Wild Branch Corridor Plan

Wolcott, Craftsbury and Eden, Vermont

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Contents

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1.0 EXECUTIVE SUMMARY

The River Corridor Planning effort is sponsored by the Lamoille County Planning Commission (LCPC) with funding provided through a grant from the Agency of Natural Resources Clean and Clear Program and the Federal Emergency Management Agency (FEMA). The Vermont Department of Environmental Conservation River Management Program provided technical expertise and shared quality control/quality assurance responsibilities with Bear Creek Environmental, LLC (BCE). The River Corridor Plan (RCP) followed the Vermont Agency of Natural Resources River Corridor Planning Guide. Information included in the RCP came from the DEC, the Vermont Center for Geographic Information (VCGI), and field data collected by BCE and LCPC.

The primary objective of the RCP is to use stream geomorphic assessment data to identify and prioritize river corridor protection and restoration projects within the Wild Branch watershed in the Towns of Wolcott, Craftsbury, and Eden. The stream geomorphic assessment data can be used by resource managers, community watershed groups, municipalities and others to identify how changes to land use alter the physical processes and habitat of rivers. The Vermont Stream Geomorphic Assessment Protocol includes three phases:

1. Phase 1- Remote sensing and cursory field assessment;
2. Phase 2 – Rapid habitat and rapid geomorphic assessment to provide field data to characterize the current physical condition of a river; and
3. Phase 3 – Detailed survey information for designing "active" channel management projects.

A Phase 1 Stream Geomorphic Assessment following Agency of Natural Resources Protocols was completed for Wild Branch watershed by LCPC during summer 2005. During fall 2007, BCE completed a Phase 2 Stream Geomorphic Assessment of the Wild Branch following Agency of Natural Resources Protocols. Bridge and culvert data collected by LCPC during 2004 were used in conjunction with data collected by BCE during the Phase 2 assessment to identify structures that: have the potential to fail because of channel adjustments, are having a geomorphic impact on the stream, or are impeding aquatic organism passage.

Human-induced practices including floodplain encroachments, channelization and bank armoring, removal of woody riparian vegetation, undersized and misaligned stream crossings, and gravel mining have led to stream instability within the Wild Branch watershed. Historic channelization of the Wild Branch adjacent to North Wolcott Road (Wolcott) and Wild Branch Road (Craftsbury), in particular, have resulted in decreased floodplain access and increased

stream power resulting in channel degradation and systemic instability (see glossary for associated definitions). The most extensive areas of channel straightening and floodplain encroachments are within the middle main stem reaches between Wild Branch Lane in Wolcott and Denton Hill Road in Craftsbury. Areas where historic or active gravel mining has taking place on the Wild Branch were mapped based on field observations and information provided by the Vermont Agency of Natural Resources. Gravel excavation has led to channel straightening, removal of woody vegetation and loss of large woody debris on the Wild Branch. This has contributed to channel instability both within and downstream of the mined areas. The lack of natural grade controls may be one reason the Wild Branch watershed has undergone so much incision and channel adjustment. Bank erosion and mass wasting caused by channel adjustments and lack of riparian vegetation has led to excessive build up of sediment in the channel. The channel modification activities, floodplain encroachments, gravel mining, channel straightening, and excessive build up of sediment have all resulted in reduced aquatic habitat.

As the river works toward a more stable equilibrium, the communities of Wolcott, Craftsbury, and Eden have the opportunity to provide long-term protection to the river corridor and encourage the reestablishment of floodplain vegetation and healthy instream habitat. At the reach and site level, potential restoration and protection projects that would be compatible with geomorphic adjustments and managing the stream toward equilibrium conditions were identified. A list of fourteen potential restoration and conservation projects was developed during project identification and is provided in Table 6 on pages 81 to 85 of this report. Types of projects include: river corridor protection through corridor easements and conservation efforts, improving riparian buffers, replacing undersized structures, berm removal, and arresting active incision. The implementation of fluvial erosion hazard (FEH) zones along the entire Wild Branch mainstem and major tributaries to prevent further loss of floodplain is highly recommended. Bridge and culvert assessments of the entire main stem from the Lamoille River confluence to the headwaters in Eden and of major tributaries in Craftsbury are recommended to better understand localized geomorphic instability caused by stream crossings. Given the systemic geomorphic instability in the Wild Branch watershed, Phase 2 geomorphic assessments of Tamarack Brook should also be undertaken to better understand adjustment processes and stressors within the watershed.

