane, root wad, and bank shaping, sta. 7+25 to 8+00,
29 October 2013.

Log vane, root wad, and bank shaping, sta. 7+25 to 8+00,
12 Nov 2014.

Figure B.4 Continued

Photo Station 15

Bed aggradation and transverse bar, sta. 9+50 to 10+00, facing downstream, 22 January 2009.

Bank sloping and J-hook, sta. 9+25 to 10+00, 22 September 2011.

Bank sloping and J-hook, sta. 9+25 to 10+00, 14 June 2012.

Bank sloping and J-hook, sta. 9+25 to 10+00, 29 October 2013.

Bank sloping and J-hook, sta. 9+25 to 10+00, 12 Nov 2014.

Figure B.4 Continued

Bura Left Bank, Roberson Right Bank, South Hominy Creek – (Enhancement II)

Photo Station 16

Lower portion of enhancement II, sta. 11+50 to 12+00, facing downstream, 22 January 2009.

Bank shaping, root wads, and toe-wood, sta. 11+50 to 12+00, facing downstream, 22 September 2011.

Bank shaping, root wads, and toe-wood, sta. 11+50 to 12+00, facing downstream, 20 November 2012.

Bank shaping, root wads, and toe-wood, sta. 11+50 to 12+00, facing downstream, 20 November 2012.

Bank shaping, root wads, and toe-wood, sta. 11+50 to 12+00, facing downstream, 12 Nov 2014.

Figure B.4 Continued

Photo Station 17

Driveway bridge at lower end of Bura/Roberson properties, sta. 12+50, facing downstream, 22 January 2009.

J-hook sta. 12+75, lower end of Bura/Roberson properties, 22 September 2011.

J-hook sta. 12+75, lower end of Bura/Roberson properties, 20 November 2012.

J-hook sta. 12+75, lower end of Bura/Roberson properties, 29 October 2013.

J-hook sta. 12+75, lower end of Bura/Roberson properties, 12 Nov 2014.

Figure B.4 Continued

Davis Property, South Hominy Creek – (Enhancement I)

Photo Station 18

J-hook proposed, sta. 0+50, facing downstream, 25 July 2008, pre-construction.

Bank shaping, log vane, and riffle construction, sta. 0+25, 22 September 2011.

Bank shaping, log vane, and riffle construction, sta. 0+25, 20 November 2012.

Bank shaping, log vane, and riffle construction, sta. 0+25, 29 October 2013.

Bank shaping, log vane, and riffle construction, sta. 0+25, 12 Nov 2014.

Figure B.4 Continued

Davis Property, South Hominy Creek – (Enhancement I)

Photo Station 19

In-stream structures proposed to enhance habitat features, sta. 2+00 3+50, facing downstream, 25 July 2008.

Log vane, root wads, and bank shaping, sta. 2+25 to 3+50, facing downstream, 7 December 2011.

Log vane, root wads, and bank shaping, sta. 2+25 to 3+50, facing downstream, 20 November 2012.

Log vane, root wads, and bank shaping, sta. 2+25 to 3+50, facing downstream, 29 October 2013.

Log vane, root wads, and bank shaping, sta. 2+25 to 3+50, facing downstream, 12 Nov 2014.

Figure B.4 Continued

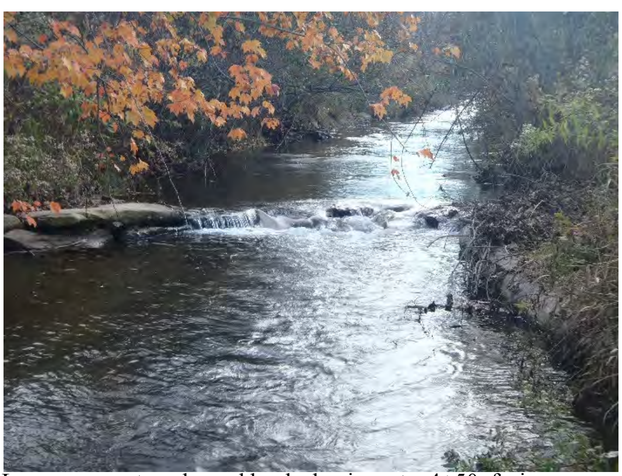
Photo Station 20

Lower end of Enhancement I, sta. 3+50 to 4+50, facing downstream. 25 July 2008.

Log vane, root wads, and bank shaping, sta. 4+50, facing upstream, 19 October 2011.

Log vane, root wads, and bank shaping, sta. 4+50, facing downstream 20 November 2012.

Log vane, root wads, and bank shaping, sta. 4+50, facing downstream 29 October 2013.



Log vane, root wads, and bank shaping, sta. 4+50, facing upstream 12 Nov 2014.

Figure B.4 Continued

Davis Property, South Hominy Creek – (Enhancement II)

Photo Station 21

Cross vane, riffle construction, and bank shaping, sta. 6+75, 4 October 2011.

Cross vane, riffle construction, and bank shaping, sta. 6+75, 20 November 2012.

Cross vane, riffle construction, and bank shaping, sta. 6+75, 29 October 2013.

Cross vane, riffle construction, and bank shaping, sta. 6+75, 12 Nov 2014.

Figure B.4 Continued

Photo Station 22

Left bank of Davis property, sta. 7+37, lower project boundary, facing upstream, 15 November 2011.

Left bank of Davis property, sta. 7+37, lower project boundary, facing upstream, 20 November 2012.

Left bank of Davis property, sta. 7+37, lower project boundary, facing upstream, 29 October 2013.

Left bank of Davis property, sta. 7+37, lower project boundary, facing upstream, 12 Nov 2014.

Figure B.4 Continued

Davis Property, Unnamed Tributary, UT3 – (Preservation)

Photo Station 23

Upper portion of UT3 preservation, facing downstream, 25 July 2008.

MY0-2011 no photo taken.

Upper portion of UT3 preservation, facing downstream, 20 November 2012.

Upper portion of UT3 preservation, facing downstream, 29 October 2013.

Upper portion of UT3 preservation, facing downstream, 20 November 2012.

Figure B.4 Continued

Davis Property, Unnamed Tributary, UT3 – (Enhancement II)

Photo Station 24

UT3 above ford, channel incision, facing downstream, 25 July 2008.

UT3 above ford, invasive removal, cattle exclusion, and bank shaping, facing upstream, 9 November 2011.

UT3 above ford, invasive removal, cattle exclusion, and bank shaping, facing upstream, 20 November 2012.

UT3 above ford, invasive removal, cattle exclusion, and bank shaping, facing upstream, 29 October 2013.

UT3 above ford, invasive removal, cattle exclusion, and bank shaping, facing upstream, 12 Nov 2014.

Figure B.4 Continued

Davis Property, Unnamed Tributary, UT3 Upper – (Restoration)

Photo Station 25

UT3 below ford, severe entrenchment and head cutting, 25 July 2008.

UT3 below ford, Priority I channel restoration, facing downstream, sta. 0+00, 15 November 2011.

UT3 below ford, Priority I channel restoration, facing downstream, sta. 0+00, 14 June 2012.

UT3 below ford, Priority I channel restoration, facing downstream, sta. 0+00, 29 October 2013.

UT3 below ford, Priority I channel restoration, facing downstream, sta. 0+00, 12 Nov 2014.

Figure B.4 Continued

Davis Property, Unnamed Tributary, UT3 Lower – (Restoration)

Photo Station 26


UT3 lower at confluence with SHC, Priority I restoration, facing upstream, 15 November 2011.


UT3 lower at confluence with SHC, Priority I restoration, facing upstream, 20 November 2012.


UT3 lower at confluence with SHC, Priority I restoration, facing upstream, 29 October 2013.


UT3 lower at confluence with SHC, Priority I restoration, facing upstream, 12 Nov 2014.

Figure B.5 Bankfull Verification Photographs, Upper South Hominy Mitigation Site.

Photo 1 bankfull event on SHC, Bianculli property, sta. 6+00, 28 November 2011.

Photo 4 bankfull event on SHC, Bianculli property, sta. 6+00 06 May 2013.

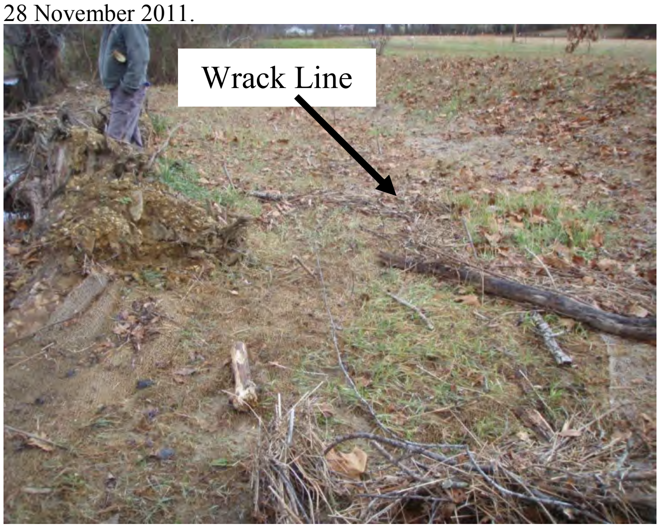


Photo 2 bankfull event on SHC, Roberson property, sta. 8+00 28 November 2011.

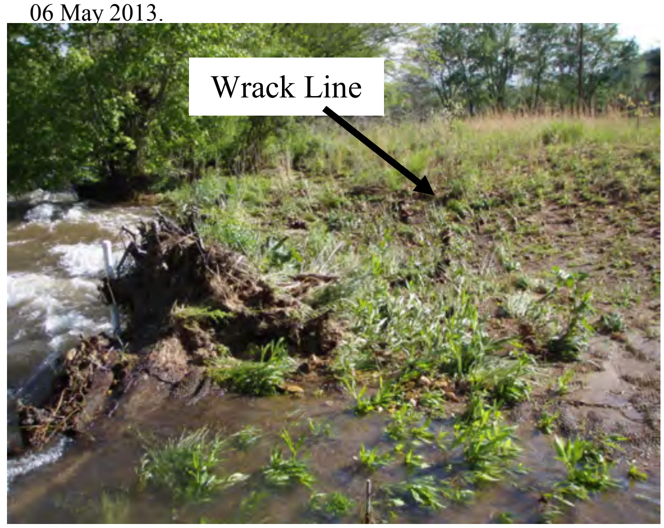


Photo 5 bankfull event on SHC, Roberson property, sta. 8+00 06 May 2013

Simple crest gage verification of the 5 May 2013 bankfull event.

Stream gage plate, sta. 8+00, Mainstem 1 reach

Figure B.5 Continued

Photo 3 bankfull event on SHC, Davis property, sta. 0+50
28 November 2011.

Photo 6 bankfull event on SHC, Davis property, sta. 0+50
06 May 2013.

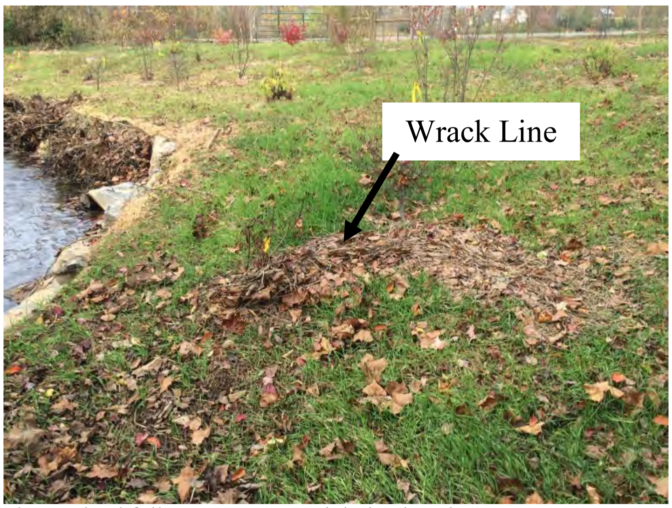


Photo 7 bankfull event on SHC, right bank Robertson property, approximately sta.12+00 facing downstream on 28 October 2014.

Figure B.6 Stream Problem Area Photographs, Upper South Hominy Mitigation Site.

Bianculli Property, South Hominy Creek

Problem Area 1

Rock vane after construction, sta. 1+50, facing upstream,
5 September 2011.

Rock vane after flood damage, sta. 1+50, facing upstream,
14 June 2012.

Rock vane, sta. 1+50, facing upstream, 20 November 2012.

Rock vane, sta. 1+50, facing upstream, 29 October 2013

Rock vane, sta 1+50 facing downstream 28, October 2014

Rock vane, sta 1+50 facing upstream, 28, October 2014

Figure B.6 Continued

Bianculli Property, South Hominy Creek

Problem Area 2

Right channel bank in stable condition, sta. 2+00, facing upstream, 5 September 2011.

Right channel bank instability after flood damage, sta. 1+75 to 2+25, facing upstream, 5 December 2011.

Right channel bank instability after flood, sta. 1+75 to2+25, facing upstream, 14 June 2012.

Right channel bank instability, sta. 1+75 to2+25, facing downstream, 20 November 2012.

Figure B.6 Continued

Bianculli Property, South Hominy Creek

Problem Area 2

Right channel bank condition after 5 May 2013 flood,
sta. 1+75 to 2+25 facing upstream, 18 July 2013.

Right channel bank condition after 5 May 2013 flood,
sta. 1+75 to 2+25, facing downstream, 29 October 2013.

Right channel bank condition
sta. 1+75 to 2+25 facing upstream, 20 October 2014.

Right channel bank condition
sta.1+45 to 2+75, facing upstream, 28 October 2014.

Figure B.6 Continued

Bianculli Property, South Hominy Creek

Problem Area 3

J-hook and meander post construction, sta. 2+50, facing downstream, 5 September 2011.

Aggradation and bar formation in meander below J-hook after flood event, sta. 2+50, facing downstream, 5 December 2011.

Aggradation and bar formation in meander below J-hook, sta. 2+50, facing downstream, 20 November 2012.

Aggradation and thalweg movement following 5 May 2013 flood, sta. 2+50, facing downstream, 29 October 2013.

Figure B.6 Continued

Bianculli Property South Hominy Creek

Problem Area 3

Aggradation below J-hook sta 2+50 facing
Downstream 28 October 2014

Figure B.6 Continued

Bura Property Left Bank, Roberson Property Right Bank, South Hominy Creek

Problem Area 4

J-hook vane after construction, sta. 9+25, facing upstream, 5 September 2011.

Aggradation and bar formation below J-hook, sta. 9+25 to 9+50, after flood event, facing upstream, 5 December 2011.

Inner berm formation below J-hook, sta. 9+25 to 9+50, following 5 May 2013 flood event, facing upstream, 18 July 2013.

