Bull Creek Watershed

Visual Assessment Survey

Bull Creek Watershed
Visual Assessment Survey

Prepared for:
Missouri Department of Conservation

Authors:
Brandy M. Henderson
and
Susan A. Sleeth
Undergraduates
Missouri State University
Geology Department

Holly Neill, M.S.
Missouri Stream Team Watershed Coalition

Special thanks to:

Mr. Damon Bassett
Instructor, MSU

Dave Woods
Fisheries Management Biologist, MDC

"I'm here at big rock
Down on Bull Creek
I came down here on a bad streak
But hey I just might stay here for a week
I'm on the wrong side of the Christian County line"
--Big Smith

Introduction

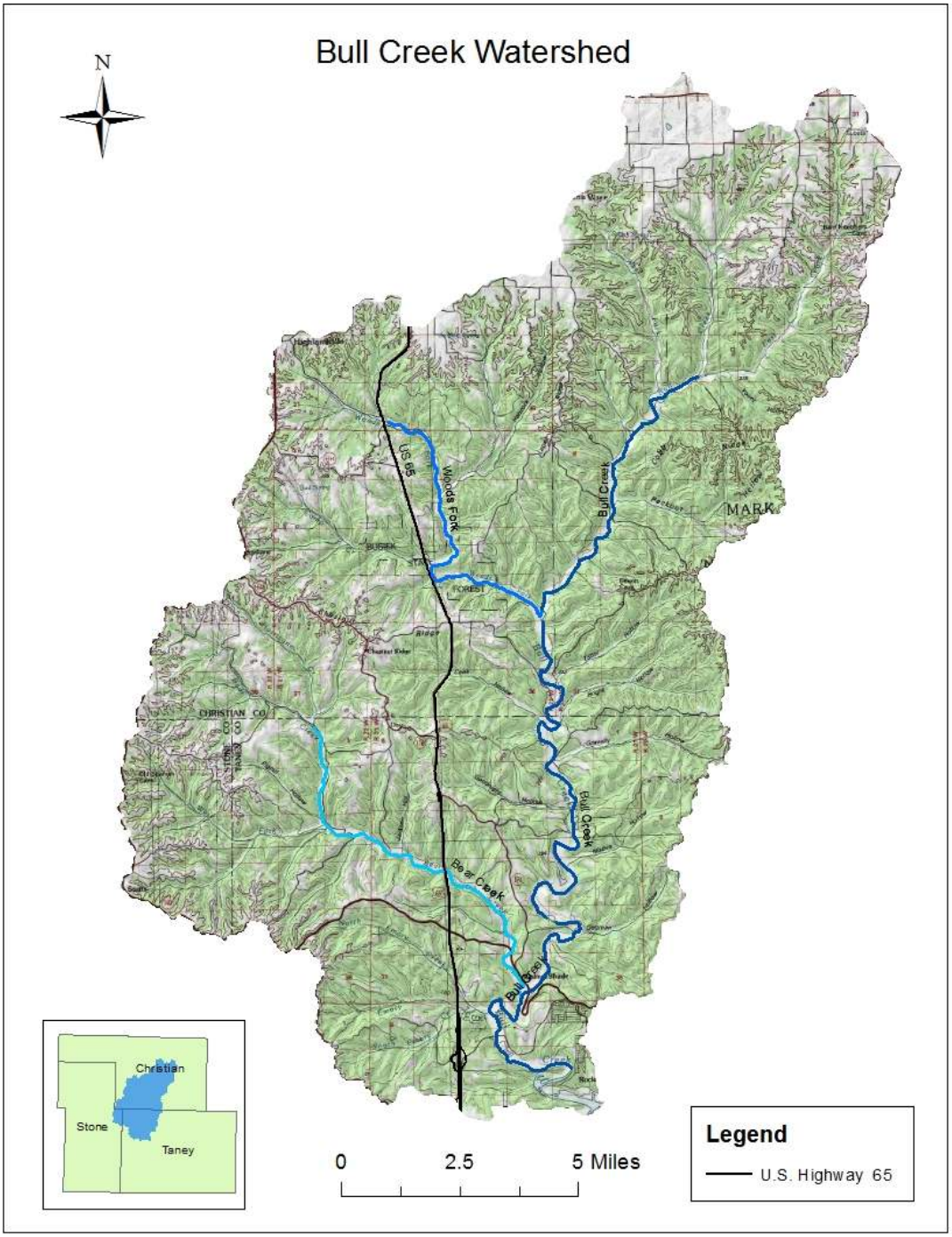
In 2008, the Missouri Department of Conservation (MDC) began work to establish baseline aquatic community data for the Woods Fork Aquatic Conservation Opportunity Area (ACOA) and to become familiar with the watershed and its stressors. In 2010, the "Bull Creek Association", so-far a loosely organized group of landowners and stakeholders in the watershed, formed for several meetings and a workshop to learn more about the watershed. Through these meetings, many local landowners and stream enthusiasts have shown interest in conservation of Bull Creek. There are many future directions and steps that are possible future activities in the watershed including increasing Stream Team monitoring and activities, education at schools and with adults, and BMP implementation with landowners and communities in the watershed.

The Bull Creek Visual Assessment Project was funded by an MDC "Fish Kill" grant (monies obtained through fish kill settlements) and awarded to Ozark Water Watch in 2011. Ozark Water Watch subcontracted with Missouri Stream Team Watershed Coalition to provide staff and volunteers to complete the project plan. The project plan included creation of a "Visual Assessment" for parts of major tributaries of Bull Creek to include Woods Fork and Bear Creek and parts of the main stem of Bull Creek, storm drain marking in the Bull Creek watershed, and an educational mailing to Bull Creek watershed residents. The purpose of the "Visual Assessment" was to identify areas of interest and communicate those to watershed managers to utilize for future restoration or improvement projects. The educational mailing was targeted to residents of Bull Creek watershed to simply give them an introduction of what a watershed is and ways they can take action to protect their water resources.

Bull Creek watershed is located in Christian and Taney counties and is a priority watershed in the White River drainage of southwest Missouri. The Bull Creek watershed contains one MDC aquatic COA (the Woods Fork ACOA) and a section of one tributary (Bear Creek) has been designated a priority by The Nature Conservancy. Eight miles of Bull Creek have been designated as an Outstanding State Resource Water by the Missouri Department of Natural Resource (DNR). Additionally, Mark Twain National Forest and Busiek State Forest provide high public land ownership within the watershed and these forests are identified as terrestrial priority areas.

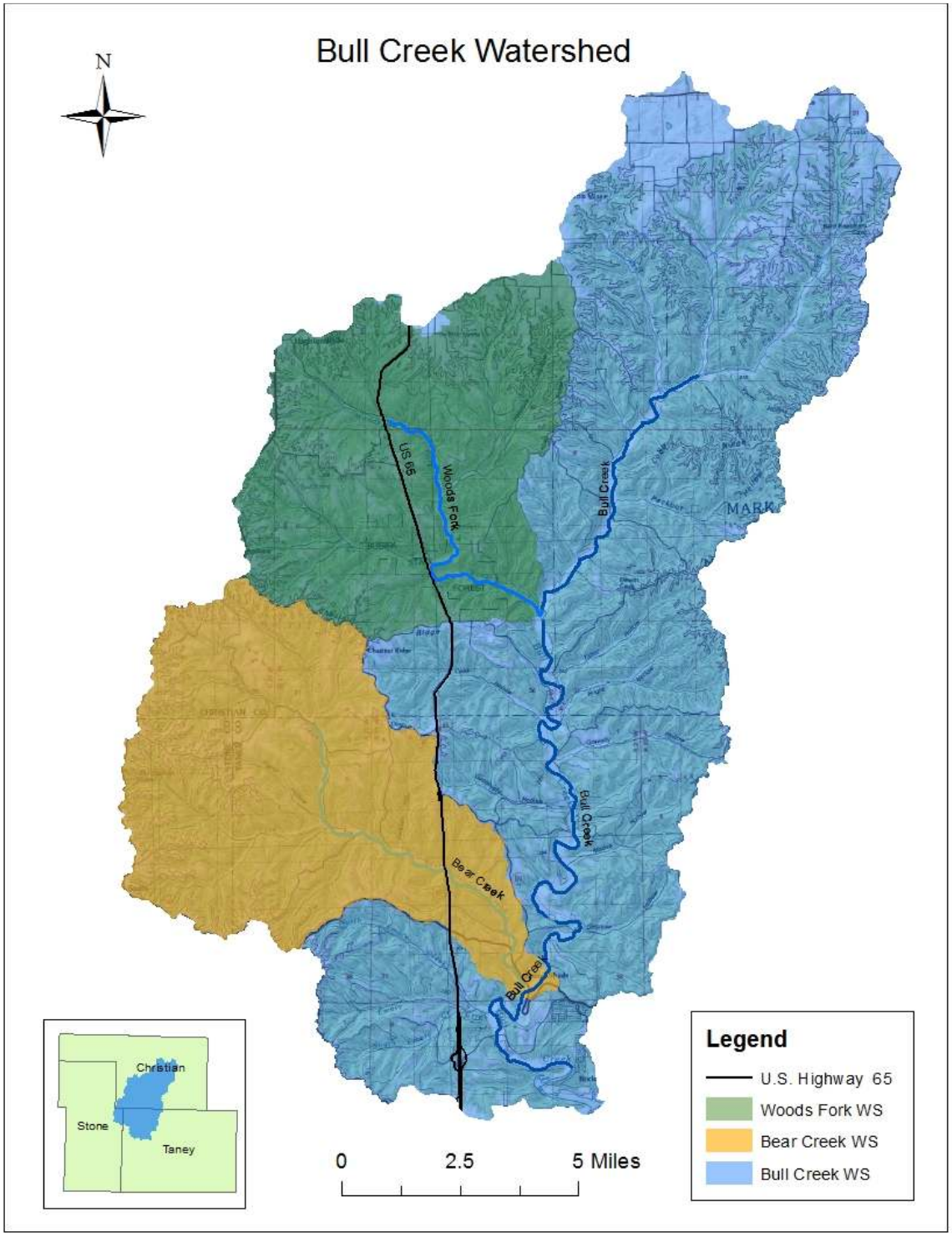
Bull Creek Watershed

The Bull Creek watershed is an area that encompasses 36,647 acres. It lies within Christian, Stone and Taney counties. Bull Creek has two major tributaries; Woods Fork Creek and Bear Creek.