2.0 LOCAL PLANNING PROGRAM OVERVIEW

2.1 RIVER CORRIDOR PLANNING TEAM

The river corridor planning team for the Wild Branch watershed is comprised of the Lamoille County Planning Commission, the Agency of Natural Resources, Bear Creek Environmental, LLC, local municipalities and landowners. This planning effort is sponsored by the Lamoille County Planning Commission. Funding for the project is provided through a grant from the Clean and Clear Program and FEMA. Staci Pomeroy from the Vermont River Management Section of the Vermont Agency of Natural Resources (VANR) provided technical guidance for this project.

2.2 GOALS AND OBJECTIVES OF THE PROJECT

The primary objective of the River Corridor Management Plan is to use the Phase 1 and 2 Stream Geomorphic Assessment data to identify and prioritize river corridor protection and restoration projects within the Wild Branch watershed. The State of Vermont's River Management Program has set out several goals and objectives that are supportive of the local initiative in the Wild Branch watershed. The State management goal is to, "manage toward, protect, and restore the fluvial geomorphic equilibrium condition of Vermont rivers by resolving conflicts between human investments and river dynamics in the most economically and ecologically sustainable manner" [Vermont Agency of Natural Resources, 2007b (VANR 2007b)]. The objectives of the Program include fluvial erosion hazard mitigation and sediment and nutrient load reduction as well as aquatic and riparian habitat protection and restoration. The Program seeks to conduct river corridor planning in an effort to remediate the geomorphic instability that is largely responsible for problems in the majority of Vermont's rivers. Additionally, the Vermont River Management Program has set out to provide funding and technical assistance to facilitate an understanding of river instability and the establishment of well developed and appropriately scaled strategies to protect and restore river equilibrium.

3.0 BACKGROUND WATERSHED INFORMATION

3.1 Geographic Setting

3.1.1 Watershed Description

The Wild Branch has a watershed size of 39.3 square miles just above the confluence of the Lamoille River in the Town of Wolcott, Vermont (Figure 3.1). The Phase 2 study focused on stream reaches on the main stem of the Wild Branch and the lowest stream reach on an unnamed tributary to the Wild Branch. The combined length of the stream reaches assessed is approximately 12.2 miles. The Wild Branch watershed drains from its headwaters in the Lowell Mountains near the Lamoille County and Orleans County boundary within the Town of Eden. The Wild Branch heads south through the Town of Eden and then briefly flows through the Wild Branch State Wildlife Management Area (WMA) (see Figure 3.2). Downstream of the Wildlife Management Area, the Wild

Branch flows into Orleans County within the Town of Craftsbury and then crosses back into the Lamoille County in the Town of Wolcott. The Wild Branch flows into the Lamoille River at approximately 665 feet above sea level, which then drains westerly into Lake Champlain.

3.1.2 Political Jurisdictions

The Wild Branch watershed flows through three towns (Eden, Craftsbury and Wolcott). Project reaches for the Wild Branch are located in both Lamoille County and Orleans County (Figure 3.2). The Wild Branch watershed falls under the jurisdiction of the LCPC and the Northeastern Vermont Development Association (NVDA). The LCPC is the regional planning commission for the 10 towns in Lamoille County. NVDA assists municipalities and organizations with regional planning and economic development in Vermont's Northeast Kingdom (Caledonia, Essex, and Orleans Counties).

3.1.3 Land Use

Geographic Information System (GIS) data from 1992 was obtained from the Vermont Center for Geographic Information (VCGI) to analyze landuse within the Wild Branch watershed. The majority of the Wild Branch is forested (Figure 3.3). The landuse breakdown for the watershed is 83 percent forest, 5 percent crop, 3 percent field, 4 percent residential and 5 percent water. The most concentrated area of development in the watershed is at the intersections of North Wolcott Road, Morey Hill Road, and Wild Branch Road in Wolcott. Agricultural lands are prevalent within the Wild Branch river corridor in Craftsbury.

The Wild Branch Wildlife Management Area and the Wolcott Research Forest are public lands within the Wild Branch watershed. A description of each of these areas is included under Section 3.5 (Ecological Setting). The Wolcott Research Forest is one of five forests throughout the State of Vermont that is used for research, education and demonstration by the University of Vermont (2010).