No photo taken during MY03 2014

Figure B.6 Continued

Bianculli Property, South Hominy Creek

Problem Area 5

Cross vane after construction, facing upstream, sta. 0+50
14 Aug 2011.

Cross vane after 5 May 2013 flood event, facing upstream,
sta. 0+50, 18 July 2013.

No longer considered a problem during MY3 (2014) field surveys
28 October 2014

Figure B.6 Continued

Bianculli Property, South Hominy Creek

Problem Area 6

J-hook vane after construction, sta. 5+75, facing downstream, 14 August 2011.

J-hook arm collapse during 5 May 2013 flood event, sta. 5+75, facing downstream, 29 October 2013.

Right bank scour and erosion, sta. 6+25, facing downstream, occurred during the 5 May 2013 flood event, 29 October 2013.

Right bank scour and erosion, sta 6+25 to 6+50 facing upstream, 28 October 2014

Figure B.6 Continued

Bura Property Left Bank, Roberson Property Right Bank, South Hominy Creek

Problem Area 7


J-hook, sta. 12+75, after construction, facing upstream, 22 Sept 2011.


J-hook after 28 Nov 2011 flood event, aggradation in pool below J-hook, 5 December 2011.


J-hook after 5 May 2013 flood event, aggradation above J-hook and scour pool below, 29 October 2013.


Right bank scour and erosion during 5 May 2013 flood event, facing upstream, sta. 12+50, 18 July 2013.

Figure B.6 Continued

Bura Property Left Bank, Roberson Property Right Bank, South Hominy Creek

Problem Area 7

PA-7 station 12+75 facing upstream was repaired and is no longer considered a problem 28 October 2014

PA-7 station 12+75 facing downstream was repaired and is no longer considered a problem 28 October 2014

Figure B.6 Continued

Bianculli Property, South Hominy Creek

Problem Area 8

Aggradation below J-hook, sta. 4+00 to 4+50, following 5 May 2013 flood event, facing downstream, 29 October 2013.

Aggradation below J-hook, sta 4+00 to 4+50, facing upstream, 28 October 2014

Figure B.6 Continued

Davis Property, South Hominy Creek

Problem Area 9

Right bank scour during 5 May 2013 flood event,
sta. 0+00 to 0+20, facing downstream, 18 July 2013.

PA-09 was no longer considered a problem during MY3 (2014)
surveys, 28 October 2014

Figure B.6 Continued

Davis Property, UT-3 to South Hominy Creek

Problem Area 10

Aggradation due to low flow velocity and dense herbaceous vegetation, sta. 0+00 to 2+00 UT-3 Upper Davis Reach, facing upstream, 28 October 2014.

Figure B.7 Wetland Delineations Map and Wetland Station Pictures. Map Prepared by Confluence Engineering, PC and ClearWater Environmental Consultants, Inc. Pre-construction Wetland Photos Courtesy of ClearWater Environmental Consultants, Inc.

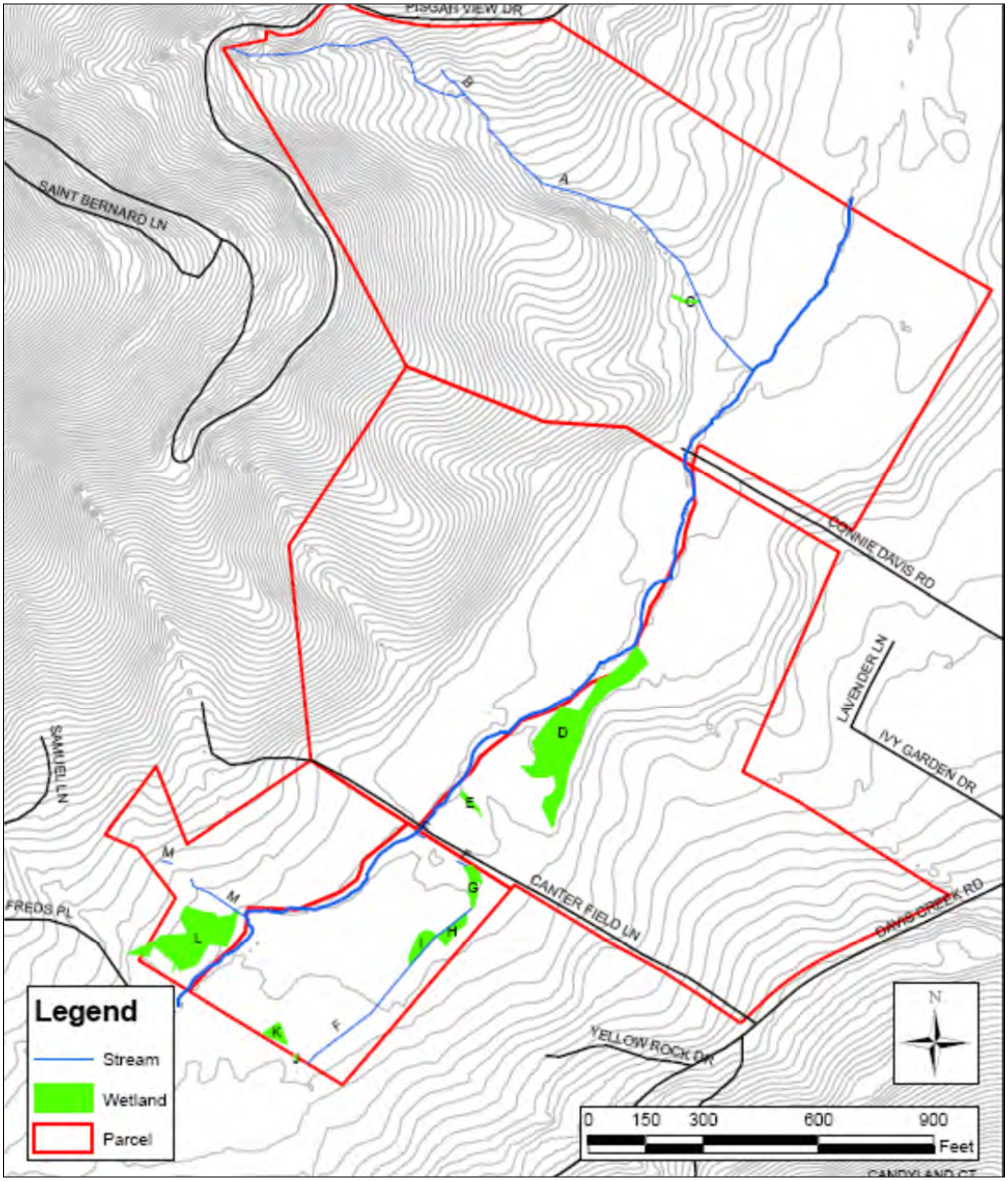


Figure B.7 Continued

Bianculli Property, Wetland L (Wetland Station 1)

Wetland L, pre-construction, 2009.

Wetland L constructed ephemeral pool, facing upstream, 5 December 2011.

Wetland L constructed ephemeral pool, facing upstream, 20 November 2012.

Wetland L constructed ephemeral pool, facing upstream, 29 October 2013.

Wetland L constructed ephemeral pool, facing upstream, 27 October 2014.

Figure B.7 Continued

Roberson Property, Wetland E and UT2 (Wetland Station 2)


Wetland E, UT2 facing upstream, pre-construction, 2009.


Wetland E reconnected with spring flow from UT2,
5 September 2011.


Wetland E reconnected with spring flow from UT2,
14 June 2012.


Wetland E reconnected with spring flow from UT2,
29 October 2013.


Wetland E reconnected with spring flow from UT2,
27 October 2014.

Figure B.7 Continued

Roberson Property, Wetland D (Wetland Station 3)

Wetland D, facing downstream, pre-construction, 2009. September

Enhancement to Wetland D, facing downstream, 22 2011.

Enhancement to Wetland D, facing downstream, 20 November 2012

Enhancement to Wetland D, facing downstream, 29 October 2013.

Enhancement to Wetland D, facing downstream, 27 October 2014.

Figure B.7 Continued

Roberson Property, Wetland D (Wetland Station 4)

Wetland D, area of livestock access, facing upstream, 2009. Enhancement to lower portion of Wetland D, 22 September 2011.

Enhancement to lower portion of Wetland D,
20 November 2012.

Enhancement to lower portion of Wetland D,
29 October 2013.

Enhancement to lower portion of Wetland D,
27 October 2014.

Figure B.7 Continued

Wetland Station 5

Lower portion of Wetland D, livestock impacts, facing upstream, 2009.

Lower portion of Wetland D, at SHC confluence, 22 September 2011.

Lower portion of Wetland D, at SHC confluence, 20 November 2012.

Lower portion of Wetland D, at SHC confluence, 29 October 2013.

Lower portion of Wetland D, at SHC confluence, 27 October 2014

Appendix C.

Vegetation Data, CVS Output Tables, and Vegetation Plot Photographs

Table C.1 Annual Seed Mix, Perennial Native Seed Mix, and Live Stake Species Used to Stabilize and Revegetate the Upper South Hominy Mitigation Site.

Type	Common Name	Scientific Name	Rate	Zone [a]	Number
Annual seed	Browntop millet	*Panicum ramosum*	10 lb/ac	1,2,3	
	Buckwheat	*Eriogonum spp.*	15 lb/ac	1,2	
	Winter rye	*Lolium spp.*	30 lb/ac	1,2	
	Winter wheat	*Triticum spp.*	15 lb/ac	1,2	
Perennial native seed	Arrowleaf tearthumb	*Polygonum sagittatum*		1,2	
	Big bluestem	*Andropogon gerardii*		1,2	
	Blackeyed Susan	*Rudbeckia hirta*		1,2	
	Blue vervain	*Verbena hastata*		1,2	
	Deer tongue	*Panicum clandestinum*		1,2	
	Eastern bur reed	*Sparganium americanum*		1,3	
	Green bulrush	*Scirpus atrovirens*		1,3	
	Grey headed cone flower	*Ratibida pinnata*		1,2	
	Hop sedge	*Carex lupulina*		1,3	
	Indian wood oats	*Chasmanthium latifolium*		1,2	
	Indiangrass	*Sorghastrum nutans*		1,2	
	Lanceleaf coreopsis	*Coreopsis lanceolata*		1,2	
	Little bluestem	*Schizachyrium scoparium*		1,2	
	Many leaved bulrush	*Scirpus polyphyllus*		1,3	
	Nodding bur-marigold	*Bidens cernua*		1,2	
	Oxeye sunflower	*Heliopsis helianthoides*		1,2	
	Partridge pea	*Chamaecrista fasciculata*		1,2	
	Pennsylvania smartweed	*Polygonum pensylvanicum*		1,2	
	Purple cone flower	*Echinacea purpurea*		1,2	
	River oats	*Chasmanthium latifolium*		1,2	
	Showy evening primrose	*Oenothera speciosa*		1,2	
	Showy tickseed sunflower	*Bidens aristosa*		1,2	
	Smooth panic grass	*Panicum dichotomiflorum*		1,2	
	Soft rush	*Juncus effusus*		1,3	
	Softstem bulrush			1,3	
	Switch grass	*Panicum virgatum*		1,2	
	Virginia wild rye	*Elymus virginicus*		1,2	
		Combined Total	15 lb/ac		
Live stakes	Elderberry	*Sambucus canadensis*		1,3	250
	Silky dogwood	*Cornus amomum*		1,3	3,250
	Silky willow	*Salix sericea*		1,3	1,500
		Total		1,3	5,000

[a] Planting zone refer to stream bank & floodplain areas (1), transition & upland areas (2), or wetland areas (3).

Table C.2 Shrub and Tree Species Installed at the Upper South Hominy Mitigation Site. Plant Source Was Either Bare Root (B) or Containerized (C) Nursery Stock.

Type	Common Name	Scientific Name	Wetness Indicator	Zone[a]	Number Installed	Plant Source[b,c]
Shrubs and small trees	American beauty berry	*Callicarpa americana*	FACU	2	20	C
	Arrowwood viburnum	*Viburnum dentatum*	FAC	2	30	C
	Button bush	*Cephalanthus occidentalis*	OBL	1,2,3	30	C
	Elderberry	*Sambucus canadensis*	FACW	1,2,3	25	C
	Possum haw	*Ilex decidua*	FACW	2	30	C
	Red chokeberry	*Aronia arbutifolia*	FACW	2	20	C
Totals	6				155	
Medium trees	Black cherry	*Prunus serotina*	FACU	2	100	B
	Black willow	*Salix nigra*	OBL	1,2,3	50	C
	Carolina ash	*Fraxinus caroliniana*	OBL	2	15	C
	Dogwood	*Cornus florida*	FACU	2	200	B
	Eastern redbud	*Cercis canadensis*	FACU	2	100	B
	Ironwood	*Carpinus caroliniana*	FAC	2	23	C
	Persimmon	*Diospyros virginiana*	FACU	2	25, 100	C,B
	River birch	*Betula nigra*	FACW	2	20, 200	C,B
	Southern crabapple	*Malus angustifolia*	FACU	2	100	B
Totals	9				933	
Large trees	Black gum	*Nyssa sylvatica*	FAC	2	100	B
	Bitternut hickory	*Carya cordiformis*	FAC	2	100	B
	Cherrybark oak	*Quercus pagoda*	FAC	2	100	B
	Chestnut oak	*Quercus prinus*	FAQU	2	100	B
	Mockernut hickory	*Carya alba*	FACU	2	100	B
	Northern red oak	*Quercus rubra*	FACU	2	30, 100	C,B
	Pin oak	*Quercus palustris*	FACW	2	100	B
	Scarlet oak	*Quercus coccinea*	FACU	2	2, 200	C, B
	Shagbark hickory	*Carya ovata*	FACU	2	100	B
	Shumard's oak	*Quercus shumardii*	FACW	2	10, 100	C,B
	Sycamore	*Platanus occidentalis*	FACW	2	200	B
	White oak	*Quercus alba*	FACU	2	30, 100	C,B
	Yellow buckeye	*Aesculus flava*	FAC	2	20	C
Totals	13				1,492	

[a] Planting zone refer to stream bank & floodplain areas (1), transition & upland areas (2), or wetland areas (3).

[b] Bare root whips ranged from 1 to 2 feet in height; hickory species were less averaging 6 inches in height.

[c] Container sizes ranged from 5 to 7 gallon; the majority of the plants were in 5 gallon containers.

Table C.3 Vegetation Monitoring Plot Location, Orientation, and Dimension, Upper South Hominy Mitigation Site.