Bull Creek Watershed Breakdown

The Bull Creek watershed includes Woods Fork sub-watershed and Bear Creek sub-watershed.



Methods

All points of interest were visually inspected in the field. GPS locations were taken and recorded at areas of interest noted in the visual assessment surveys. Areas of interest included: insufficient riparian corridors, bank erosion, excessive litter, agricultural influences, excessive algae, drainage pipes, and gravel mining sites. Riparian corridors were determined to be insufficient if less than 100 feet in width from top of bank. Erosion was only noted when significant and not considered to be occurring at a natural rate. Vegetation health and maturity was also considered as it applied to riparian corridor health and contribution to erosion.

For reporting purposes, the Bull Creek watershed has been broken down by its individual watersheds of Bull Creek, Bear Creek, and Woods Fork Creek. Each watershed was broken down further for clarification in reporting locations. Individual maps are included to illustrate the breakdown of each watershed. Woods Fork is separated into North Woods Fork, Middle Woods Fork, and South Woods Fork. North Woods Fork extends from 6 miles above the confluence with Bull Creek through to the low water bridge on Woods Fork Road. Middle Woods Fork starts at the low water bridge on Woods Fork Road and extends to the northern Busiek property line. South Woods Fork includes Busiek and continues to the confluence with Bull Creek. Bear Creek has been divided into two parts; Bear Creek West and Bear Creek East. Bear Creek West begins six miles above the confluence and extends to US 65 Highway. Bear Creek East begins at US 65 Highway and extends to the confluence with Bull Creek. Bull Creek is seperated into Bull Creek North, Bull Creek Middle North, Bull Creek Middle South, and Bull Creek Far South. Bull Creek North begins near the confluence of Woods Fork and Bull Creek twenty three miles from the mouth of Lake Taneycomo.

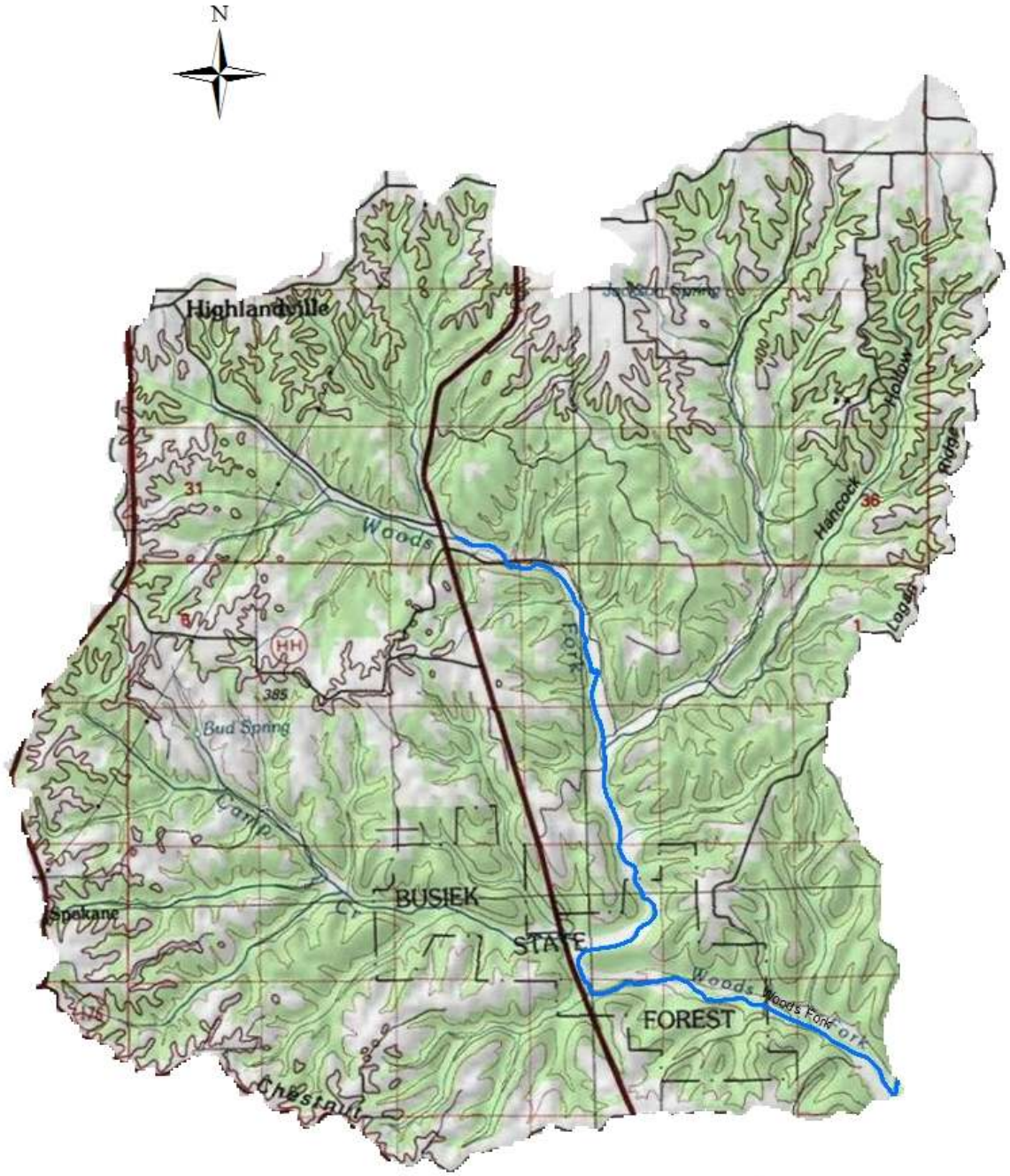
All maps were created in ArcMap10 using shape files provided by MDC. The aerial photo basemaps are from 2010 and the topographic base maps are from 2011. The erosion and riparian corridor maps were created by utilizing aerial photography and field notes. Feature Analyst was utilized to highlight the areas of insufficient riparian corridor and erosion. There is no metadata attached to the polygons that were created. A GPS trimble unit would be required to complete metadata for these features.

Photographs were taken of areas of interest and are included in the report. Most of the photographs were taken with a GPS camera and include a GPS geotagged location. The photos included in the report are labeled and coincide to a map that indicates the photos location.

Results

A series of maps were created to showcase results of the visual assessment and include areas of insufficient riparian corridor, bank erosion, and photo journal of points of interest.