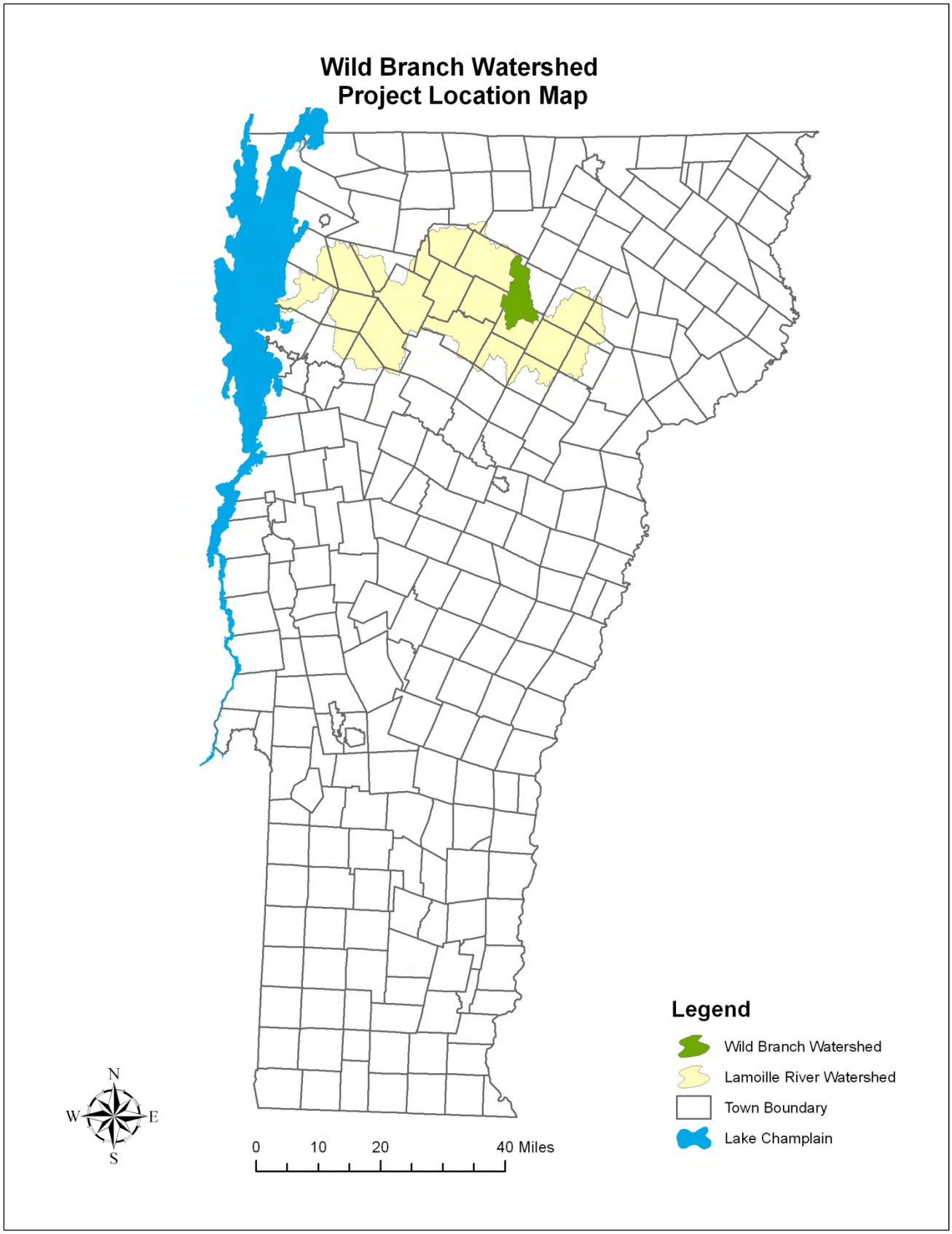

Figure 3.1. Project Location Map for the Wild Branch Watershed

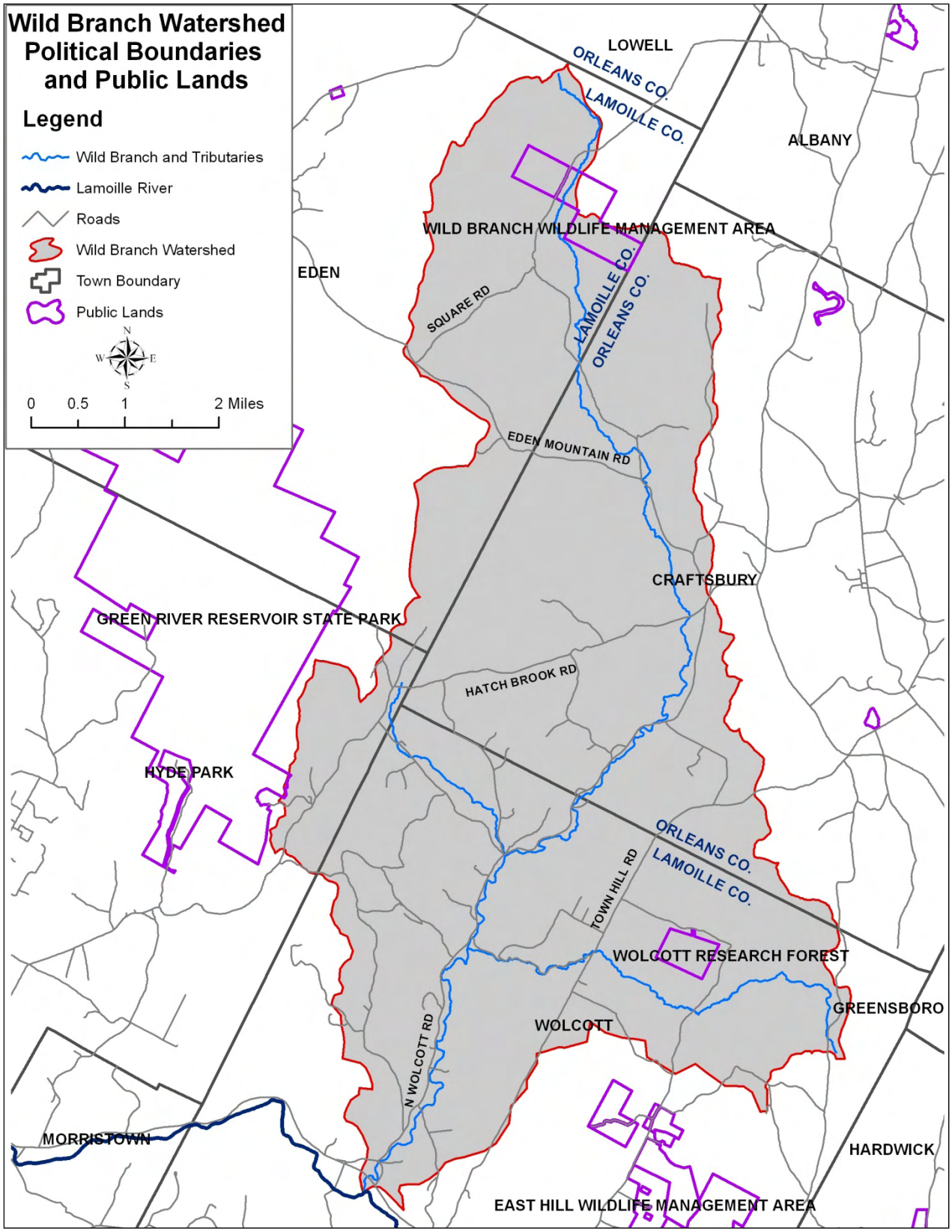

Figure 3.2. Wild Branch Political Boundaries and Public Lands

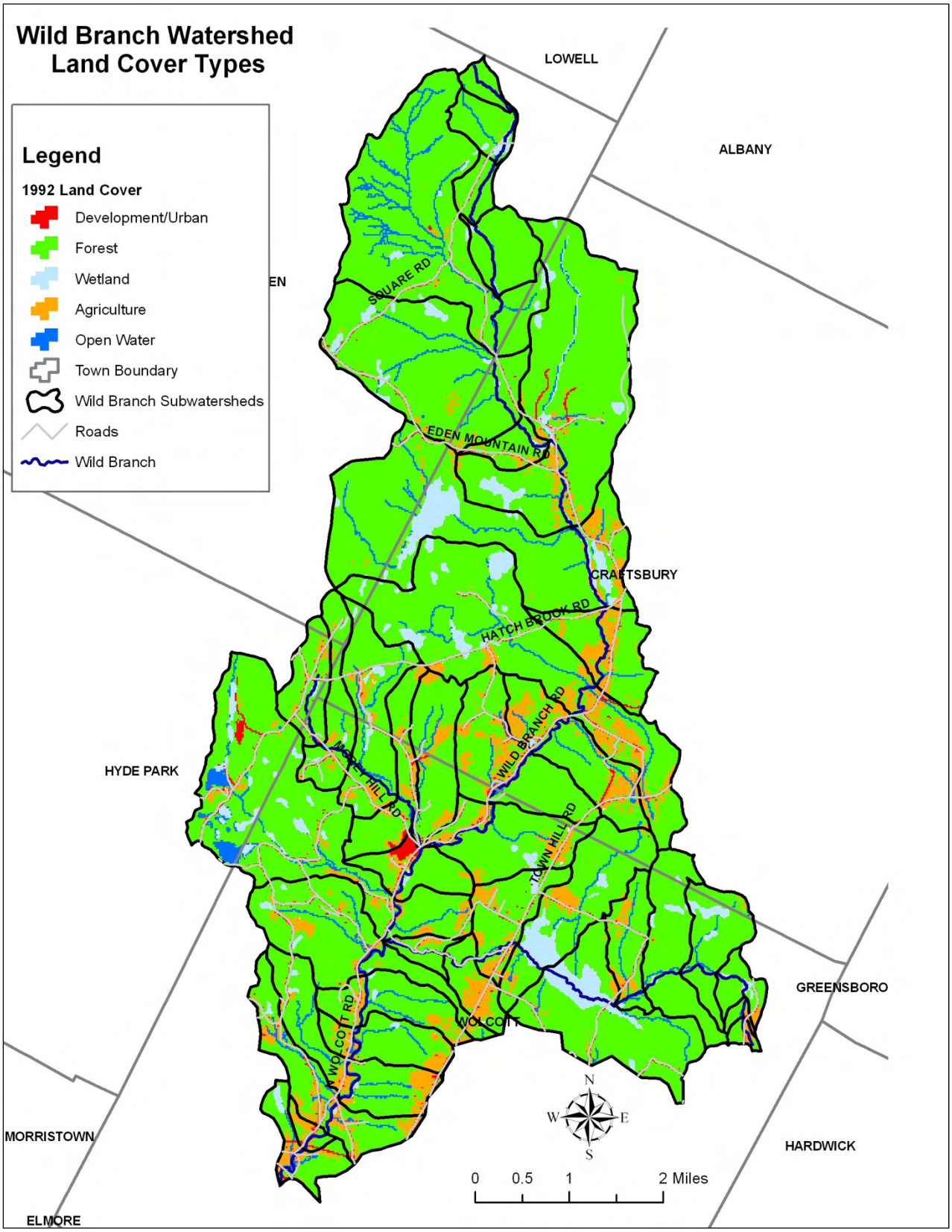

Figure 3.3. Land Cover and Land Use Map for the Wild Branch Watershed

3.2 Geologic Setting

The Wild Branch watershed is located within the Green Mountain Geo-physiographic Province. The Green Mountains were uplifted during the Taconic orogeny about 455 million years ago (Doolan, 1996). The bedrock underlying the Wild Branch watershed primarily includes the Moretown member of the Missisquoi Formation in the eastern part of the watershed. The Moretown member of the Missisquoi Formation is comprised of quartzite and quartz-plagioclase granulite separated by thin layers of minerals and also phyllite and schist. In the center of the watershed is a thin band of the Umbrella Hill member of the Missisquoi formation. The Umbrella Hill Member contains a quartz and slate pebble conglomerate. The Stowe Formation is located in the mid-western and northwestern part of the watershed. The Stowe Formation is comprised of quartz and chlorite phyllite and schist with abundant segregations of granular white quartz (Doll, 1961).

The Green Mountains and adjacent valleys have been covered with ice during historic glacial periods. The last large ice sheet, the Laurentide Ice Sheet, covered all of New England and advanced up the Lamoille River Valley. As the climate warmed, the glacier slowly retreated and glacial lakes were dammed in the Lamoille River valley. Following the retreat of the ice sheet, the Lamoille River and its tributaries began eroding the glacial and lake sediments that were left behind (Wright, 2003).