Vegetation Monitoring Plots Photographs Upper South Hominy Mitigation Site (EEP project number 92632)			
Stream	**Location**	**Bearing (Degrees from North)**	**Plot Dimensions (m)**
UT2	Plot 1 left bank sta. 2+00	Plot origin (x,y) 140º	10 X 10
SHC	Plot 2 right bank sta. 7+50	Plot origin (x,y) 160º	10 X 10
SHC	Plot 3 left bank sta. 7+25	Plot origin (x,y) 140º	10 X 10
SHC	Plot 4 right bank sta. 0+50	Plot origin (x,y) 140º	10 X 10
SHC	Plot 5 left bank sta. 9+50	Plot origin (x,y) 125º	10 X 10
SHC	Plot 6 right bank sta.10+50	Plot origin (x,y) 120º	5 X 20
SHC	Plot 7 right bank sta. 0+75	Plot origin (x,y) 140º	10 X 10
SHC	Plot 8 left bank sta. 2+50	Plot origin (x,y) 150º	10 X 10
SHC	Plot 9 right bank sta. 5+75	Plot origin (x,y) 140º	5 X 20
UT3 Lower	Plot 10 left bank sta. 1+00	Plot origin (x,y) 130º	10 X 10

Table C.4 Vegetation Metadata, Upper South Hominy Mitigation Site.

MY0-MY3 Vegetation Metadata Upper South Hominy Mitigation Site (EEP project number 92632)	
Report Prepared By	Phillip Perkinson
Date Prepared	11/3/2014 15:37
Database Name	USH MY2 cvs-eep-entrytool-v2.3.1.mdb
Database Location	S:\CVS database\2014
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Project, Planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Project, Total Stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp.	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp.	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp.	Count of living stems of each species for each plot; dead and missing stems are excluded.
PROJECT SUMMARY	
Project Code/Number	92632
Project Name	Upper South Hominy Mitigation Site
Description	NCEEP Mitigation Site, Buncombe County, N.C.
Length (ft)	5,804
Stream-to-Edge Width (ft)	30
Area (m^2/acres)	33,586 m^2 / 8.3 acres
Required Plots (calculated)	9
Sampled Plots	10

Table C.5 Vegetation Vigor by Species, Upper South Hominy Mitigation Site.

MY0 Vegetation Vigor by Species								
Upper South Hominy Mitigation Site (EEP project number 92632)								
Species	**Common Name**	**4**	**3**	**2**	**1**	**0**	**Missing**	**Unknown**
Aesculus flava	Yellow buckeye	2	1					
Aronia arbutifolia	Red Chokeberry	1	2					
Betula nigra	River birch		6					
Callicarpa americana	American beautyberry	6						
Carpinus caroliniana	American hornbeam	1						
Carya alba	Mockernut hickory		5					
Carya cordiformis	Bitternut hickory		5					
Carya ovata	Shagbark hickory	1	4					
Cephalanthus occidentalis	Buttonbush		2					
Cercis canadensis	Eastern redbud		8					
Cornus amomum	Silky dogwood		4					
Cornus florida	Flowering dogwood		16					
Diospyros virginiana	Persimmon	1	14					
Fraxinus caroliniana	Carolina ash	1						
Ilex decidua	Possumhaw	1	1					
Liriodendron tulipifera	Tuliptree		8					
Malus angustifolia	Southern crabapple	1						
Nyssa sylvatica	Blackgum		3					
Platanus occidentalis	Sycamore		7					
Prunus serotina	Black cherry		15					
Quercus alba	White oak		7					
Quercus coccinea	Scarlet oak		7					
Quercus pagoda	Cherrybark oak		7					
Quercus palustris	Pin oak	1	7					
Quercus prinus	Chestnut oak		5					
Quercus rubra	Northern red oak	2	6					
Quercus shumardii	Shumard's oak		9					
Salix nigra	Black willow	3	1					
Salix sericea	Silky willow		3					
Sambucus canadensis	Elderberry	4	2					
Viburnum dentatum	Southern arrowwood	2	2					
Total Species	**31**	**27**	**157**					

Table C.5 Continued

MY1 Vegetation Vigor by Species								
Upper South Hominy Mitigation Site (EEP project number 92632)								
Species	**Common Name**	**4**	**3**	**2**	**1**	**0**	**Missing**	**Unknown**
Aesculus flava	Yellow buckeye		2				1	
Aronia arbutifolia	Red Chokeberry		1	1			1	
Betula nigra	River birch		4			1		
Callicarpa americana	American beautyberry		5	1				
Carpinus caroliniana	American hornbeam		1					
Carya alba	Mockernut hickory			2	1			
Carya cordiformis	Bitternut hickory			3		2		
Carya ovata	Shagbark hickory			3		1		
Cephalanthus occidentalis	Buttonbush		2					
Cercis canadensis	Eastern redbud		4	4				
Cornus amomum	Silky dogwood		2				1	
Cornus florida	Flowering dogwood		3	6	2	2	1	
Diospyros virginiana	Persimmon		7	8		1		
Fraxinus caroliniana	Carolina ash	1						
Ilex decidua	Possumhaw		2					
Liriodendron tulipifera	Tuliptree	1	4	2		1		
Malus angustifolia	Southern crabapple		2	1	1			
Nyssa sylvatica	Blackgum		3	3				
Platanus occidentalis	Sycamore	3	1	2	1			
Prunus serotina	Black cherry		5	6	2		1	
Quercus alba	White oak	1	5	3	1			
Quercus coccinea	Scarlet oak		6	2		2		
Quercus pagoda	Cherrybark oak	1	2	3	1			
Quercus palustris	Pin oak		3	3	1	1		
Quercus prinus	Chestnut oak			2			1	
Quercus rubra	Northern red oak	2	3	4				
Quercus shumardii	Shumard's oak		5	3				
Salix nigra	Black willow	2	2					
Salix sericea	Silky willow	4						
Sambucus canadensis	Elderberry	1	4	1	1			
Viburnum dentatum	Southern arrowwood		5					
Total Species	**31**	**16**	**83**	**63**	**11**	**11**	**6**	

Table C.5 Continued

MY2 Vegetation Vigor by Species								
Upper South Hominy Mitigation Site (EEP project number 92632)								
Species	**Common Name**	**4**	**3**	**2**	**1**	**0**	**Missing**	**Unknown**
Aesculus flava	Yellow buckeye		2					
Aronia arbutifolia	Red Chokeberry		2				**1**	
Betula nigra	River birch	1	2	1				
Callicarpa americana	American beautyberry		5	1				
Carpinus caroliniana	American hornbeam		1					
Carya alba	Mockernut hickory			1		**1**	**1**	
Carya cordiformis	Bitternut hickory			2		**1**		
Carya ovata	Shagbark hickory			3				
Cephalanthus occidentalis	Buttonbush		2					
Cercis canadensis	Eastern redbud		2	5	1			
Cornus amomum	Silky dogwood		2				**1**	
Cornus florida	Flowering dogwood		10	2		**1**		
Diospyros virginiana	Persimmon		5	5	2	**1**	**1**	
Fraxinus caroliniana	Carolina ash	1						
Ilex decidua	Possumhaw		2					
Liriodendron tulipifera	Tuliptree	3	2	2				
Malus angustifolia	Southern crabapple		3					
Nyssa sylvatica	Blackgum			6				
Platanus occidentalis	Sycamore	3	2	2				
Prunus serotina	Black cherry		4	7			**3**	
Quercus alba	White oak	1	4	5		**1**		
Quercus coccinea	Scarlet oak		4	3				
Quercus pagoda	Cherrybark oak		4	1				
Quercus palustris	Pin oak		1	6				
Quercus prinus	Chestnut oak		2	1		**1**		
Quercus rubra	Northern red oak	3	3	3				
Quercus shumardii	Shumard's oak	1	5	2				
Salix nigra	Black willow	1	2	1				
Salix sericea	Silky willow		1	3				
Sambucus canadensis	Elderberry	2	2	1		**1**	**1**	
Viburnum dentatum	Southern arrowwood	1	4					
Total Species	**31**	**17**	**78**	**63**	**3**	**7**	**8**	

Table C.5 Continued

MY3 Vegetation Vigor by Species								
Upper South Hominy Mitigation Site (EEP project number 92632)								
Species	**Common Name**	**4**	**3**	**2**	**1**	**0**	**Missing**	**Unknown**
Aesculus flava	yellow buckeye	2						
Aronia arbutifolia	Red Chokeberry	1	1					
Betula nigra	river birch	2	1			1		
Callicarpa americana	American beautyberry	1	1			4		
Carya alba	mockernut hickory						2	
Carya cordiformis	bitternut hickory						2	
Carya ovata	shagbark hickory					1	2	
Cephalanthus occidentalis	common buttonbush	2						
Cornus amomum	silky dogwood	2						
Cornus florida	flowering dogwood	9	3				1	
Diospyros virginiana	common persimmon	7	3				3	
Fraxinus caroliniana	Carolina ash	1						
Nyssa sylvatica	blackgum	6						
Quercus alba	white oak	9	4					
Quercus coccinea	scarlet oak	5						
Quercus michauxii	swamp chestnut oak	2						
Quercus montana			1					
Quercus muehlenbergii	chinkapin oak	2	2					
Quercus pagoda	cherrybark oak	3	1					
Quercus palustris	pin oak	3						
Quercus prinoides	dwarf chinkapin oak		2					
Salix nigra	black willow	3		1				
Salix sericea	silky willow		4					
Sambucus canadensis	Common Elderberry	3	1	1		1		
Malus angustifolia	southern crabapple	2						
Viburnum dentatum	southern arrowwood	3	2					
Ilex decidua	possumhaw	1	1					
Carpinus caroliniana	American hornbeam	1						
Cercis canadensis	eastern redbud	6	1			1		
Quercus	oak		1					
Quercus rubra	northern red oak	7	4					
Quercus shumardii	Shumard's oak	4	1					
Liriodendron tulipifera	tuliptree	5	2					
Platanus occidentalis	American sycamore	8						
Prunus serotina	black cherry	5	5			1	2	
35	**34**	**105**	**41**	**2**		**9**	**12**	

Table C.6 Vegetation Damage by Species, Upper South Hominy Mitigation Site.

MY0 Vegetation Damage by Species			
Upper South Hominy Mitigation Site (EEP project number 92632)			
Species	**Common Name**	**Count of Damage Categories**	**(no damage)**
Aesculus flava	Yellow buckeye	0	3
Aronia arbutifolia	Red Chokeberry	0	3
Betula nigra	River birch	0	6
Callicarpa americana	American beautyberry	0	6
Carpinus caroliniana	American hornbeam	0	1
Carya alba	Mockernut hickory	0	5
Carya cordiformis	Bitternut hickory	0	5
Carya ovata	Shagbark hickory	0	5
Cephalanthus occidentalis	Buttonbush	0	2
Cercis canadensis	Eastern redbud	0	8
Cornus amomum	Silky dogwood	0	4
Cornus florida	Flowering dogwood	0	16
Diospyros virginiana	Persimmon	0	15
Fraxinus caroliniana	Carolina ash	0	1
Ilex decidua	Possumhaw	0	2
Liriodendron tulipifera	Tuliptree	0	8
Malus angustifolia	Southern crabapple	0	1
Nyssa sylvatica	Blackgum	0	3
Platanus occidentalis	Sycamore	0	7
Prunus serotina	Black cherry	0	15
Quercus alba	White oak	0	7
Quercus coccinea	Scarlet oak	0	7
Quercus pagoda	Cherrybark oak	0	7
Quercus palustris	Pin oak	0	8
Quercus prinus	Chestnut oak	0	5
Quercus rubra	Northern red oak	0	8
Quercus shumardii	Shumard's oak	0	9
Salix nigra	Black willow	0	4
Salix sericea	Silky willow	0	3
Sambucus canadensis	Elderberry	0	6
Viburnum dentatum	Southern arrowwood	0	4
Total Species	**31**	**0**	**184**

Table C.6 Continued

MY1 Vegetation Damage by Species								
Upper South Hominy Mitigation Site (EEP project number 92632)								
Species	**Common Name**	**Count of Damage Categories**	**No Damage**	**Beaver**	**Human Trampled**	**Rodents**	**Unknown**	**Vine**
Aesculus flava	Yellow buckeye		3					
Aronia arbutifolia	Red Chokeberry		3					
Betula nigra	River birch	1	4				1	
Callicarpa americana	American beautyberry		6					
Carpinus caroliniana	American hornbeam		1					
Carya alba	Mockernut hickory		3					
Carya cordiformis	Bitternut hickory	1	4		1			
Carya ovata	Shagbark hickory		4					
Cephalanthus occidentalis	Buttonbush		2					
Cercis canadensis	Eastern redbud		8					
Cornus amomum	Silky dogwood		3					
Cornus florida	Flowering dogwood	1	13	1				
Diospyros virginiana	Persimmon		16					
Fraxinus caroliniana	Carolina ash		1					
Ilex decidua	Possumhaw		2					
Liriodendron tulipifera	Tuliptree		8					
Malus angustifolia	Southern crabapple	1	3					1
Nyssa sylvatica	Blackgum	1	5			1		
Platanus occidentalis	Sycamore	3	4	3				
Prunus serotina	Black cherry	2	12		1			1
Quercus alba	White oak		10					
Quercus coccinea	Scarlet oak		10					
Quercus pagoda	Cherrybark oak	1	6	1				
Quercus palustris	Pin oak	2	6		2			
Quercus prinus	Chestnut oak		3					
Quercus rubra	Northern red oak	2	7	1	1			
Quercus shumardii	Shumard's oak		8					
Salix nigra	Black willow		4					
Salix sericea	Silky willow		4					
Sambucus canadensis	Elderberry		7					
Viburnum dentatum	Southern arrowwood		5					
Total Species	**31**	**15**	**175**	**6**	**5**	**1**	**1**	**2**