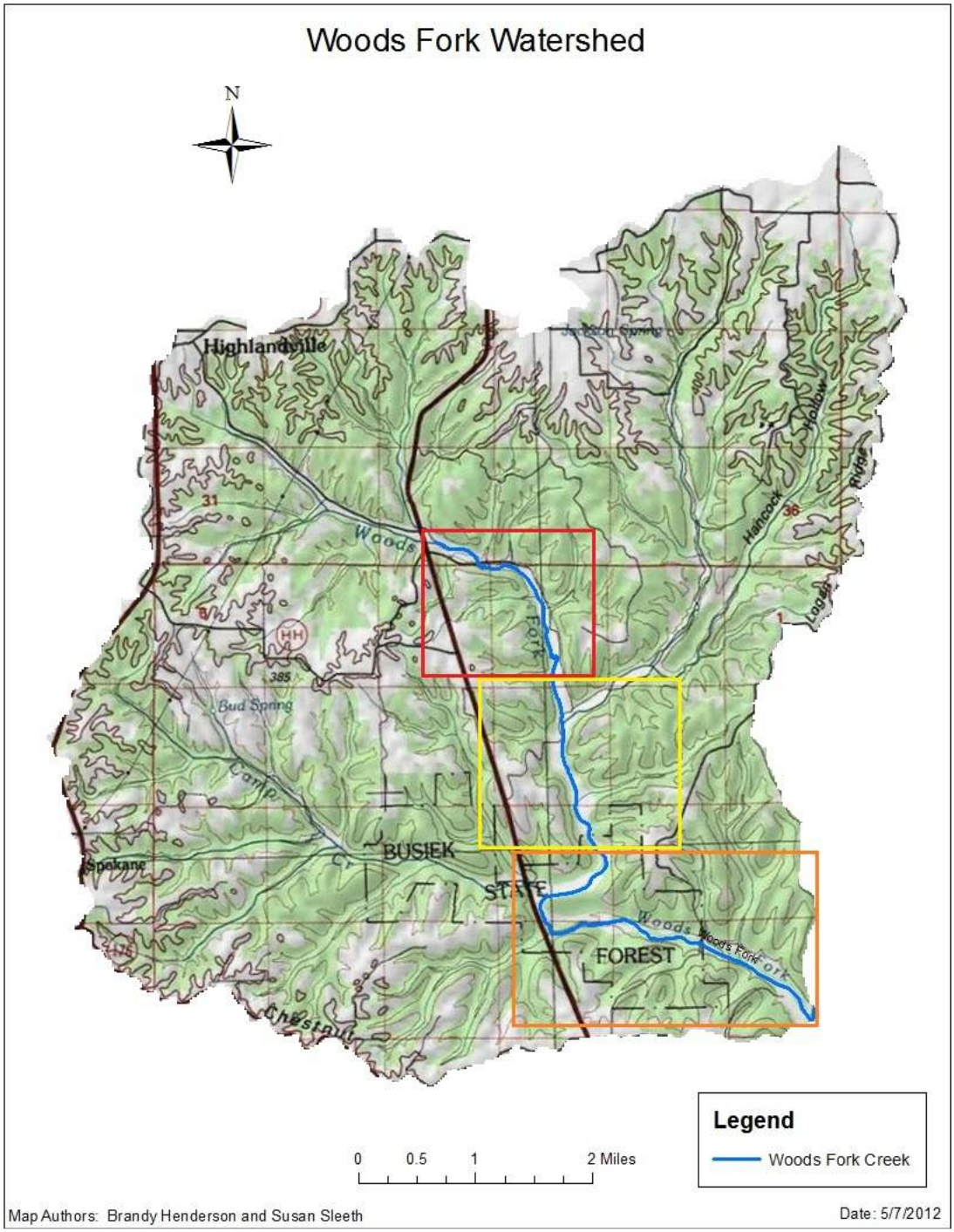
Woods Fork Watershed



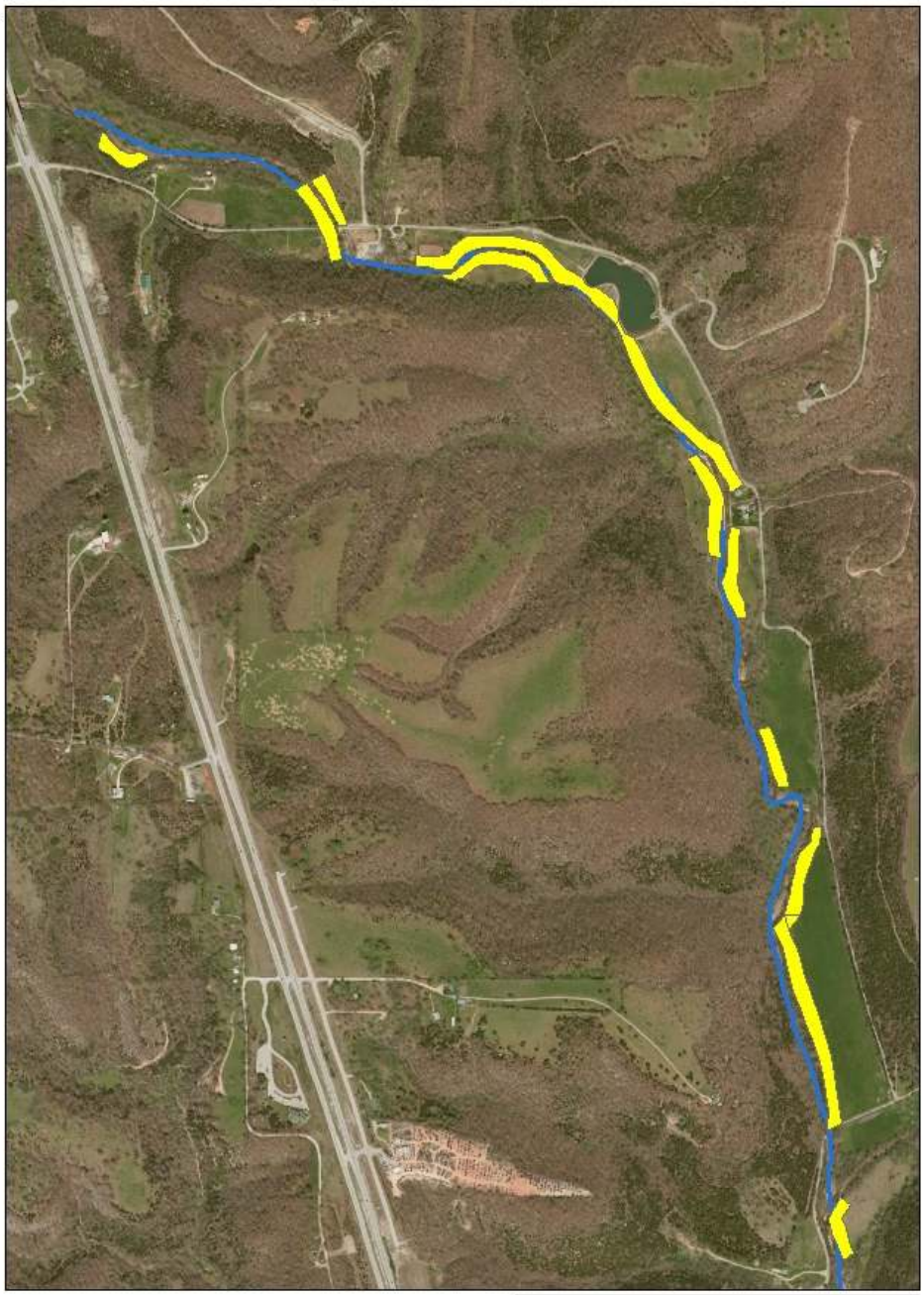
Map Authors: Brandy Henderson and Susan Sleeth

Date: 5/7/2012

For report purposes watersheds are broken into smaller sections (red, yellow, and orange) to highlight specific areas. Red is North Woods Fork, yellow is Middle Woods Fork and orange is South Woods Fork.



North Woods Fork
Riparian Corridor



Map Authors: Brandy Henderson and Susan Sleeth Date: 5/15/2012

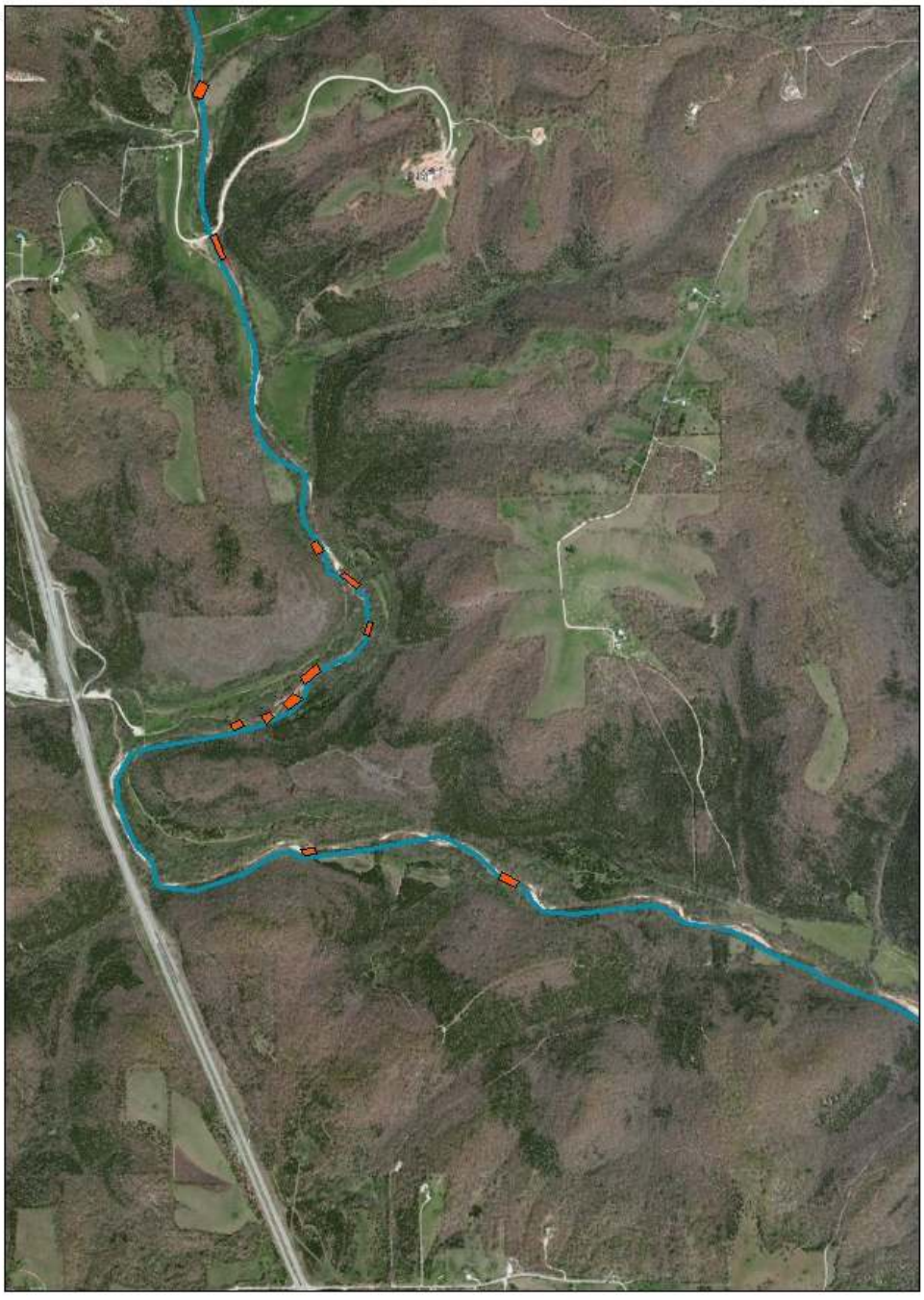
Middle and South Woods Fork Riparian Corridor

Map Authors: Brandy Henderson and Susan Sleeth Date: 5/15/2012

North Woods Fork
Erosion Areas

Map Authors: Brandy Henderson and Susan Sleeth Date: 5/15/2012

Middle and South Woods Fork Erosion Areas



Map Authors: Brandy Henderson and Susan Sleeth Date: 5/15/2012

Woods Fork North Photo Locations

WFN1 Agricultural Influences

WFN2 Bank Erosion

WFN2.1 Agricultural Influences/Inadequate Riparian Corridor

WFN3 Bank Erosion

WFN4 Agricultural Influences

WFN5 Agricultural Influences/Inadequate Riparian Corridor

WFN6

WFN7

WFN8

Agricultural Influences/Inadequate Riparian Corridor/Bank Erosion

Middle Woods Fork Photo Locations

MWF1 Low Water Bridge

MWF2 Bank Erosion

MWF3 Inadequate Riparian Corridor

MWF4 Inadequate Riparian Corridor

MWF5 Inadequate Riparian Corridor

MWF6 Inadequate Riparian Corridor

Bridge-Fish Barrier

South Woods Fork Photo Locations

SWF1 Bank Erosion

SWF2 Bank Erosion

SWF3 Bank Erosion

SWF4 Bank Erosion

SWF5 Bank Erosion

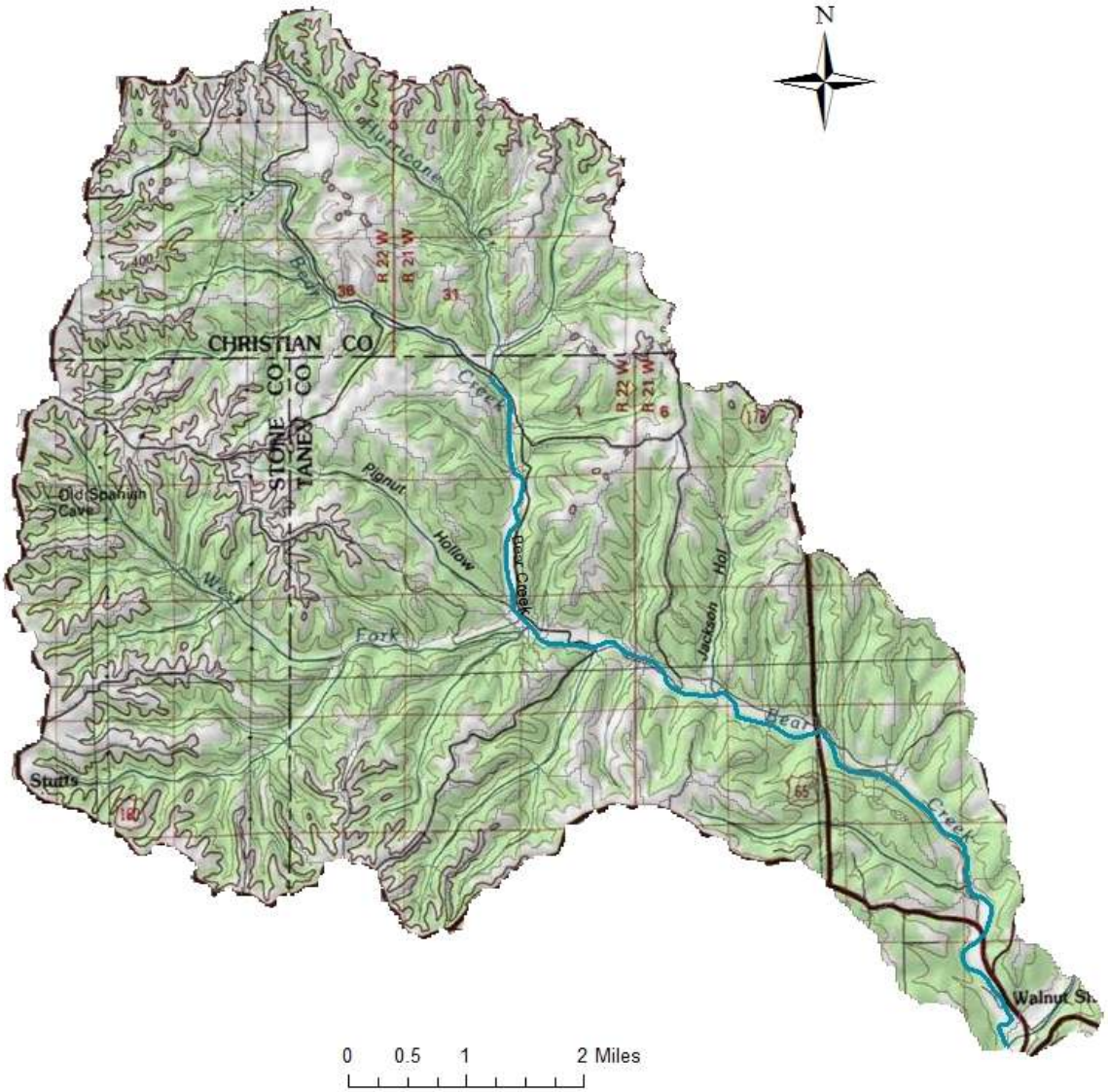
SWF6 Bank Erosion-Busiek Campsite

SWF7 Recreational Trail-Bank Erosion

SWF8 Bank Erosion

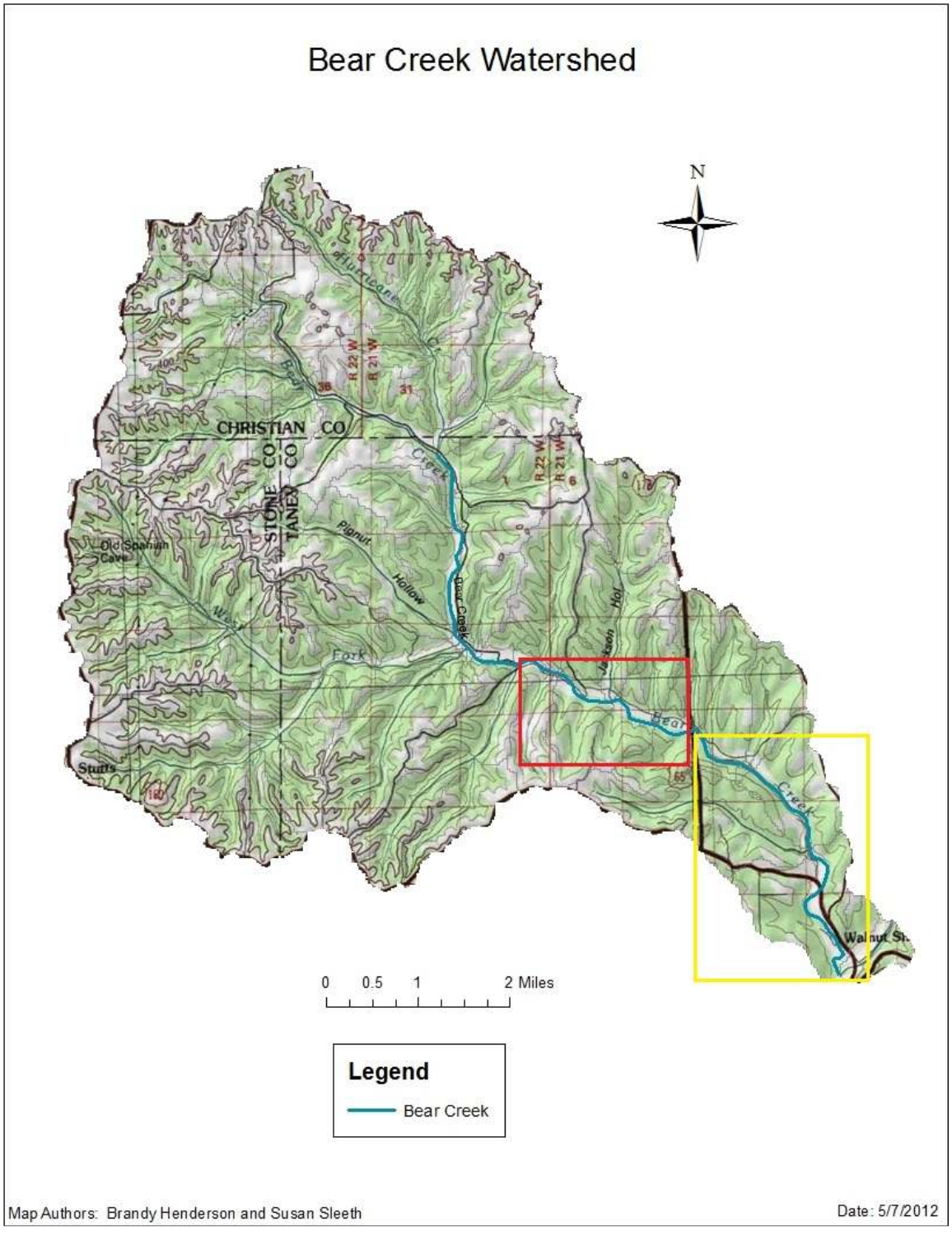
SWF9 Gravel Accumulation

Bear Creek Watershed



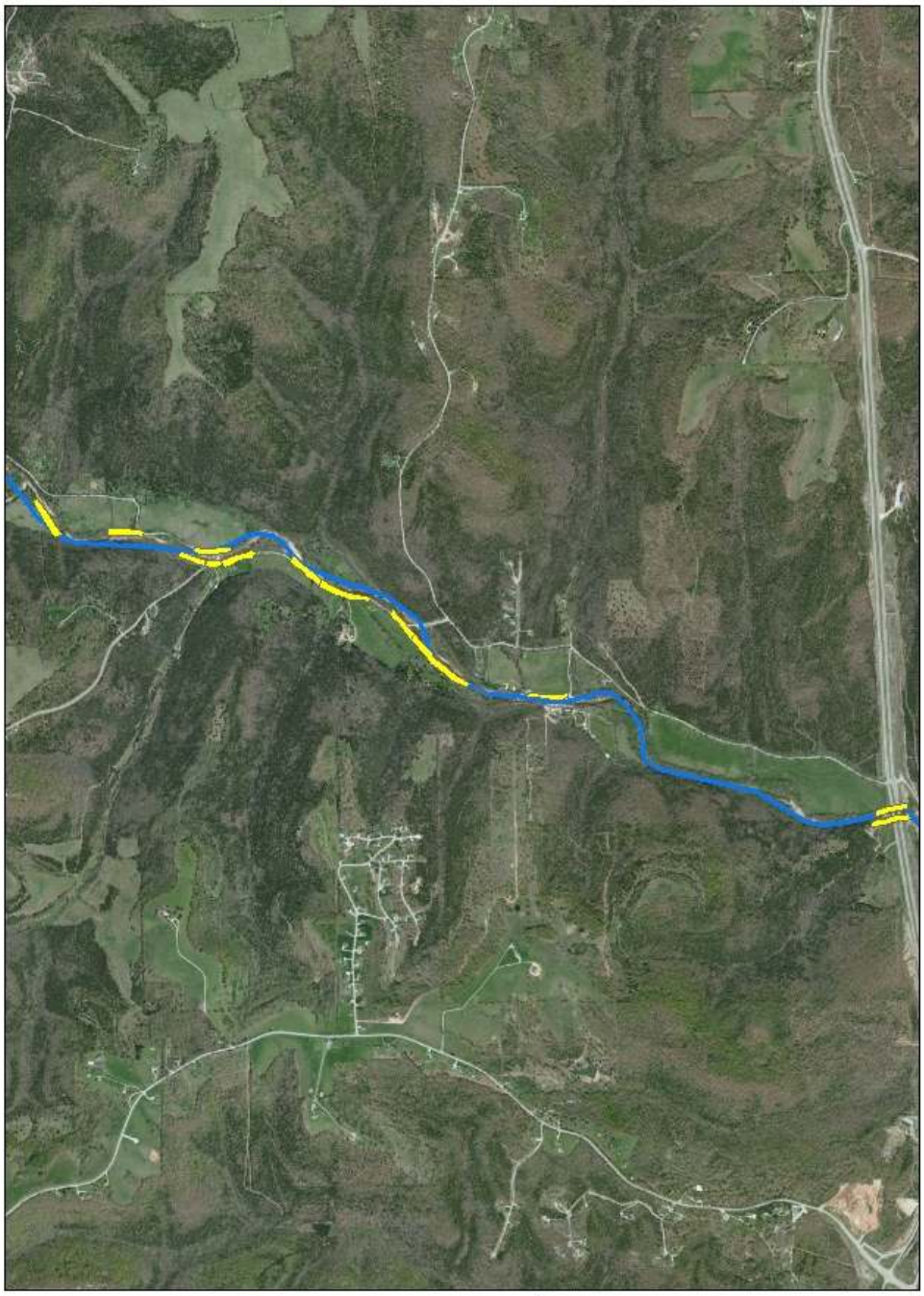
Map Authors: Brandy Henderson and Susan Sleeth

Date: 5/7/2012



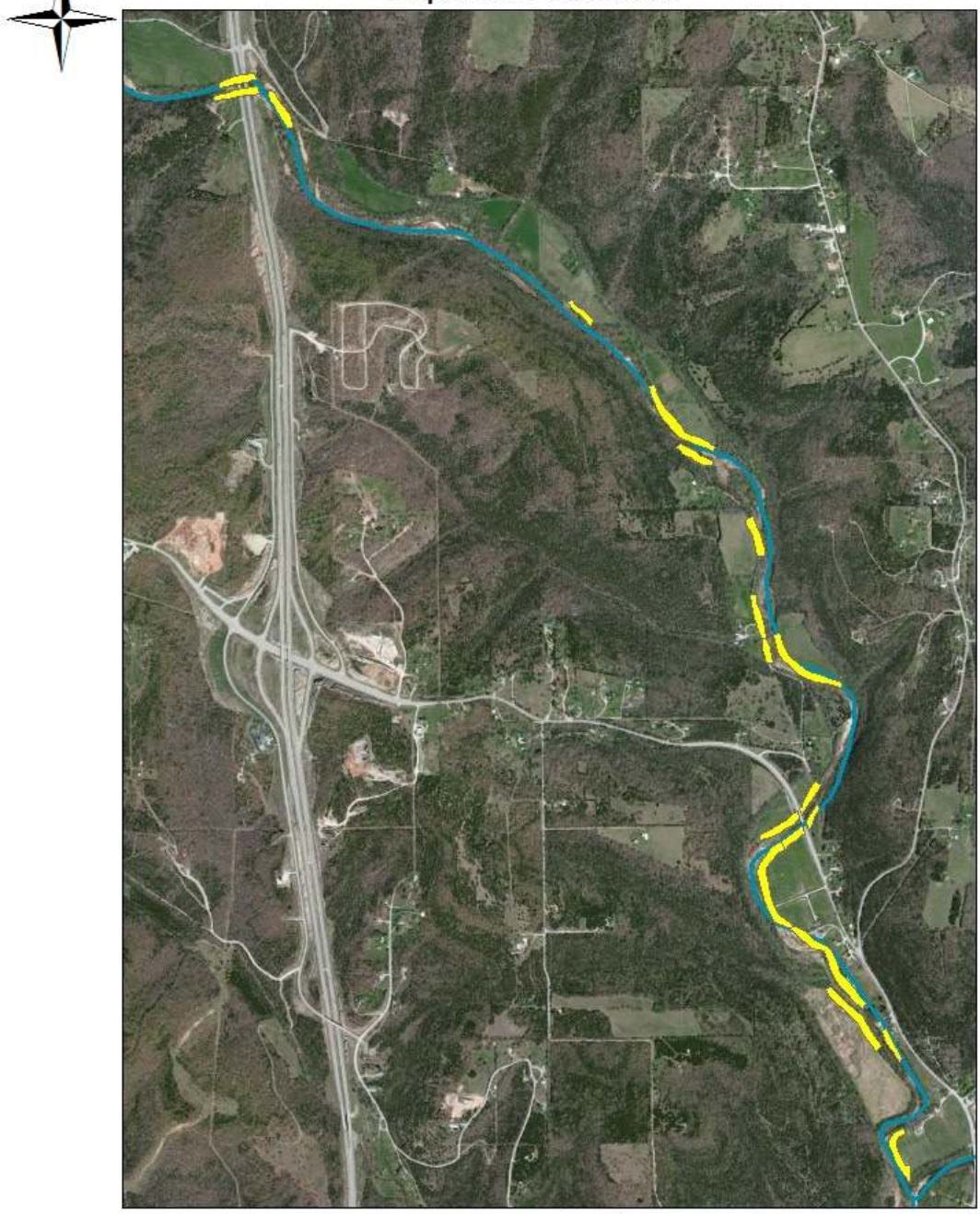
For report purposes watersheds are broken into smaller sections (red and yellow) to highlight specific areas. Red is Bear Creek West of 65 Hwy and yellow is Bear Creek East of 65 Hwy.