Table C.6 Continued

MY2 Vegetation Damage by Species								
Upper South Hominy Mitigation Site (EEP project number 92632)								
Species	**Common Name**	**Count of Damage Categories**	**No Damage**	**Beaver**	**Human Trampled**	**Rodents**	**Unknown**	**Vine**
Aesculus flava	Yellow buckeye	0	2					
Aronia arbutifolia	Red Chokeberry	0	3					
Betula nigra	River birch	1	3	1				
Callicarpa americana	American beautyberry	0	6					
Carpinus caroliniana	American hornbeam	1		1				
Carya alba	Mockernut hickory	0	3					
Carya cordiformis	Bitternut hickory	0	3					
Carya ovata	Shagbark hickory	1	2		1			
Cephalanthus occidentalis	Buttonbush	0	2					
Cercis canadensis	Eastern redbud	1	7		1			
Cornus amomum	Silky dogwood	0	3					
Cornus florida	Flowering dogwood	2	11	2				
Diospyros virginiana	Persimmon	1	13	1				
Fraxinus caroliniana	Carolina ash	0	1					
Ilex decidua	Possumhaw	0	2					
Liriodendron tulipifera	Tuliptree	0	7					
Malus angustifolia	Southern crabapple	0	3					
Nyssa sylvatica	Blackgum	0	6					
Platanus occidentalis	Sycamore	3	4	3				
Prunus serotina	Black cherry	0	14					
Quercus alba	White oak	0	11					
Quercus coccinea	Scarlet oak	1	6	1				
Quercus pagoda	Cherrybark oak	0	5					
Quercus palustris	Pin oak	2	5	2				
Quercus prinus	Chestnut oak	0	4					
Quercus rubra	Northern red oak	1	8		1			
Quercus shumardii	Shumard's oak	0	8					
Salix nigra	Black willow	1	3	1				
Salix sericea	Silky willow	3	1	3				
Sambucus canadensis	Elderberry	0	7					
Viburnum dentatum	Southern arrowwood	0	5					
Total Species	**31**	**18**	**158**	**15**	**3**	**0**	**0**	**0**

Table C.6 Continued

MY3 Vegetation Damage by Species						
Upper South Hominy Mitigation Site (EEP project number 92632)						
Species	**Common Name**	**Count of Damage Categories**	**No Damage**	**Beaver**	**Rodents**	**Vine Strangulation**
Aesculus flava	yellow buckeye	0	2			
Aronia arbutifolia	Red Chokeberry	0	2			
Betula nigra	river birch	1	3			1
Callicarpa americana	American beautyberry	1	5			1
Carpinus caroliniana	American hornbeam	0	1			
Carya alba	mockernut hickory	0	2			
Carya cordiformis	bitternut hickory	0	2			
Carya ovata	shagbark hickory	0	3			
Cephalanthus occidentalis	common buttonbush	0	2			
Cercis canadensis	eastern redbud	0	8			
Cornus amomum	silky dogwood	0	2			
Cornus florida	flowering dogwood	1	12			1
Diospyros virginiana	common persimmon	2	11			2
Fraxinus caroliniana	Carolina ash	0	1			
Ilex decidua	possumhaw	1	1			1
Liriodendron tulipifera	tuliptree	0	7			
Malus angustifolia	southern crabapple	0	2			
Nyssa sylvatica	blackgum	0	6			
Platanus occidentalis	American sycamore	0	8			
Prunus serotina	black cherry	3	10			3
Quercus	oak	0	1			
Quercus alba	white oak	0	13			
Quercus coccinea	scarlet oak	0	5			
Quercus michauxii	swamp chestnut oak	0	2			
Quercus montana		0	1			
Quercus muehlenbergii	chinkapin oak	0	4			
Quercus pagoda	cherrybark oak	1	3		1	
Quercus palustris	pin oak	0	3			
Quercus prinoides	dwarf chinkapin oak	0	2			
Quercus rubra	northern red oak	0	11			
Quercus shumardii	Shumard's oak	1	4		1	
Salix nigra	black willow	1	3	1		
Salix sericea	silky willow	3	1		3	
Sambucus canadensis	Common Elderberry	1	5			1
Viburnum dentatum	southern arrowwood	1	4			1
35	**34**	**17**	**152**	**1**	**5**	**11**

Table C.7 Vegetation Damage by Plot, Upper South Hominy Mitigation Site.

MY0 Vegetation Damage by Plot		
Upper South Hominy Mitigation Site (EEP project number 92632)		
Plot	**Count of Damage Categories**	**No Damage**
92632-NCWRC-VP1-MY0	0	13
92632-NCWRC-VP2-MY0	0	14
92632-NCWRC-VP3-MY0	0	19
92632-NCWRC-VP4-MY0	0	16
92632-NCWRC-VP5-MY0	0	25
92632-NCWRC-VP6-MY0	0	15
92632-NCWRC-VP7-MY0	0	18
92632-NCWRC-VP8-MY0	0	27
92632-NCWRC-VP9-MY0	0	16
92632-NCWRC-VP10-MY0	0	21
Total: 10	**0**	**184**

MY1 Vegetation Damage by Plot							
Upper South Hominy Mitigation Site (EEP project number 92632)							
Plot	**Count of Damage Categories**	**No Damage**	**Beaver**	**Human Trampled**	**Rodents**	**Unknown**	**Vine**
92632-NCWRC-VP1-MY0	3	10		1		1	1
92632-NCWRC-VP2-MY0	2	12		1			1
92632-NCWRC-VP3-MY0	2	18		1	1		
92632-NCWRC-VP4-MY0	6	11	6				
92632-NCWRC-VP5-MY0	1	24		1			
92632-NCWRC-VP6-MY0	1	15		1			
92632-NCWRC-VP7-MY0		20					
92632-NCWRC-VP8-MY0		27					
92632-NCWRC-VP9-MY0		16					
92632-NCWRC-VP10-MY0		22					
Total Plots: 10	**15**	**175**	**6**	**5**	**1**	**1**	**2**

Table C.7 Continued

MY2 Vegetation Damage by Plot							
Upper South Hominy Mitigation Site (EEP project number 92632)							
Plot	**Count of Damage Categories**	**No Damage**	**Beaver**	**Human Trampled**	**Rodents**	**Unknown**	**Vine**
92632-NCWRC-VP1-MY0	0	12					
92632-NCWRC-VP2-MY0	2	12	2				
92632-NCWRC-VP3-MY0	1	18	1				
92632-NCWRC-VP4-MY0	4	11	4				
92632-NCWRC-VP5-MY0	2	22		2			
92632-NCWRC-VP6-MY0	2	14	2				
92632-NCWRC-VP7-MY0	0	18					
92632-NCWRC-VP8-MY0	3	22	3				
92632-NCWRC-VP9-MY0	3	11	3				
92632-NCWRC-VP10-MY0	1	18		1			
Total Plots: 10	**18**	**158**	**15**	**3**	**0**	**0**	**0**

MY3 Vegetation Damage by Plot					
Upper South Hominy Mitigation Site (EEP project number 92632)					
Plot	**Count of Damage Categories**	**No Damage**	**Beaver**	**Rodents**	**Vine**
EUSH 92632-NCWRC-VP10-year:3	0	19			
EUSH 92632-NCWRC-VP1-year:3	4	7		1	3
EUSH 92632-NCWRC-VP2-year:3	5	9	1		4
EUSH 92632-NCWRC-VP3-year:3	0	18			
EUSH 92632-NCWRC-VP4-year:3	2	14			2
EUSH 92632-NCWRC-VP5-year:3	0	22			
EUSH 92632-NCWRC-VP6-year:3	2	12			2
EUSH 92632-NCWRC-VP7-year:3	0	18			
EUSH 92632-NCWRC-VP8-year:3	3	20		3	
EUSH 92632-NCWRC-VP9-year:3	1	13		1	
10	**17**	**152**	**1**	**5**	**11**

Table C.8 Planted Stem Count by Plot and Species, Upper South Hominy Mitigation Site.

MY0 Planted Stem Count by Plot and Species									
Upper South Hominy Mitigation Site (EEP project number 92632)									
Species	**Common Name**	**Total Stems**	**Number of Plots**	**Average Number of Stems**	**VP1**	**VP2**	**VP3**	**VP4**	**VP5**
Aesculus flava	Yellow buckeye	3	3	1			1		1
Aronia arbutifolia	Red Chokeberry	3	2	1.5					
Betula nigra	River birch	6	4	1.5	1	3		1	1
Callicarpa americana	American beautyberry	6	5	1.2					
Carpinus caroliniana	American hornbeam	1	1	1					
Carya alba	Mockernut hickory	5	4	1.25			2		1
Carya cordiformis	Bitternut hickory	5	5	1	1		1		1
Carya ovata	Shagbark hickory	5	3	1.67					2
Cephalanthus occidentalis	Buttonbush	2	2	1		1	1		
Cercis canadensis	Eastern redbud	8	3	2.67					
Cornus amomum	Silky dogwood	4	1	4					
Cornus florida	Flowering dogwood	16	8	2	3	1	3	2	
Diospyros virginiana	Persimmon	15	8	1.88		1	2	1	6
Fraxinus caroliniana	Carolina ash	1	1	1				1	
Ilex decidua	Possumhaw	2	2	1	1				
Liriodendron tulipifera	Tuliptree	8	4	2			2		3
Malus angustifolia	Southern crabapple	1	1	1					
Nyssa sylvatica	Blackgum	3	2	1.5			1		2
Platanus occidentalis	Sycamore	7	3	2.33			1	5	
Prunus serotina	Black cherry	15	8	1.88	2	2		1	2
Quercus alba	White oak	7	6	1.17	1		1		1
Quercus coccinea	Scarlet oak	7	6	1.17	1	1			
Quercus pagoda	Cherrybark oak	7	7	1	1	1		1	1
Quercus palustris	Pin oak	8	7	1.14	1		1	1	
Quercus prinus	Chestnut oak	5	4	1.25					1
Quercus rubra	Northern red oak	8	8	1		1	1	1	1
Quercus shumardii	Shumard's oak	9	8	1.12	1		1	2	
Salix nigra	Black willow	4	4	1		1			
Salix sericea	Silky willow	3	1	3					
Sambucus canadensis	Elderberry	6	4	1.5		1			2
Viburnum dentatum	Southern arrowwood	4	4	1		1	1		
Totals:	**31**	**184**			**13**	**14**	**19**	**16**	**25**
Density (stem/acre):		**745**			**526**	**566**	**769**	**648**	**1,011**

Table C.8 Continued

MY0 Planted Stem Count by Plot and Species									
Upper South Hominy Mitigation Site (EEP project number 92632)									
Species	**Common Name**	**Total Stems**	**Number of Plots**	**Average Number of Stems**	**VP6**	**VP7**	**VP8**	**VP9**	**VP10**
Aesculus flava	Yellow buckeye	3	3	1					1
Aronia arbutifolia	Red Chokeberry	3	2	1.5		2	1		
Betula nigra	River birch	6	4	1.5					
Callicarpa americana	American beautyberry	6	5	1.2	1	1	1	2	1
Carpinus caroliniana	American hornbeam	1	1	1				1	
Carya alba	Mockernut hickory	5	4	1.25				1	1
Carya cordiformis	Bitternut hickory	5	5	1			1		1
Carya ovata	Shagbark hickory	5	3	1.67			1		2
Cephalanthus occidentalis	Buttonbush	2	2	1					
Cercis canadensis	Eastern redbud	8	3	2.67		2	1		5
Cornus amomum	Silky dogwood	4	1	4			4		
Cornus florida	Flowering dogwood	16	8	2	3		1	1	2
Diospyros virginiana	Persimmon	15	8	1.88		1	2	1	1
Fraxinus caroliniana	Carolina ash	1	1	1					
Ilex decidua	Possumhaw	2	2	1				1	
Liriodendron tulipifera	Tuliptree	8	4	2			1		2
Malus angustifolia	Southern crabapple	1	1	1				1	
Nyssa sylvatica	Blackgum	3	2	1.5					
Platanus occidentalis	Sycamore	7	3	2.33		1			
Prunus serotina	Black cherry	15	8	1.88	1	1	3	3	
Quercus alba	White oak	7	6	1.17	1	2	1		
Quercus coccinea	Scarlet oak	7	6	1.17	1	2	1	1	
Quercus pagoda	Cherrybark oak	7	7	1	1	1		1	
Quercus palustris	Pin oak	8	7	1.14	1	1	2	1	
Quercus prinus	Chestnut oak	5	4	1.25	2	1			1
Quercus rubra	Northern red oak	8	8	1	1		1	1	1
Quercus shumardii	Shumard's oak	9	8	1.12	1	1	1	1	1
Salix nigra	Black willow	4	4	1	1	1	1		
Salix sericea	Silky willow	3	1	3			3		
Sambucus canadensis	Elderberry	6	4	1.5			1		2
Viburnum dentatum	Southern arrowwood	4	4	1	1	1			
Totals:	**31**	**184**			**15**	**18**	**27**	**16**	**21**
Density (stems/acre):		**745**			**607**	**728**	**1,093**	**648**	**850**

Table C.8 Continued

MY1 Planted Stem Count by Plot and Species									
Upper South Hominy Mitigation Site (EEP project number 92632)									
Species	**Common Name**	**Total Stems**	**Number of Plots**	**Average Number of Stems**	**VP1**	**VP2**	**VP3**	**VP4**	**VP5**
Aesculus flava	Yellow buckeye	2	2	1			1		1
Aronia arbutifolia	Red Chokeberry	2	2	1					
Betula nigra	River birch	4	2	2		3		1	
Callicarpa americana	American beautyberry	6	5	1.2					
Carpinus caroliniana	American hornbeam	1	1	1					
Carya alba	Mockernut hickory	3	3	1			1		
Carya cordiformis	Bitternut hickory	3	3	1	1		1		
Carya ovata	Shagbark hickory	3	2	1.5					1
Cephalanthus occidentalis	Buttonbush	2	2	1		1	1		
Cercis canadensis	Eastern redbud	8	3	2.67					
Cornus amomum	Silky dogwood	2	1	2					
Cornus florida	Flowering dogwood	11	5	2.2	3	1	3	1	
Diospyros virginiana	Persimmon	15	8	1.88		1	1	1	6
Fraxinus caroliniana	Carolina ash	1	1	1				1	
Ilex decidua	Possumhaw	2	2	1	1				
Liriodendron tulipifera	Tuliptree	7	3	2.33			2		3
Malus angustifolia	Southern crabapple	4	3	1.33		1		2	
Nyssa sylvatica	Blackgum	6	2	3			1		5
Platanus occidentalis	Sycamore	7	2	3.5				5	
Prunus serotina	Black cherry	13	7	1.86	2	1			
Quercus alba	White oak	10	6	1.67	1		2		3
Quercus coccinea	Scarlet oak	8	8	1	1	1	1		
Quercus pagoda	Cherrybark oak	7	7	1	1	1	1	1	1
Quercus palustris	Pin oak	7	6	1.17	1		1	1	
Quercus prinus	Chestnut oak	2	2	1					1
Quercus rubra	Northern red oak	9	8	1.12		1	1	1	1
Quercus shumardii	Shumard's oak	8	7	1.14	1		1	2	
Salix nigra	Black willow	4	4	1		1			
Salix sericea	Silky willow	4	1	4					
Sambucus canadensis	Elderberry	7	6	1.17		1			2
Viburnum dentatum	Southern arrowwood	5	5	1		1	1		
Totals:	**31**	**173**	**31**		**12**	**14**	**19**	**16**	**24**
Density (stem/acre):		**700**			**486**	**566**	**769**	**648**	**971**