Bear Creek West of 65 Hwy
Riparian Corridor



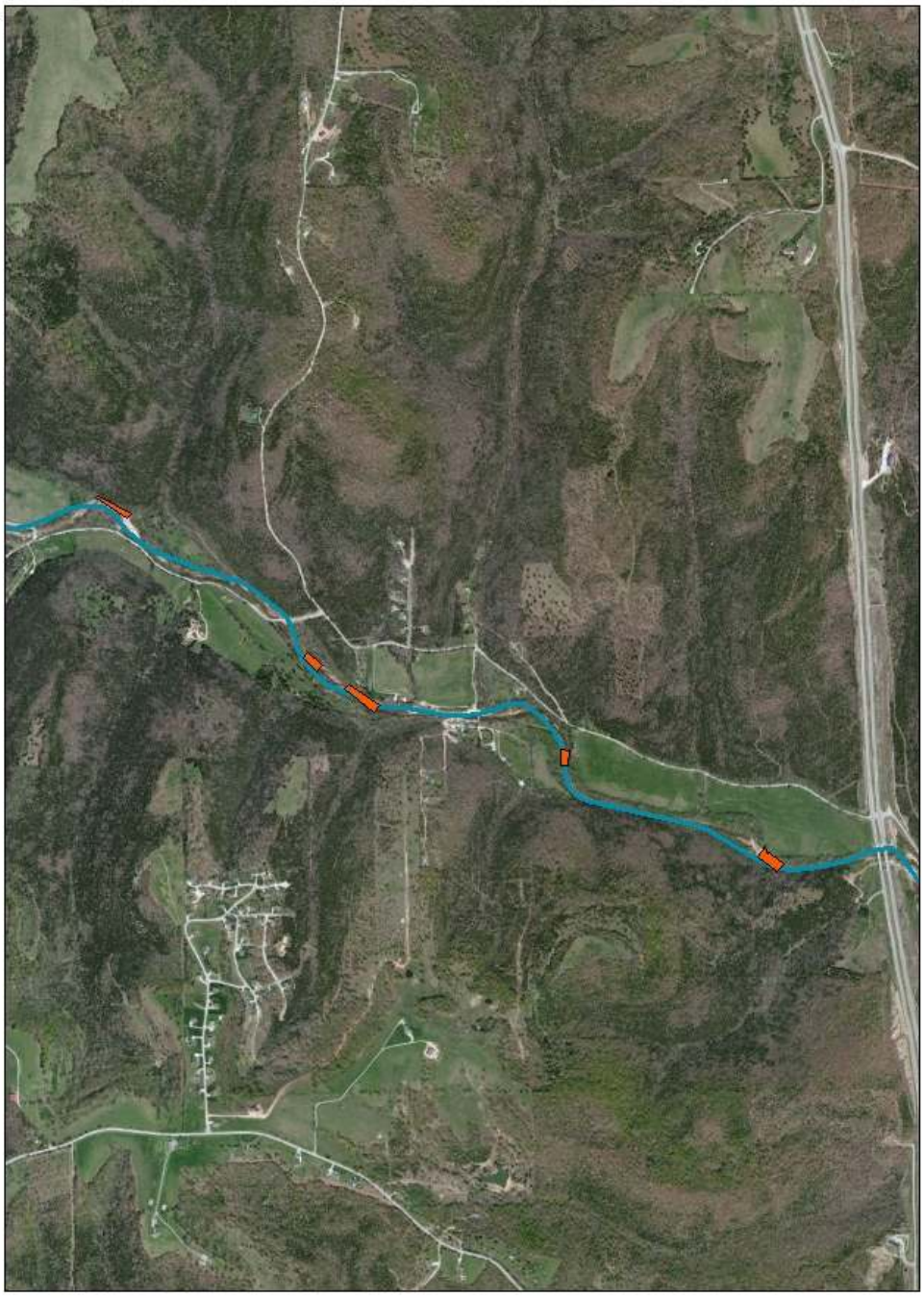
Map Authors: Brandy Henderson and Susan Sleeth Date: 5/15/2012

Bear Creek East of 65 Hwy
Riparian Corridor



Map Authors: Brandy Henderson and Susan Sleeth Date: 5/15/2012

Bear Creek West of 65 Hwy
Erosion Areas



Map Authors: Brandy Henderson and Susan Sleeth Date: 5/15/2012

Bear Creek East of 65 Hwy
Erosion Areas

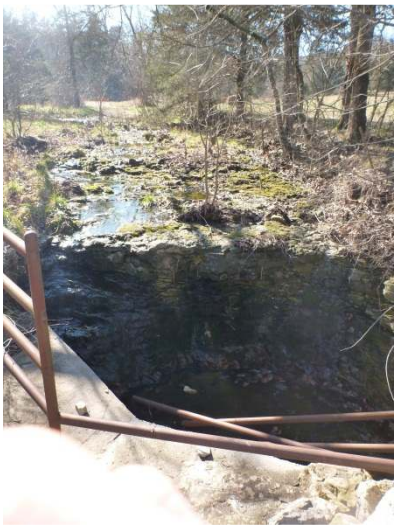
Map Authors: Brandy Henderson and Susan Sleeth Date: 5/15/2012

Bear Creek West Photo Locations

BCW1 Bridge/Road Crossing

BCW2 Bank Erosion

BCW3 Inadequate Riparian Corridor/Bank Erosion



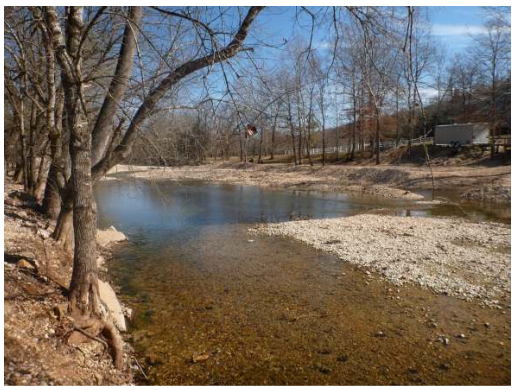
BCW4 Bridge/Road Crossing

BCW5 Culvert-discharge

BCW6 Algae

BCW7 Bridge/Road Crossing

BCW8 Algae



BCW9 Inadequate Riparian Corrdor

BCW10 Trash Site

BCW11 Algae

BCW12 Inadequate Riparian Corrdior

BCW13 Agricultural Influences-Horse Stream Access

Bear Creek East Photo Locations

BCE1 Bridge/Road Crossing

BCE2 Inadequate Riparian Corridor

BCE3 Bank Erosion/ Inadequate Riparian Corridor

BCE4 Bank Erosion/ Inadequate Riparian Corridor

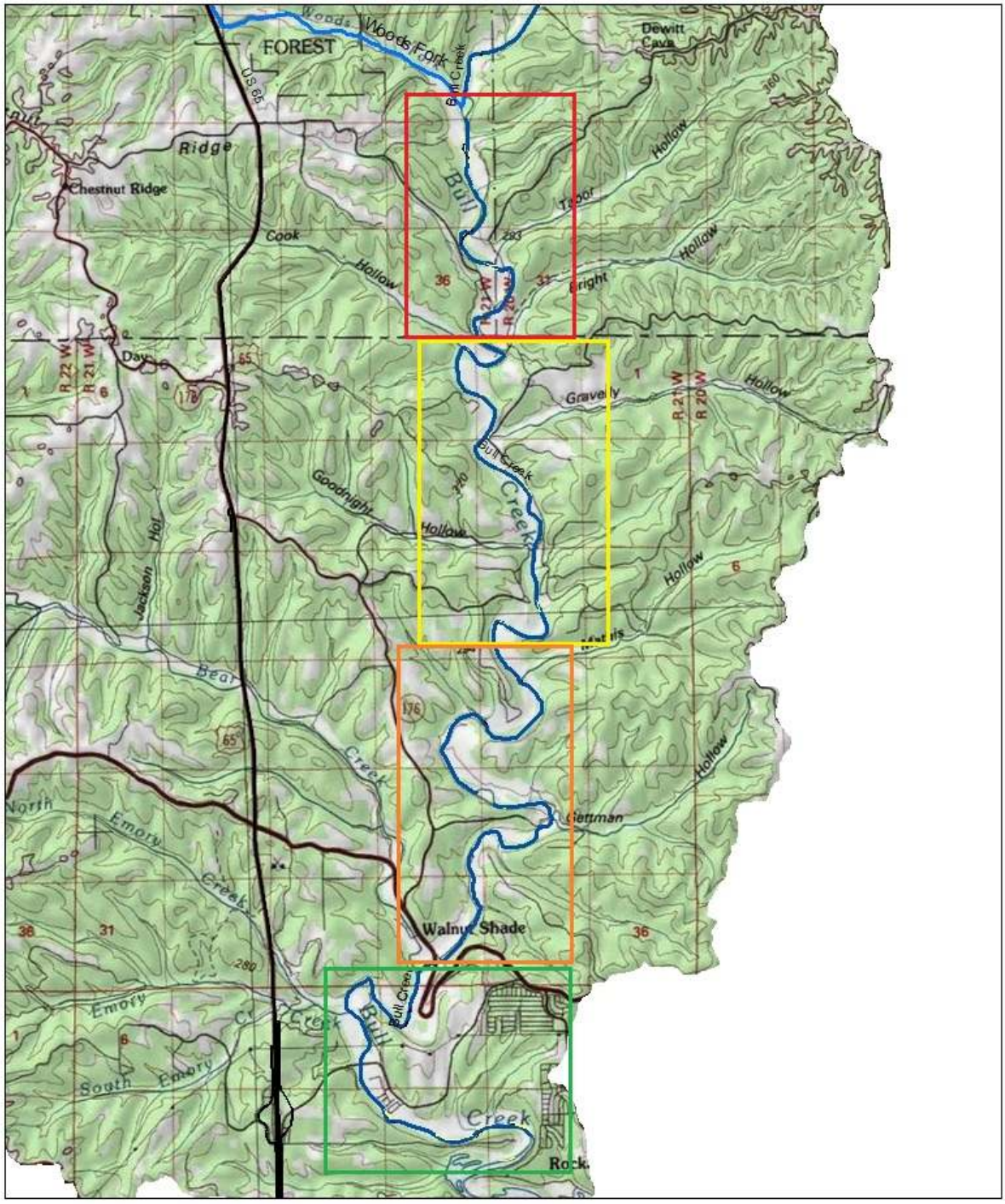
BCE5 Bank Erosion/ Inadequate Riparian Corridor

BCE6 Bank Erosion/ Inadequate Riparian Corridor

BCE7 Bank Erosion/ Inadequate Riparian Corridor

BCE8 Bank Erosion/ Inadequate Riparian Corridor

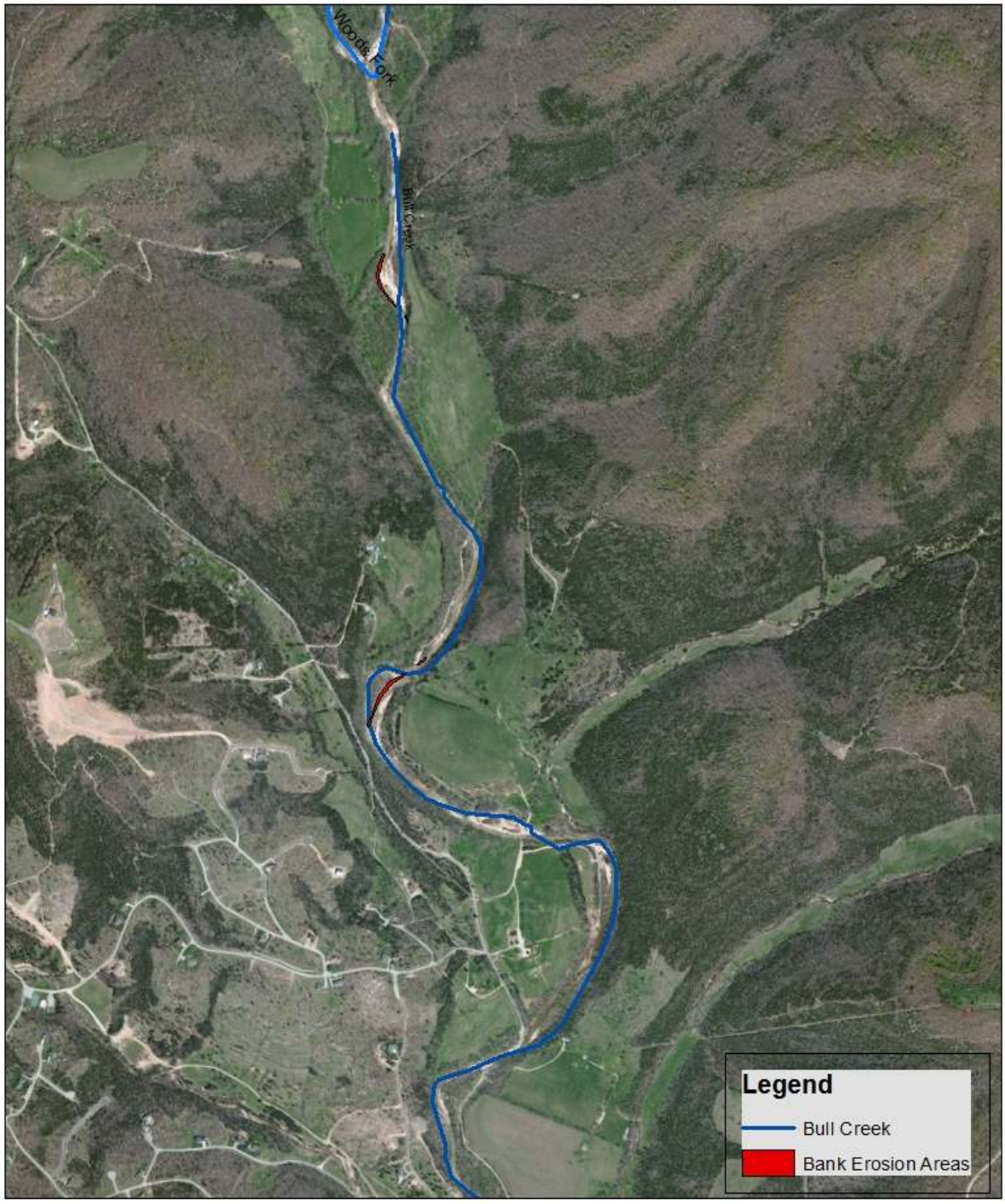
Bull Creek Watershed



Map Author: Brandy M. Henderson

Date: 4 November 2012

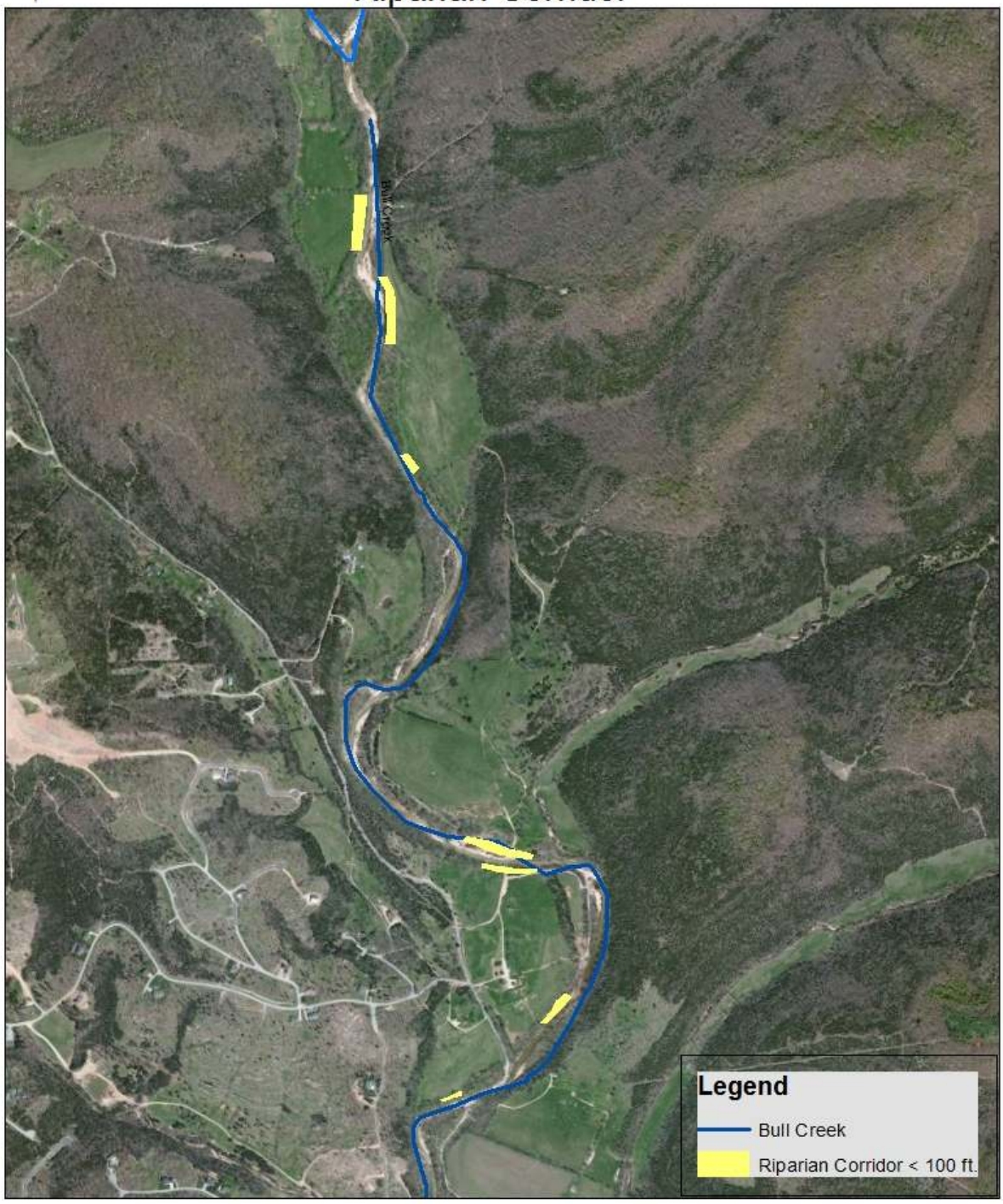
Bull Creek North Erosion Areas



Map Author: Brandy M. Henderson

Date: 4 November 2012

Bull Creek North
Riparian Corridor



Map Author: Brandy M. Henderson

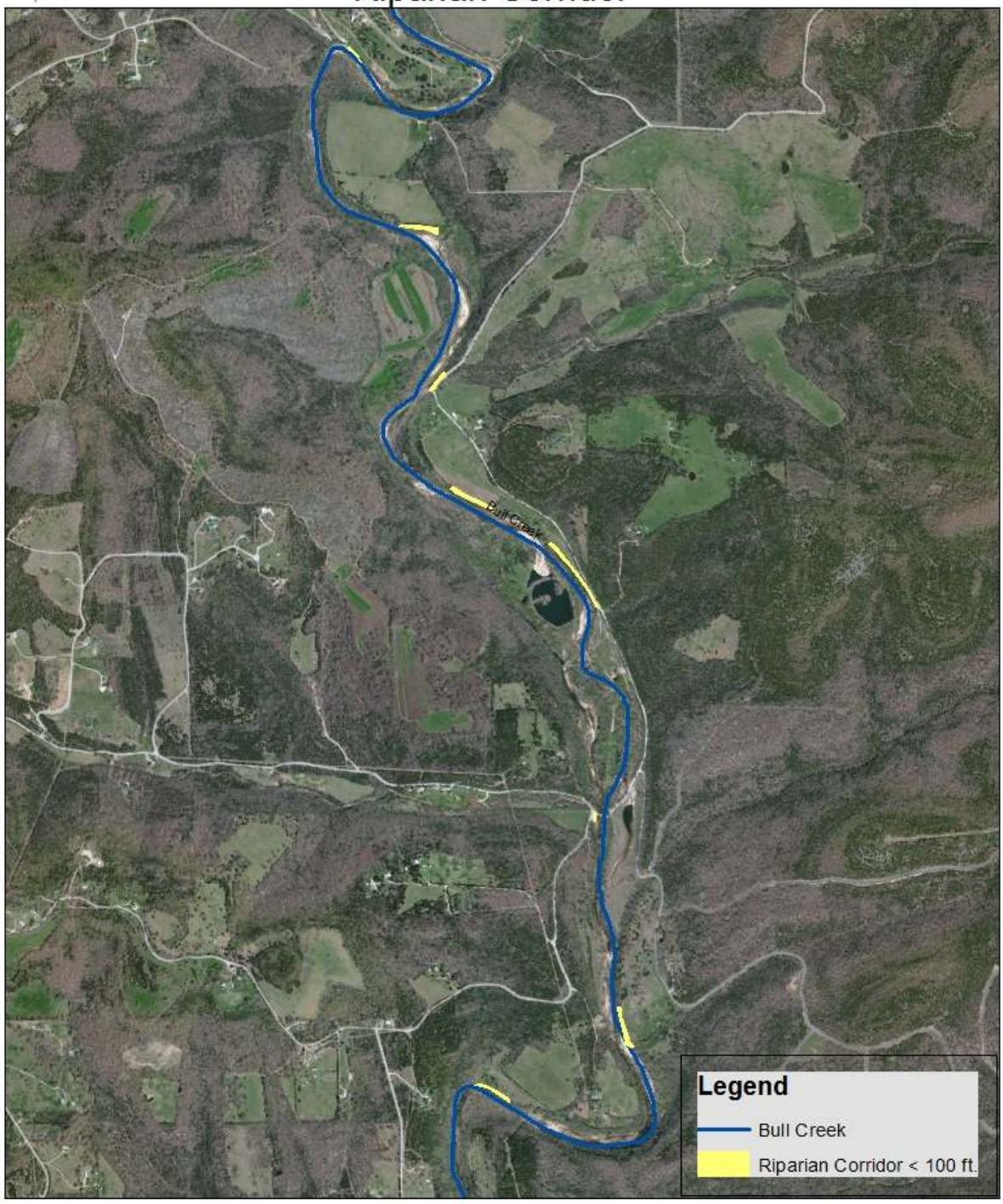
Date: 4 November 2012

Bull Creek Middle North Erosion Areas

Map Author: Brandy M. Henderson

Date: 4 November 2012

Bull Creek Middle North
Riparian Corridor



Map Author: Brandy M. Henderson

Date: 4 November 2012

Bull Creek Middle South
Erosion Areas

Map Author: Brandy M. Henderson

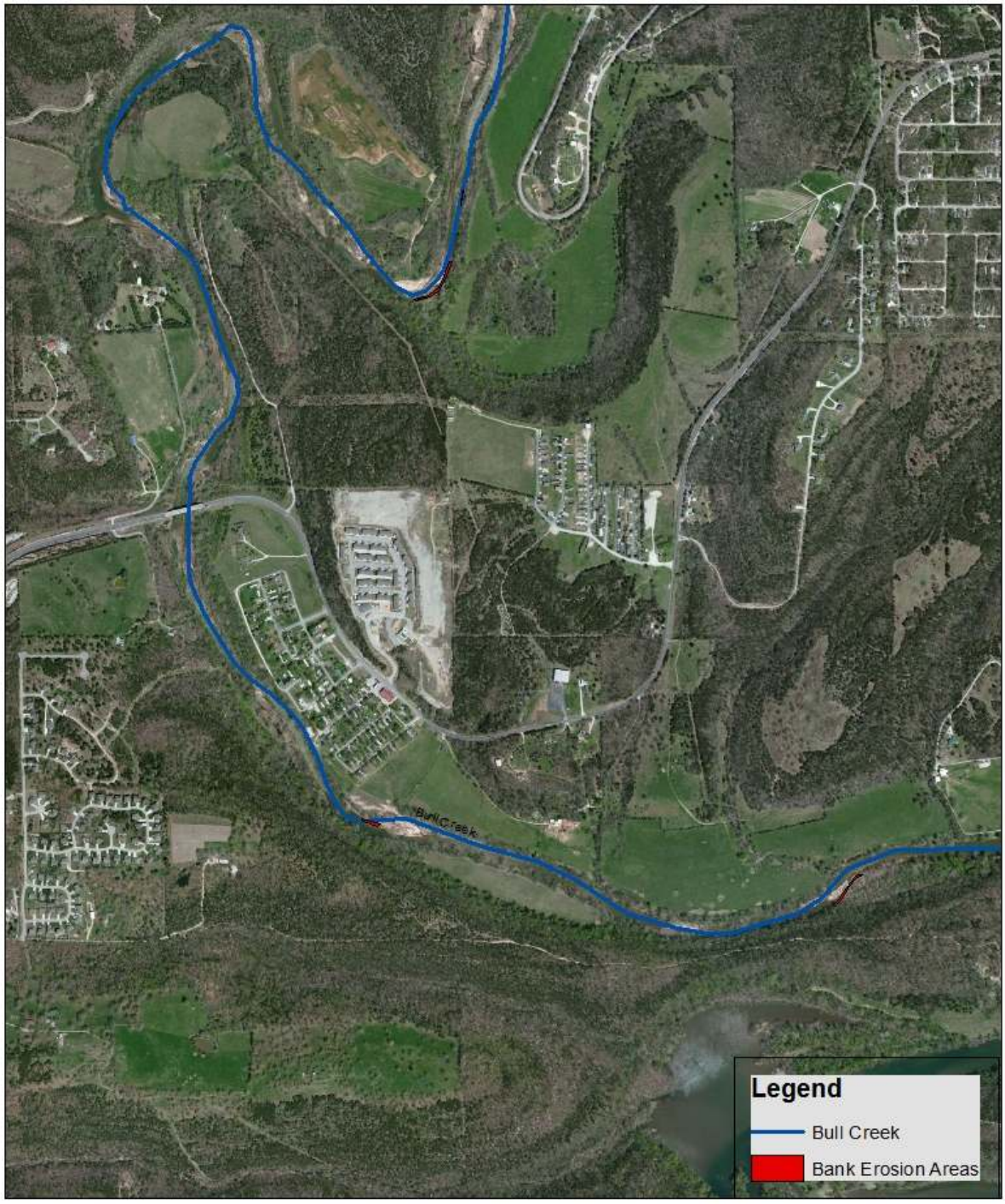
Date: 4 November 2012

Bull Creek Middle South
Riparian Corridor

Map Author: Brandy M. Henderson

Date: 4 November 2012

Bull Creek Far South Erosion Areas



Map Author: Brandy M. Henderson

Date: 4 November 2012

Bull Creek Far South Riparian Corridor

Map Author: Brandy M. Henderson

Date: 4 November 2012

Bull Creek North Photo Locations

BCN1 Bank Erosion/ Inadequate Riparian Corridor

BCN2 Bank Erosion/ Inadequate Riparian Corridor

BCN3 Agricutlural Influences-Cattle Stream Access

BCN4 Agricutlural Influences-Cattle Stream Access

BCN5 Algae

BCN6 Algae

BCN7 Trash Dump Site

BCN8 Inadequate Riparian Corridor

BCN9 Pipe Discharge

Bull Creek Middle North Photo Locations

BCMN1 Suburban Influences

BCMN2 Suburban Influences

BCMN3 Suburban Influences

BCMN4 Bank Erosion

BCMN5 Bank Erosion

BCMN6 Abandoned Gravel Mine

BCMN7 Road/Brdige Crossing

BCMN8 Inadequate Riparian Corridor

BCMN9 Aglae

Bull Creek Middle South Photo Locations

BCMS1 Algae

BCMS2 Algae

BCMS3 Clear Cut for Viewshed

Bull Creek Far South Photo Locations

BCFS1 Inadequate Riparian Corrdior