Table C.8 Continued

MY1 Planted Stem Count by Plot and Species									
Upper South Hominy Mitigation Site (EEP project number 92632)									
Species	**Common Name**	**Total Stems**	**Number of Plots**	**Average Number of Stems**	**VP6**	**VP7**	**VP8**	**VP9**	**VP10**
Aesculus flava	Yellow buckeye	2	2	1					
Aronia arbutifolia	Red Chokeberry	2	2	1		1	1		
Betula nigra	River birch	4	2	2					
Callicarpa americana	American beautyberry	6	5	1.2	1	1	1	2	1
Carpinus caroliniana	American hornbeam	1	1	1				1	
Carya alba	Mockernut hickory	3	3	1				1	1
Carya cordiformis	Bitternut hickory	3	3	1			1		
Carya ovata	Shagbark hickory	3	2	1.5					2
Cephalanthus occidentalis	Buttonbush	2	2	1					
Cercis canadensis	Eastern redbud	8	3	2.67		2	1		5
Cornus amomum	Silky dogwood	2	1	2			2		
Cornus florida	Flowering dogwood	11	5	2.2	3				
Diospyros virginiana	Persimmon	15	8	1.88		1	2	1	2
Fraxinus caroliniana	Carolina ash	1	1	1					
Ilex decidua	Possumhaw	2	2	1				1	
Liriodendron tulipifera	Tuliptree	7	3	2.33					2
Malus angustifolia	Southern crabapple	4	3	1.33				1	
Nyssa sylvatica	Blackgum	6	2	3					
Platanus occidentalis	Sycamore	7	2	3.5		2			
Prunus serotina	Black cherry	13	7	1.86	1	3	2	3	1
Quercus alba	White oak	10	6	1.67	1	2	1		
Quercus coccinea	Scarlet oak	8	8	1	1	1	1	1	1
Quercus pagoda	Cherrybark oak	7	7	1	1			1	
Quercus palustris	Pin oak	7	6	1.17	1	1	2		
Quercus prinus	Chestnut oak	2	2	1	1				
Quercus rubra	Northern red oak	9	8	1.12	1		2	1	1
Quercus shumardii	Shumard's oak	8	7	1.14	1		1	1	1
Salix nigra	Black willow	4	4	1	1	1	1		
Salix sericea	Silky willow	4	1	4			4		
Sambucus canadensis	Elderberry	7	6	1.17	1	1	1		1
Viburnum dentatum	Southern arrowwood	5	5	1	1	1			1
Totals:	**31**	**173**	**31**		**15**	**17**	**23**	**14**	**19**
Density (stem/acre):		**700**			**607**	**688**	**931**	**567**	**769**

Table C.8 Continued

MY2 Planted Stem Count by Plot and Species									
Upper South Hominy Mitigation Site (EEP project number 92632)									
Species	**Common Name**	**Total Stems**	**Number of Plots**	**Average Number of Stems**	**VP1**	**VP2**	**VP3**	**VP4**	**VP5**
Aesculus flava	Yellow buckeye	2	2	1			1		1
Aronia arbutifolia	Red Chokeberry	2	2	1					
Betula nigra	River birch	4	2	2		3		1	
Callicarpa americana	American beautyberry	6	5	1.2					
Carpinus caroliniana	American hornbeam	1	1	1					
Carya alba	Mockernut hickory	1	1	1					
Carya cordiformis	Bitternut hickory	2	2	1	1				
Carya ovata	Shagbark hickory	3	2	1.5					1
Cephalanthus occidentalis	Buttonbush	2	2	1		1	1		
Cercis canadensis	Eastern redbud	8	3	2.67					
Cornus amomum	Silky dogwood	2	1	2					
Cornus florida	Flowering dogwood	12	6	2	2	1	3	1	
Diospyros virginiana	Persimmon	12	7	1.71		1	1	1	4
Fraxinus caroliniana	Carolina ash	1	1	1				1	
Ilex decidua	Possumhaw	2	2	1	1				
Liriodendron tulipifera	Tuliptree	7	3	2.33			2		3
Malus angustifolia	Southern crabapple	3	3	1		1		1	
Nyssa sylvatica	Blackgum	6	2	3			1		5
Platanus occidentalis	Sycamore	7	2	3.5				5	
Prunus serotina	Black cherry	11	8	1.38	2	1		1	
Quercus alba	White oak	10	5	2	1		2		4
Quercus coccinea	Scarlet oak	7	7	1	1	1	1		
Quercus pagoda	Cherrybark oak	5	5	1	1	1			1
Quercus palustris	Pin oak	7	6	1.17	1		1	1	
Quercus prinus	Chestnut oak	3	3	1			1		
Quercus rubra	Northern red oak	9	8	1.12		1	1	1	1
Quercus shumardii	Shumard's oak	8	7	1.14	1		1	2	
Salix nigra	Black willow	4	4	1		1			
Salix sericea	Silky willow	4	1	4					
Sambucus canadensis	Elderberry	5	5	1		1			1
Viburnum dentatum	Southern arrowwood	5	5	1		1	1		
Totals:	**31**	**161**	**32**		**11**	**14**	**17**	**15**	**21**
Density (stem/acre):		**652**			**445**	**567**	**688**	**607**	**850**

Table C.8 Continued

MY2 Planted Stem Count by Plot and Species									
Upper South Hominy Mitigation Site (EEP project number 92632)									
Species	**Common Name**	**Total Stems**	**Number of Plots**	**Average Number of Stems**	**VP6**	**VP7**	**VP8**	**VP9**	**VP10**
Aesculus flava	Yellow buckeye	2	2	1					
Aronia arbutifolia	Red Chokeberry	2	2	1		1	1		
Betula nigra	River birch	4	2	2					
Callicarpa americana	American beautyberry	6	5	1.2	1	1	1	2	1
Carpinus caroliniana	American hornbeam	1	1	1				1	
Carya alba	Mockernut hickory	1	1	1					1
Carya cordiformis	Bitternut hickory	2	2	1			1		
Carya ovata	Shagbark hickory	3	2	1.5					2
Cephalanthus occidentalis	Buttonbush	2	2	1					
Cercis canadensis	Eastern redbud	8	3	2.67		2	1		5
Cornus amomum	Silky dogwood	2	1	2			2		
Cornus florida	Flowering dogwood	12	6	2	3				2
Diospyros virginiana	Persimmon	12	7	1.71		1	2	2	
Fraxinus caroliniana	Carolina ash	1	1	1					
Ilex decidua	Possumhaw	2	2	1				1	
Liriodendron tulipifera	Tuliptree	7	3	2.33					2
Malus angustifolia	Southern crabapple	3	3	1				1	
Nyssa sylvatica	Blackgum	6	2	3					
Platanus occidentalis	Sycamore	7	2	3.5		2			
Prunus serotina	Black cherry	11	8	1.38	1	3	1	1	1
Quercus alba	White oak	10	5	2		2	1		
Quercus coccinea	Scarlet oak	7	7	1	1		1	1	1
Quercus pagoda	Cherrybark oak	5	5	1	1			1	
Quercus palustris	Pin oak	7	6	1.17	1	1	2		
Quercus prinus	Chestnut oak	3	3	1	1	1			
Quercus rubra	Northern red oak	9	8	1.12	1		2	1	1
Quercus shumardii	Shumard's oak	8	7	1.14	1		1	1	1
Salix nigra	Black willow	4	4	1	1	1	1		
Salix sericea	Silky willow	4	1	4			4		
Sambucus canadensis	Elderberry	5	5	1	1		1		1
Viburnum dentatum	Southern arrowwood	5	5	1	1	1			1
Totals:	**31**	**161**	**32**		**14**	**16**	**22**	**12**	**19**
Density (stem/acre):		**652**			**567**	**648**	**890**	**486**	**769**

Table C.8 Continued

MY3 Planted Stem Count by Plot and Species

Upper South Hominy Mitigation Site (EEP project number 92632)

	Comment	Species	SpType	CommonName	Total Planted Stems	# plots	avg# stems	plot EUSH 92632-NCWRC-VP1-year:3	plot EUSH 92632-NCWRC-VP2-year:3	plot EUSH 92632-NCWRC-VP3-year:3	plot EUSH 92632-NCWRC-VP4-year:3	plot EUSH 92632-NCWRC-VP5-year:3	plot EUSH 92632-NCWRC-VP6-year:3	plot EUSH 92632-NCWRC-VP7-year:3	plot EUSH 92632-NCWRC-VP8-year:3	plot EUSH 92632-NCWRC-VP9-year:3	plot EUSH 92632-NCWRC-VP10-year:3
		Aesculus flava	Shrub Tree	yellow buckeye	2	2	1			1		1					
		Aronia arbutifolia	Shrub	Red Chokeberry	2	2	1							1	1		
		Betula nigra	Tree	river birch	3	2	1.5		2		1						
		Callicarpa americana	Shrub	American beautyberry	2	2	1							1		1	
		Carpinus caroliniana	Shrub Tree	American hornbeam	1	1	1									1	
		Cephalanthus occidentalis	Shrub Tree	common buttonbush	2	2	1		1	1							
		Cercis canadensis	Shrub Tree	eastern redbud	7	3	2.33							2	1		4
		Cornus amomum	Shrub	silky dogwood	2	1	2								2		
		Cornus florida	Shrub Tree	flowering dogwood	12	7	1.71	2	1	3	1		2	1			2
		Diospyros virginiana	Tree	common persimmon	10	7	1.43		1	1	1	4		1	1	1	
		Fraxinus caroliniana	Shrub Tree	Carolina ash	1	1	1				1						
		Ilex decidua	Shrub Tree	possumhaw	2	2	1	1								1	
		Liriodendron tulipifera	Tree	tuliptree	7	3	2.33			2		3					2
		Malus angustifolia	Shrub Tree	southern crabapple	2	2	1		1		1						
		Nyssa sylvatica	Tree	blackgum	6	2	3			1		5					
		Platanus occidentalis	Tree	American sycamore	8	2	4				6			2			
		Prunus serotina	Shrub Tree	black cherry	10	7	1.43	1	1		1		1	3	1	2	
		Quercus	Shrub Tree	oak	1	1	1				1						
		Quercus alba	Tree	white oak	13	6	2.17	1		5	1	3		1	2		
		Quercus coccinea	Tree	scarlet oak	5	5	1						1	1	1	1	1
		Quercus michauxii	Tree	swamp chestnut oak	2	1	2		2								
		Quercus montana	Tree		1	1	1							1			
		Quercus muehlenbergii	Tree	chinkapin oak	4	3	1.33			1	1	2					
		Quercus pagoda	Tree	cherrybark oak	4	4	1	1					1	1		1	
		Quercus palustris	Tree	pin oak	3	3	1	1					1		1		
		Quercus prinoides	Shrub Tree	dwarf chinkapin oak	2	2	1			1			1				
		Quercus rubra	Tree	northern red oak	11	9	1.22	1	1	1	1	1	1		2	1	2
		Quercus shumardii	Shrub Tree	Shumard's oak	5	5	1	1					1		1	1	1
		Salix nigra	Tree	black willow	4	4	1		1				1	1	1		
		Salix sericea	Shrub Tree	silky willow	4	1	4								4		
		Sambucus canadensis	Shrub Tree	Common Elderberry	5	5	1		1				1	1	1		1
		Viburnum dentatum	Shrub Tree	southern arrowwood	5	5	1		1	1			1	1			1
TOT:	**0**	**32**	**32**	**31**	**148**	**32**		**9**	**13**	**18**	**16**	**19**	**12**	**18**	**19**	**10**	**14**

Table C.9 Total Stem Count by Plot and Species, Upper South Hominy Mitigation Site.

MY1 Total Stem Count by Plot and Species									
Upper South Hominy Mitigation Site (EEP project number 92632)									
Species	**Common Name**	**Total Stems**	**Number of Plots**	**Average Number of Stems**	**VP1**	**VP2**	**VP3**	**[a]VP4**	**VP5**
Aesculus flava	Yellow buckeye	2	2	1			1		1
Aronia arbutifolia	Red Chokeberry	2	2	1					
Betula nigra	River birch	4	3	1.67				1	
Callicarpa americana	American beautyberry	6	5	1.2					
Carpinus caroliniana	American hornbeam	1	1	1					
Carya alba	Mockernut hickory	3	3	1			1		
Carya cordiformis	Bitternut hickory	3	5	1	1		1		
Carya ovata	Shagbark hickory	3	3	1.33					1
Cephalanthus occidentalis	Buttonbush	2	2	1		1	1		
Cercis canadensis	Eastern redbud	8	3	2.67					
Cornus amomum	Silky dogwood	2	1	2					
Cornus florida	Flowering dogwood	11	6	2.17	3	1	3	1	
Diospyros virginiana	Persimmon	15	8	2		1	1	1	6
Fraxinus caroliniana	Carolina ash	1	1	1				1	
Ilex decidua	Possumhaw	2	2	1	1				
Liriodendron tulipifera	Tuliptree	22	5	4.6			2	**10**	3
Malus angustifolia	Southern crabapple	4	3	1.33		1		2	
Nyssa sylvatica	Blackgum	6	2	3			1		5
Platanus occidentalis	Sycamore	9	3	3				5	
Prunus serotina	Black cherry	15	8	1.88	2	1		**2**	
Quercus alba	White oak	10	6	1.67	1		2		3
Quercus coccinea	Scarlet oak	8	8	1.25	1	1	1		
Quercus pagoda	Cherrybark oak	7	7	1	1	1	1	1	1
Quercus palustris	Pin oak	7	7	1.14	1		1	1	
Quercus prinus	Chestnut oak	2	2	1					1
Quercus rubra	Northern red oak	9	8	1.12		1	1	1	1
Quercus shumardii	Shumard's oak	8	7	1.14	1		1	2	
Salix nigra	Black willow	4	4	1		1			
Salix sericea	Silky willow	4	1	4					
Sambucus canadensis	Elderberry	7	6	1.17		1			2
Viburnum dentatum	Southern arrowwood	5	5	1		1	1		
Totals:	**31**	**192**	**31**		**12**	**14**	**19**	**28**	**24**
Density (stem/acre):		**777**			**486**	**567**	**769**	**1,133**	**971**

[a] Vegetation plots with volunteer species, numbers in bold font.