BCFS2 Inadequate Riparian Corrdior/Bank Erosion

BCFS3 Inadequate Riparian Corrdior

BCFS4 Bull Creek turns to lake

Conclusions

After compiling the data from the visual assessment, inadequate riparian corridor and bank erosion were frequently observed and were widespread throughout Bear Creek, Woods Fork and the main stem of Bull Creek. However, within the watersheds there were many areas with adequate riparian corridor systems and stable banks occurring. Agricultural influences were also a common occurrence. The most wide spread agricultural influence was removal or inadequate riparian corridors. There were limited amounts of livestock access to Bull Creek and its tributaries. However, it was typical to see significant amounts of algae present near livestock accesses. Surprisingly there were few trash dumps present and localized to only two specific sites. Residential areas were also observed in these watersheds and impacts from these areas included lack of or inadequate riparian corridors.

The information presented in this visual assessment concludes that future restoration or improvement efforts should be focused on reestablishing riparian corridor areas and reducing bank erosion. In most cases bank erosion was occurring when riparian corridor was inadequate. Bank erosion was most evident in both Bull Creek and Woods Fork. Bull Creek had an estimated 2,252 feet of eroding bank and Woods Fork had an estimated 2,962 feet of eroding bank. The results of this visual assessment would suggest that Bull Creek and Woods Fork would be the priority watersheds for focused restoration efforts.

Education and Outreach efforts would benefit all of the watersheds that were assessed. Private land owners in agricultural or residential areas would benefit from information related to importance of riparian corridors and their effect on stream quality along with resources available to them for restoration efforts.