Table C.9 Continued

MY1 Total Stem Count by Plot and Species									
Upper South Hominy Mitigation Site (EEP project number 92632)									
Species	**Common Name**	**Total Stems**	**Number of Plots**	**Average Number of Stems**	**VP6**	**VP7**	**[a]VP8**	**VP9**	**VP10**
Aesculus flava	Yellow buckeye	2	2	1					
Aronia arbutifolia	Red Chokeberry	2	2	1		1	1		
Betula nigra	River birch	4	3	1.67					
Callicarpa americana	American beautyberry	6	5	1.2	1	1	1	2	1
Carpinus caroliniana	American hornbeam	1	1	1				1	
Carya alba	Mockernut hickory	3	3	1				1	1
Carya cordiformis	Bitternut hickory	3	5	1			1		
Carya ovata	Shagbark hickory	3	3	1.33					2
Cephalanthus occidentalis	Buttonbush	2	2	1					
Cercis canadensis	Eastern redbud	8	3	2.67		2	1		5
Cornus amomum	Silky dogwood	2	1	2			2		
Cornus florida	Flowering dogwood	11	6	2.17	3				
Diospyros virginiana	Persimmon	15	8	2		1	2	1	2
Fraxinus caroliniana	Carolina ash	1	1	1					
Ilex decidua	Possumhaw	2	2	1				1	
Liriodendron tulipifera	Tuliptree	22	5	4.6			**4**		2,**1**
Malus angustifolia	Southern crabapple	4	3	1.33				1	
Nyssa sylvatica	Blackgum	6	2	3					
Platanus occidentalis	Sycamore	9	3	3		2	**2**		
Prunus serotina	Black cherry	15	8	1.88	1	3	2	3	1
Quercus alba	White oak	10	6	1.67	1	2	1		
Quercus coccinea	Scarlet oak	8	8	1.25	1	1	1	1	1
Quercus pagoda	Cherrybark oak	7	7	1	1			1	
Quercus palustris	Pin oak	7	7	1.14	1	1	2		
Quercus prinus	Chestnut oak	2	2	1	1				
Quercus rubra	Northern red oak	9	8	1.12	1		2	1	1
Quercus shumardii	Shumard's oak	8	7	1.14	1		1	1	1
Salix nigra	Black willow	4	4	1	1	1	1		
Salix sericea	Silky willow	4	1	4			4		
Sambucus canadensis	Elderberry	7	6	1.17	1	1	1		1
Viburnum dentatum	Southern arrowwood	5	5	1	1	1			1
Totals:	**31**	**192**	**31**		**15**	**17**	**29**	**14**	**20**
Density (stem/acre):		**777**			**607**	**688**	**1,173**	**567**	**809**

[a] Vegetation plots with volunteer species, numbers are in bold font.

Table C.9 Continued

MY2 Total Stem Count by Plot and Species									
Upper South Hominy Mitigation Site (EEP project number 92632)									
Species	**Common Name**	**Total Stems**	**Number of Plots**	**Average Number of Stems**	**[a]VP1**	**VP2**	**[a]VP3**	**[a]VP4**	**[a]VP5**
Acer rubrum	Red maple	2	1	2	**2**				
Aesculus flava	Yellow buckeye	2	2	1			1		1
Alnus serrulata	Tag alder	4	2	2			**1**		**3**
Aronia arbutifolia	Red chokeberry	2	2	1					
Betula nigra	River birch	4	2	2		3		1	
Callicarpa americana	American beautyberry	6	5	1.2					
Carpinus caroliniana	American hornbeam	1	1	1					
Carya alba	Mockernut hickory	2	2	1			1		
Carya cordiformis	Bitternut hickory	3	3	1	1		1		
Carya ovata	Shagbark hickory	3	2	1.5					1
Cephalanthus occidentalis	Buttonbush	2	2	1		1	1		
Cercis canadensis	Eastern redbud	8	3	2.67					
Cornus amomum	Silky dogwood	2	1	2					
Cornus florida	Flowering dogwood	13	6	2.17	3	1	3	1	
Diospyros virginiana	Persimmon	13	7	1.86		1	1	1	5
Fraxinus caroliniana	Carolina ash	1	1	1				1	
Ilex decidua	Possumhaw	2	2	1	1				
Liriodendron tulipifera	Tuliptree	50	5	10			2	**38**	3
Malus angustifolia	Southern crabapple	3	3	1		1		1	
Nyssa sylvatica	Blackgum	6	2	3			1		5
Platanus occidentalis	Sycamore	7	2	3.5				5	
Prunus serotina	Black cherry	14	9	1.56	2	1		1, **2**	**1**
Quercus alba	White oak	11	6	1.83	1		2		4
Quercus coccinea	Scarlet oak	7	7	1	1	1	1		
Quercus pagoda	Cherrybark oak	5	5	1	1	1			1
Quercus palustris	Pin oak	7	6	1.17	1		1	1	
Quercus prinus	Chestnut oak	4	3	1.5			1		
Quercus rubra	Northern red oak	9	8	1.12		1	1	1	1
Quercus shumardii	Shumard's oak	8	7	1.14	1		1	2	
Salix nigra	Black willow	4	4	1		1			
Salix sericea	Silky willow	4	1	4					
Sambucus canadensis	Elderberry	6	5	1.2		1			2
Viburnum dentatum	Southern arrowwood	5	5	1		1	1		
Totals:	**33**	**213**	**34**		**13**	**14**	**18**	**55**	**25**
Density (stem/acre):		**862**			**526**	**567**	**728**	**2,226**	**1,011**

[a] Volunteer species and numbers are in bold font

Table C.9 Continued

MY2 Total Stem Count by Plot and Species									
Upper South Hominy Mitigation Site (EEP project number 92632)									
Species	**Common Name**	**Total Stems**	**Number of Plots**	**Average Number of Stems**	**[a]VP6**	**VP7**	**VP8**	**VP9**	**VP10**
Acer rubrum	Red maple	2	1	2					
Aesculus flava	Yellow buckeye	2	2	1					
Alnus serrulata	Tag alder	4	2	2					
Aronia arbutifolia	Red chokeberry	2	2	1		1	1		
Betula nigra	River birch	4	2	2					
Callicarpa americana	American beautyberry	6	5	1.2	1	1	1	2	1
Carpinus caroliniana	American hornbeam	1	1	1				1	
Carya alba	Mockernut hickory	2	2	1					1
Carya cordiformis	Bitternut hickory	3	3	1			1		
Carya ovata	Shagbark hickory	3	2	1.5					2
Cephalanthus occidentalis	Buttonbush	2	2	1					
Cercis canadensis	Eastern redbud	8	3	2.67		2	1		5
Cornus amomum	Silky dogwood	2	1	2			2		
Cornus florida	Flowering dogwood	13	6	2.17	3				2
Diospyros virginiana	Persimmon	13	7	1.86		1	2	2	
Fraxinus caroliniana	Carolina ash	1	1	1					
Ilex decidua	Possumhaw	2	2	1				1	
Liriodendron tulipifera	Tuliptree	50	5	10	**5**				2
Malus angustifolia	Southern crabapple	3	3	1				1	
Nyssa sylvatica	Blackgum	6	2	3					
Platanus occidentalis	Sycamore	7	2	3.5		2			
Prunus serotina	Black cherry	14	9	1.56	1	3	1	1	1
Quercus alba	White oak	11	6	1.83	1	2	1		
Quercus coccinea	Scarlet oak	7	7	1	1		1	1	1
Quercus pagoda	Cherrybark oak	5	5	1	1			1	
Quercus palustris	Pin oak	7	6	1.17	1	1	2		
Quercus prinus	Chestnut oak	4	3	1.5	2	1			
Quercus rubra	Northern red oak	9	8	1.12	1		2	1	1
Quercus shumardii	Shumard's oak	8	7	1.14	1		1	1	1
Salix nigra	Black willow	4	4	1	1	1	1		
Salix sericea	Silky willow	4	1	4			4		
Sambucus canadensis	Elderberry	6	5	1.2	1		1		1
Viburnum dentatum	Southern arrowwood	5	5	1	1	1			1
Totals:	**33**	**213**	**34**		**19**	**16**	**22**	**12**	**19**
Density (stem/acre):		**862**			**768**	**648**	**890**	**486**	**769**

[a] Volunteer species and numbers are in bold font.

Table C.9 Continued

MY3 Total Stem Count by Plot and Species																
Upper South Hominy Mitigation Site (EEP project number 92632)																
	Comment	Species	CommonName	Total Stems	# plots	avg# stems	EUSH 92632-NCWRC-VP1-year:3	EUSH 92632-NCWRC-VP2-year:3	EUSH 92632-NCWRC-VP3-year:3	EUSH 92632-NCWRC-VP4-year:3	EUSH 92632-NCWRC-VP5-year:3	EUSH 92632-NCWRC-VP6-year:3	EUSH 92632-NCWRC-VP7-year:3	EUSH 92632-NCWRC-VP8-year:3	EUSH 92632-NCWRC-VP9-year:3	EUSH 92632-NCWRC-VP10-year:3
		Acer rubrum	red maple	3	2	1.5							2	1		
		Aesculus flava	yellow buckeye	2	2	1			1		1					
		Alnus serrulata	hazel alder	6	3	2			1		4			1		
		Aronia arbutifolia	Red Chokeberry	2	2	1							1	1		
		Betula nigra	river birch	4	2	2		3		1						
		Callicarpa americana	American beautyberry	6	5	1.2						1	1	1	2	1
		Carpinus caroliniana	American hornbeam	1	1	1									1	
		Carya ovata	shagbark hickory	1	1	1					1					
		Cephalanthus occidentalis	common buttonbush	2	2	1		1	1							
		Cercis canadensis	eastern redbud	8	3	2.67							2	1		5
		Cornus amomum	silky dogwood	2	1	2								2		
		Cornus florida	flowering dogwood	12	7	1.71	2	1	3	1		2	1			2
		Diospyros virginiana	common persimmon	10	7	1.43		1	1	1	4		1	1	1	
		Fraxinus caroliniana	Carolina ash	1	1	1				1						
		Ilex decidua	possumhaw	2	2	1	1								1	
		Liriodendron tulipifera	tuliptree	95	7	13.57		4	6	68	3	8	2			4
		Malus angustifolia	southern crabapple	2	2	1		1		1						
		Nyssa sylvatica	blackgum	6	2	3			1		5					
		Platanus occidentalis	American sycamore	13	4	3.25				6	1		4	2		
		Prunus serotina	black cherry	12	7	1.71	2	1		2		1	3	1	2	
		Quercus	oak	1	1	1				1						
		Quercus alba	white oak	13	6	2.17	1		5	1	3		1	2		
		Quercus coccinea	scarlet oak	5	5	1						1	1	1	1	1
		Quercus michauxii	swamp chestnut oak	2	1	2		2								
		Quercus montana		1	1	1							1			
		Quercus muehlenbergii	chinkapin oak	4	3	1.33			1	1	2					
		Quercus pagoda	cherrybark oak	4	4	1	1					1	1		1	
		Quercus palustris	pin oak	3	3	1	1					1		1		
		Quercus prinoides	dwarf chinkapin oak	2	2	1			1			1				
		Quercus rubra	northern red oak	11	9	1.22	1	1	1	1	1	1		2	1	2
		Quercus shumardii	Shumard's oak	5	5	1	1					1		1	1	1
		Robinia pseudoacacia	black locust	1	1	1					1					
		Salix nigra	black willow	4	4	1		1				1	1	1		
		Salix sericea	silky willow	4	1	4								4		
		Sambucus canadensis	Common Elderberry	6	6	1		1			1	1	1	1		1
		Viburnum dentatum	southern arrowwood	5	5	1		1	1			1	1			1
TOT:	**0**	**36**	**35**	**261**	**36**		**10**	**18**	**23**	**85**	**27**	**21**	**24**	**24**	**11**	**18**

Table C.10 Vegetation Problem Areas, Upper South Hominy Mitigation Site.

MY1-MY3 Vegetation Problem Areas Upper South Hominy Mitigation Site (EEP project number 92632)			
Feature/Issue	**Station Number/Range**	**Probable Cause**	**Photo Number**
Dense Japanese Honeysuckle	UT-2	Invasive	2
Dense Japanese Honeysuckle	UT-2	Invasive	1
Dense Japanese Honeysuckle	Mainstem 1 Sta. 7+25 to 8+00	Invasive	--
Dense Bamboo	Mainstem 2 Sta. 1+00 to 1+75	Invasive	3
Dense Japanese Honeysuckle	Mainstem 2 Sta. 4+25 to 5+50	Invasive	--
Dense Japanese Honeysuckle	Mainstem 2 Sta. 8+25 to 9+75	Invasive	--
Dense Japanese Honeysuckle	Mainstem 2 Sta. 11+00 to 12+00	Invasive	--
Dense Japanese Honeysuckle	Mainstem 3 0+00 to 1+00	Invasive	--
Dense Japanese Honeysuckle	Mainstem 3 4+25 to 5+50	Invasive	--

Table C.11 Vegetation Condition Assessment, Upper South Hominy Mitigation Site.

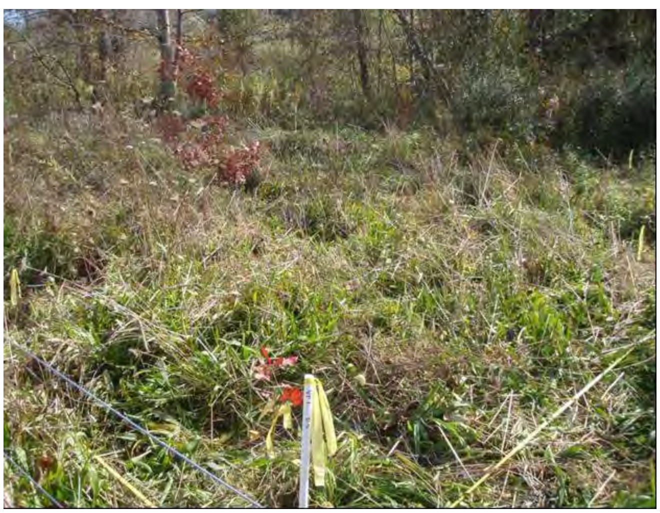
MY1-MY3 Vegetation Condition Assessment							
Upper South Hominy Mitigation Site (EEP project number 92632)							
Planted Acreage	8.3						
Vegetation Category		**Definitions**	**Mapping Threshold (acres)**	**CCPV Depiction**	**Number of Polygons**	**Combined Acreage**	**% of Planted Acreage**
1. Bare Areas		Very limited cover of both woody and herbaceous material	0.1		0	0	0
2. Low Stem Density Areas		Woody stem densities clearly below target levels based on MY3, 4 or 5 stem count criteria	0.1		0	0	0
				Totals			
3. Areas of Poor Growth Rates or Vigor		Areas with woody stems of a size class that are obviously small given the monitoring year	0.25		0	0	0
				Cumulative Totals	0	0	0
Easement Acreage	16.4						
Vegetation Category		**Definitions**	**Mapping Threshold (acres)**	**CCPV Depiction**	**Number of Polygons**	**Combined Acreage**	**% of Easement Acreage**
4. Invasive Areas of Concern		Dense patches of Japanese honeysuckle (*Lonicera japonica*) and Bamboo (*Bambusa* sp.)	0.02	Tan and purple polygons	9	1.15	7.0
5. Easement Encroachment Areas		Areas or points (if too small to render as polygons at map scale)	none		0	0	0

Figure C.1 Vegetation Monitoring Plot Photographs, Upper South Hominy Mitigation Site.

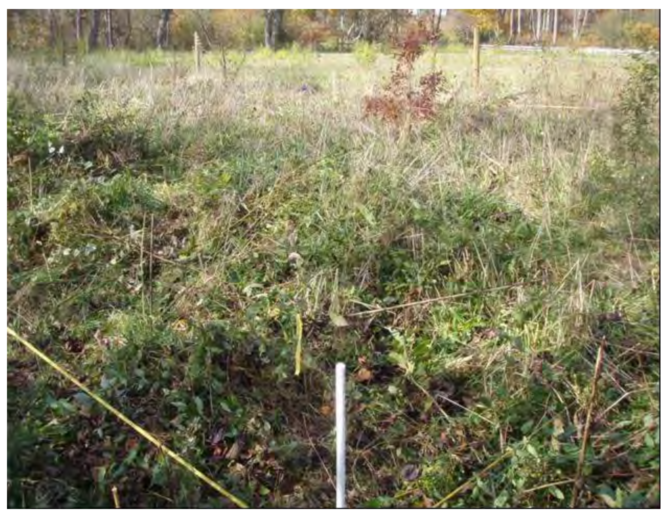
Vegetation Plot 1

Vegetation plot 1, UT2 facing downstream (0,0), 2 February 2012, MY0.

Vegetation plot 1, UT2 facing upstream (10,10), 2 Feb 2012, MY0.



Vegetation plot 1, UT2 facing downstream (0,0), 23 October 2012, MY1.



Vegetation plot 1, UT2 facing upstream (10,10), 23 October 2012, MY1.

Figure C.1 Continued

Vegetation plot 1, UT2 facing downstream (0,0), 6 Nov 2013, MY2

Vegetation plot 1, UT2 facing upstream (10,10), 6 Nov 2013, MY2.

Vegetation plot 1, UT2 facing downstream (0,0), 11 Nov 2014, MY3

Vegetation plot 1, UT2 facing upstream (10,10), 11 Nov 2014, MY3.

Figure C.1 Continued

Vegetation Plot 2

Vegetation plot 2, SHC facing downstream (0,0), 2 Feb 2012, MY0.

Vegetation plot 2, SHC facing upstream (10,10), 2 Feb 2012, MY0.

Vegetation plot 2, SHC facing downstream (0,0), 23 October 2012, MY1.

Vegetation plot 2, SHC facing upstream (10,10), 23 October 2012 MY1.

Figure C.1 Continued

Vegetation plot 2, SHC facing downstream (0,0), 6 Nov 2013, MY2.

Vegetation plot 2, SHC facing upstream (10,10), 6 Nov 2013 MY2.

Vegetation plot 2, SHC facing downstream (0,0), 11 Nov 2014, MY3.

Vegetation plot 2, SHC facing upstream (10,10), 11 Nov 2014 MY3.

Figure C.1 Continued

Vegetation Plot 3

Vegetation plot 3, SHC facing downstream (0,0), 2 Feb 2012, MY0.

Vegetation plot 3, SHC facing upstream (10,10), 2 Feb 2012, MY0.

Vegetation plot 3, SHC facing downstream (0,0), 23October 2012, MY1.

Vegetation plot 3, SHC facing upstream (10,10), 23 October 2012, MY1.

Figure C.1 Continued

Vegetation plot 3, SHC facing downstream (0,0), 6 Nov 2013, MY2.

Vegetation plot 3, SHC facing upstream (10,10), 6 Nov 2013, MY2.

Vegetation plot 3, SHC facing downstream (0,0), 11 Nov 2014, MY3.

Vegetation plot 3, SHC facing upstream (10,10), 11 Nov 2014, MY3.

Figure C.1 Continued

Vegetation Plot 4

No Pictures MY0 – 2011

Vegetation plot 4, SHC facing downstream (0,0), 23 October 2012, MY1.

Vegetation plot 4, SHC facing upstream (10,10), 23 October 2012, MY1.

Vegetation plot 4, SHC facing downstream (0,0), 6 Nov 2013, MY2.

Vegetation plot 4, SHC facing upstream (10,10), 6 Nov 2013, MY2.

Figure C.1 Continued

Vegetation Plot 4

No pictures MY0-2011

Vegetation plot 4, SHC facing downstream (0,0), 11 Nov 2014, MY3.

Vegetation plot 4, SHC facing upstream (10,10), 11 Nov 2014, MY3.

Figure C.1 Continued

Vegetation Plot 5

Vegetation plot 5, SHC facing downstream (0,0), 2 Feb 2012, MY0.

Vegetation plot 5, SHC facing upstream (10,10), 2 Feb 2012, MY0.

Vegetation plot 5, SHC facing downstream (0,0), 23 October 2012, MY1.

Vegetation plot 5, SHC facing upstream (10,10), 23 October 2012, MY1.

Figure C.1 Continued

Vegetation plot 5, SHC facing downstream (0,0), 6 Nov 2013, MY2.

Vegetation plot 5, SHC facing upstream (10,10), 6 Nov 2013, MY2.

Vegetation plot 5, SHC facing downstream (0,0), 11 Nov 2014, MY3.

Vegetation plot 5, SHC facing upstream (10,10), 11 Nov 2014, MY3.

Figure C.1 Continued

Vegetation Plot 6

Vegetation plot 6, SHC facing downstream (0,5), 2 Feb 2012, MY0.

Vegetation plot 6, SHC facing upstream (20,0), 2 Feb 2012, MY0.

Vegetation plot 6, SHC facing downstream (0,0), 23 October 2012, MY1.

Vegetation plot 6, SHC facing upstream (20,5), 23 October 2012, MY1.

Figure C.1 Continued


Vegetation plot 6, SHC facing downstream (0,0), 6 Nov 2013, MY2.


Vegetation plot 6, SHC facing upstream (20,5), 6 Nov 2013, MY2.


Vegetation plot 6, SHC facing downstream (0,0), 11 Nov 2014, MY3.


Vegetation plot 6, SHC facing upstream (10,10), 11 Nov 2014, MY3.

Figure C.1 Continued

Vegetation Plot 7

Vegetation plot 7, SHC facing downstream (0,0), 2 Feb 2012, MY0.

Vegetation plot 7, SHC facing upstream (10,10), 2 Feb 2012, MY0.

Vegetation plot 7, SHC facing downstream (0,0), 23 October 2012, MY1.

Vegetation plot 7, SHC facing upstream (10,10), 23 October 2012, MY1.

Figure C.1 Continued

Vegetation plot 7, SHC facing downstream (0,0), 6 Nov 2013, MY2.

Vegetation plot 7, SHC facing upstream (10,10), 6 Nov 2013, MY2.

Vegetation plot 7, SHC facing downstream (0,0), 11 Nov 2014, MY3.

Vegetation plot 7, SHC facing upstream (10,10), 11 Nov 2014, MY3.

Figure C.1 Continued

Vegetation Plot 8

Vegetation plot 8, SHC facing downstream (0,0), 2 Feb 2012, MY0.

Vegetation plot 8, SHC facing upstream (10,10), 2 Feb 2012, MY0.

Vegetation plot 8, SHC facing downstream (0,0), 23 October 2012, MY1.

Vegetation plot 8, SHC facing upstream (10,10), 23 October 2012, MY1.

Figure C.1 Continued

Vegetation plot 8, SHC facing downstream (0,0), 6 Nov 2013, MY2.

Vegetation plot 8, SHC facing upstream (10,10), 6 Nov 2013, MY2.

Vegetation plot 8, SHC facing downstream (0,0), 11 Nov 2014, MY3.

Vegetation plot 8, SHC facing upstream (10,10), 11 Nov 2014, MY3.

Figure C.1 Continued

Vegetation Plot 9

Vegetation plot 9, SHC facing downstream (0,5), 2 Feb 2012, MY0.

Vegetation plot 9, SHC facing upstream (20,0), 2 Feb 2012, MY0.

Vegetation plot 9, SHC facing downstream (0,0), 23 October 2012, MY1.

Vegetation plot 9, SHC facing upstream (20,5), 23 October 2012, MY1.

Figure C.1 Continued

Vegetation plot 9, SHC facing downstream (0,0), 6 Nov 2013, MY2.

Vegetation plot 9, SHC facing upstream (20,5), 6 Nov 2013, MY2.

Vegetation plot 9, SHC facing downstream (0,0), 11 Nov 2014, MY3.

Vegetation plot 9, SHC facing upstream (20,5), 11 Nov 2014, MY3.

Figure C.1 Continued

Vegetation Plot 10

Vegetation plot 10, UT3 facing downstream (0,0), 2 Feb 2012, MY0.

Vegetation plot 10, UT3 facing upstream (10,10), 2 Feb 2012, MY0.

Vegetation plot 10, UT3 facing downstream (0,0), 23 October 2012, MY1.

Vegetation plot 10, UT3 facing upstream (10,10), 23 October 2012, MY1.

Figure C.1 Continued

Vegetation plot 10, UT3 facing downstream (0,0), 6 Nov 2013, MY2.

Vegetation plot 10, UT3 facing upstream (10,10), 6 Nov 2013, MY2.

Vegetation plot 10, UT3 facing downstream (0,0), 11 Nov 2014, MY3.

Vegetation plot 10, UT3 facing upstream (10,10), 11 Nov 2014, MY3.

Figure C.2 Vegetation Problem Area Photographs, Upper South Hominy Mitigation Site.

Photo 1: Japanese honeysuckle along Trib-2

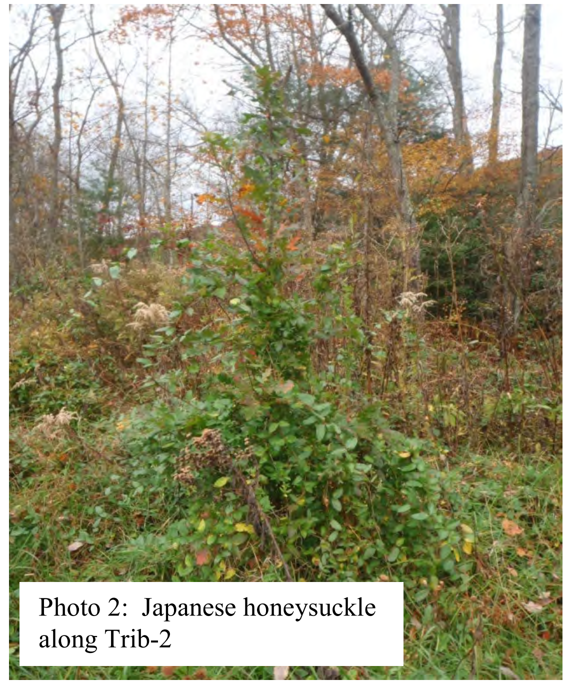


Photo 2: Japanese honeysuckle along Trib-2

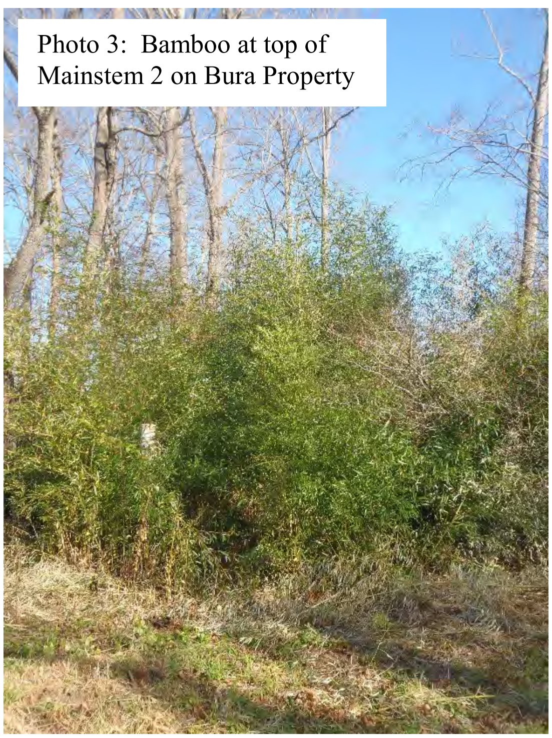
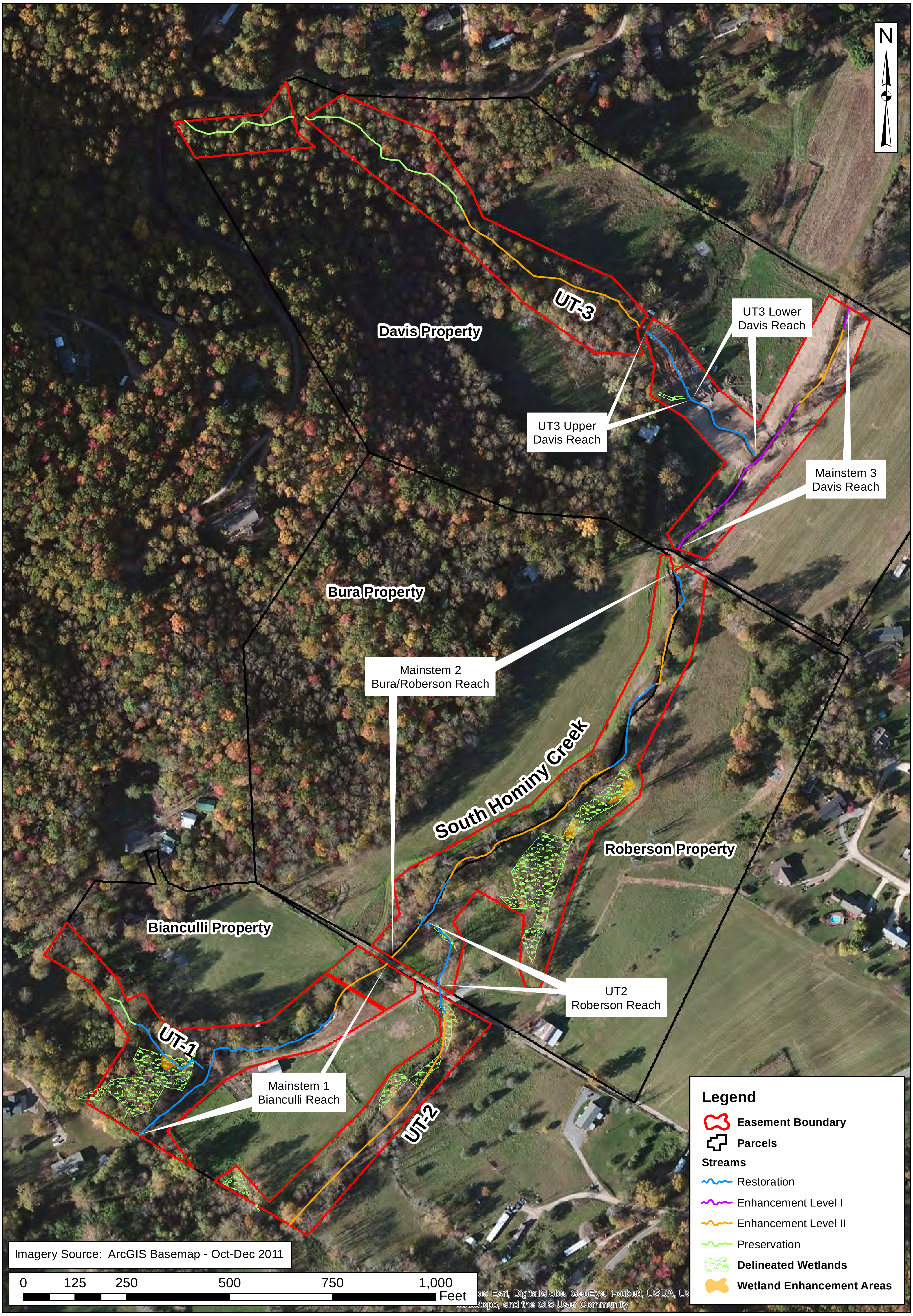


Photo 3: Bamboo at top of Mainstem 2 on Bura Property

Appendix D.

Monitoring Year-3, 2014, Plan Sheets



Prepared by:

Axiom Environmental, Inc.

Prepared for:

Ecosystem Enhancement Program

MONITORING YEAR 3 PLAN SHEETS
UPPER SOUTH HOMINY MITIGATION SITE
EEP PROJECT NUMBER 92632
Buncombe County, North Carolina

Dwn. by.: KRJ

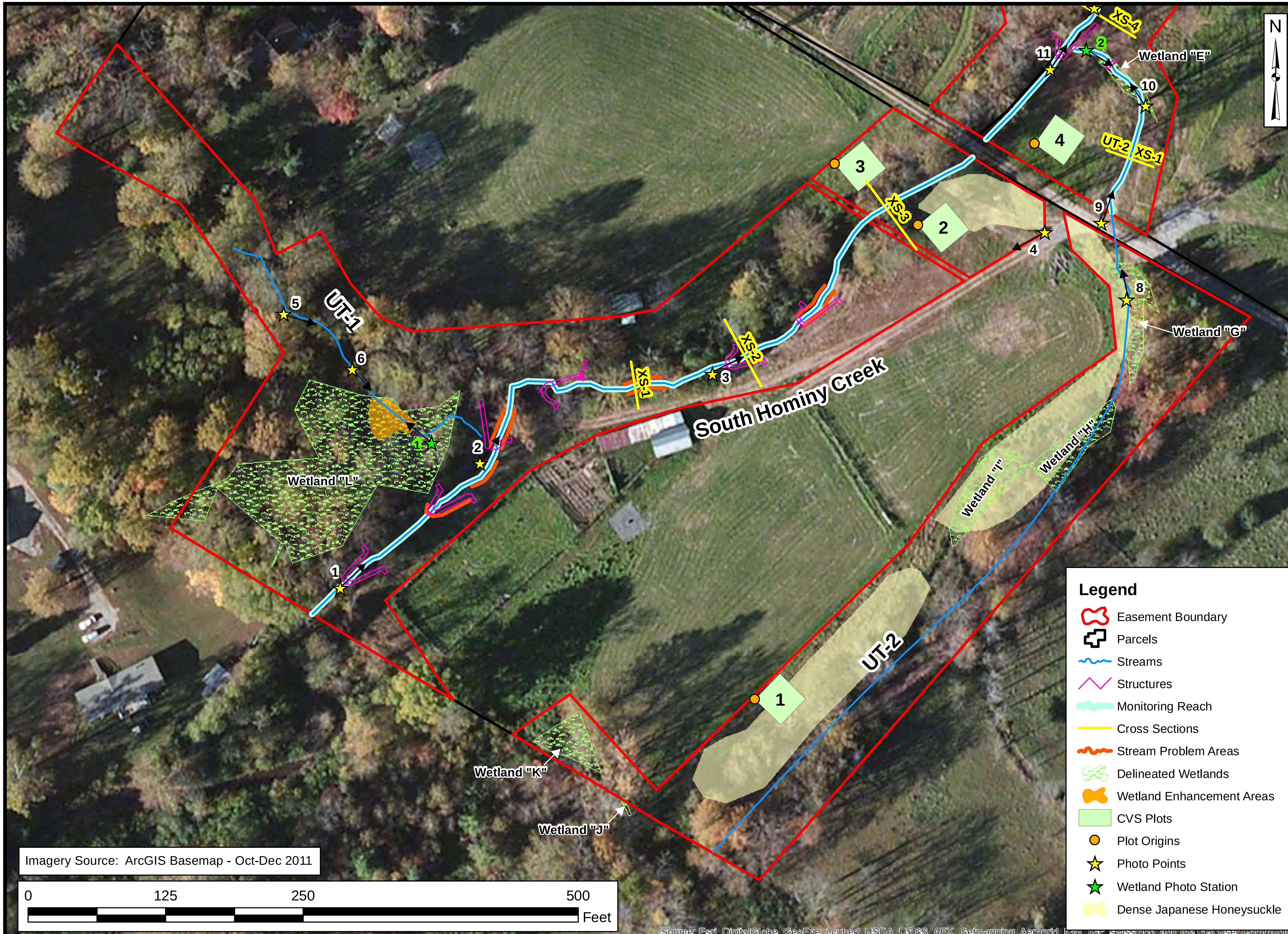
Date: December 2014

Project: 12-004.20

FIGURE

D.1

Sheet 1 of 4



Prepared by:

Axiom Environmental, Inc.

Prepared for:

Ecosystem Enhancement PROGRAM

Project:

UPPER SOUTH HOMINY MITIGATION SITE

Bianculli Reach

Buncombe County, NC

Title:

MONITORING YEAR 3 PLAN SHEETS

Drawn by: KRJ

Date: DEC 2014

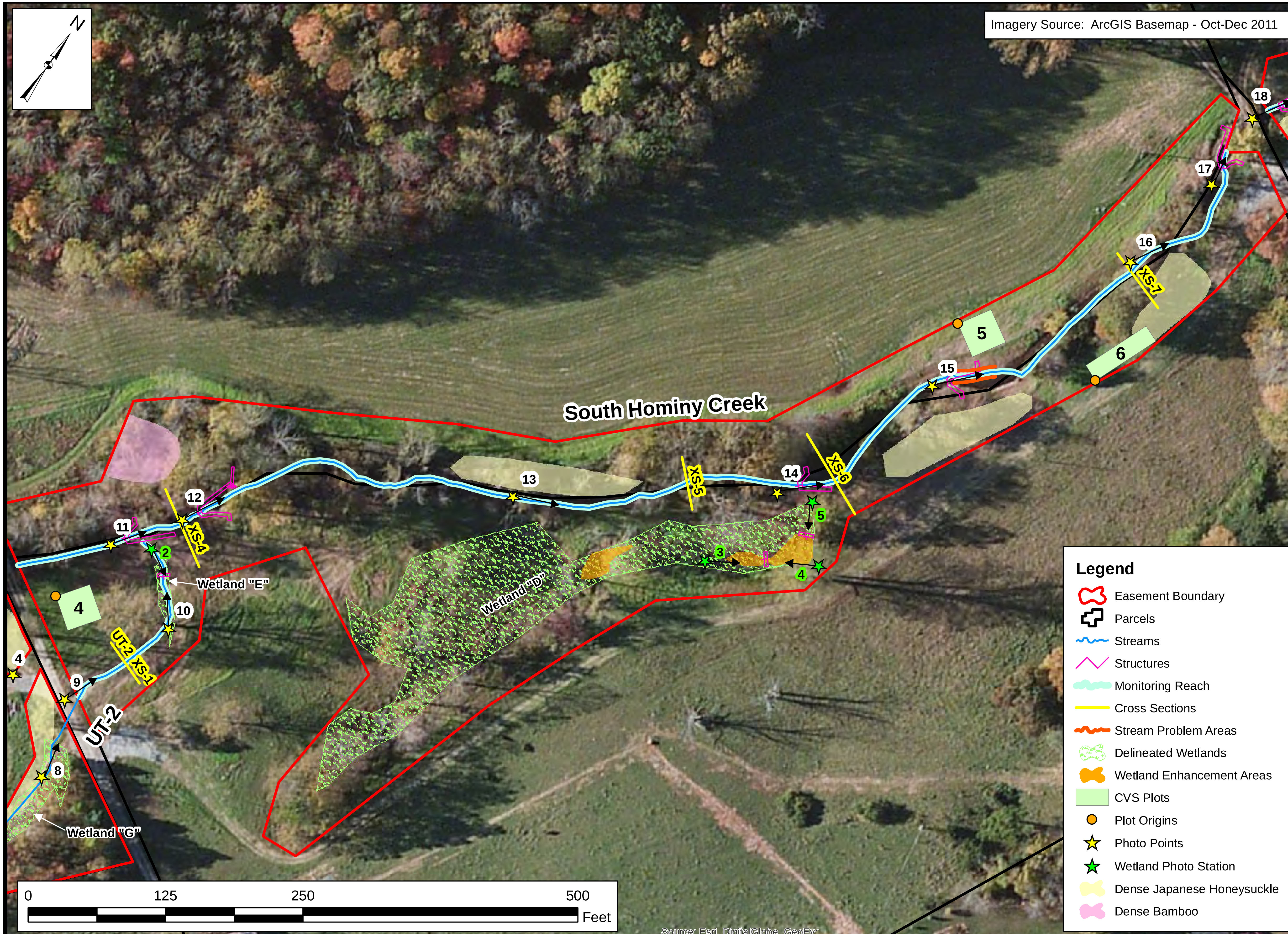
Scale: 1:1000

Project No.: 12-004.20

FIGURE

D.1

Sheet 2 of 4



Prepared by:

Axiom Environmental, Inc.

Prepared for:

Ecosystem Enhancement Program

Project:

UPPER SOUTH HOMINY MITIGATION SITE

Bura/Roberson Reach

Buncombe County, NC

Title:

MONITORING YEAR 3 PLAN SHEETS

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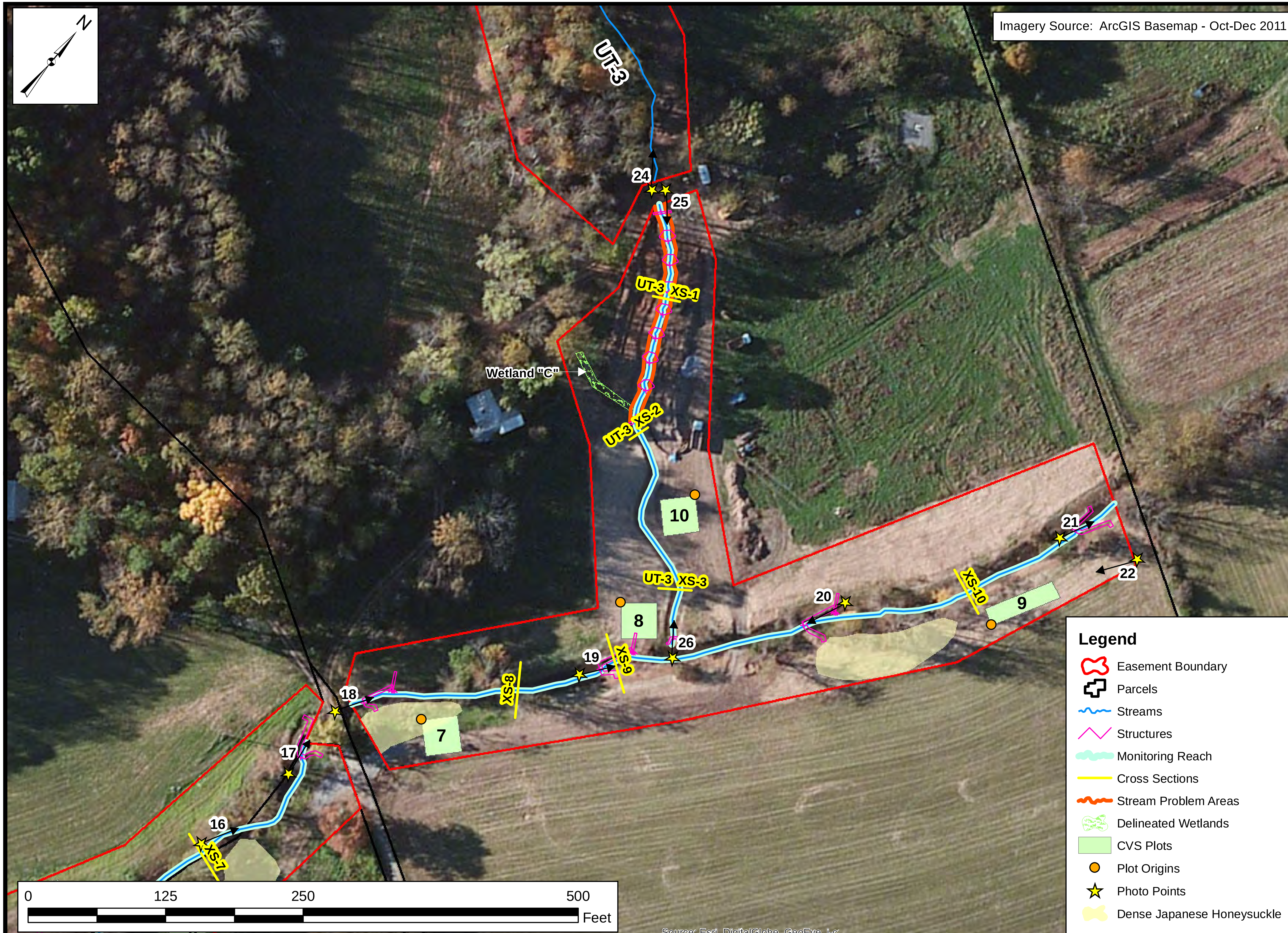
Project No.: 12-004.20

FIGURE

D.1

Sheet 3 of 4



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Prepared for:

Ecosystem Enhancement Program

Project:

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Davis Reach

Buncombe County, NC

Title:

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FIGURE

D.1

Sheet 4 of 4