Natural Resource Conservation Service (NRCS) soils information for the Wild Branch watershed was acquired from GeologicSoils_So (VCGI 2008). The dominant surficial geology of the Wild Branch watershed consists of glacial till and outwash (ice-contact deposits) as shown in Figure 3.4. Alluvial deposits and outwash are dominant within the Wild Branch corridor in Wolcott. In the middle of the watershed in Craftsbury, a combination of parent materials including: outwash, alluvial deposits, lacustrine and till are found within the river corridor. Till is the predominate parent material in the upper watershed in Eden. The watershed is comprised of primarily highly erodible and potentially highly erodible soils (Figure 3.5).

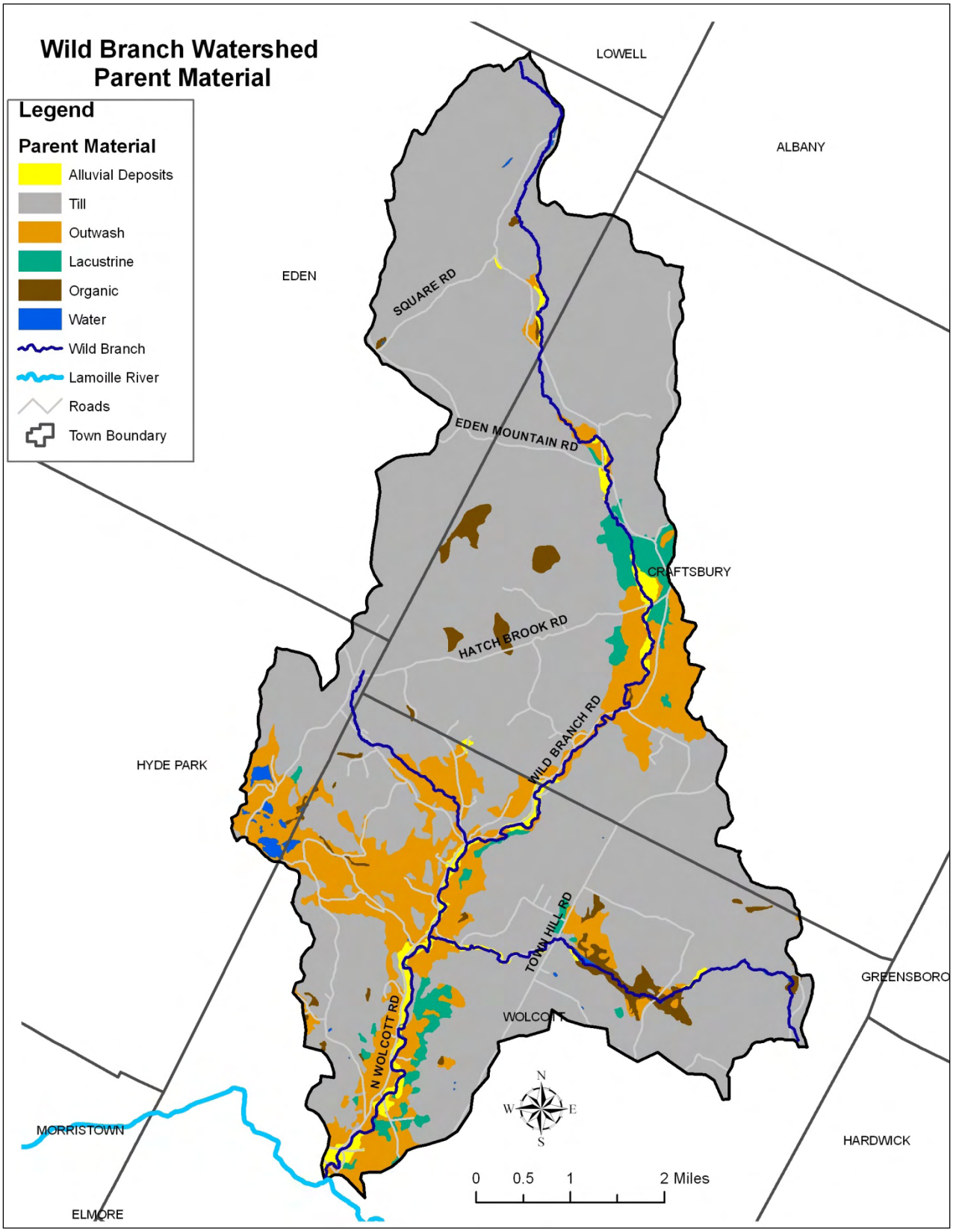

Figure 3.4 Wild Branch Watershed Soil Parent Material

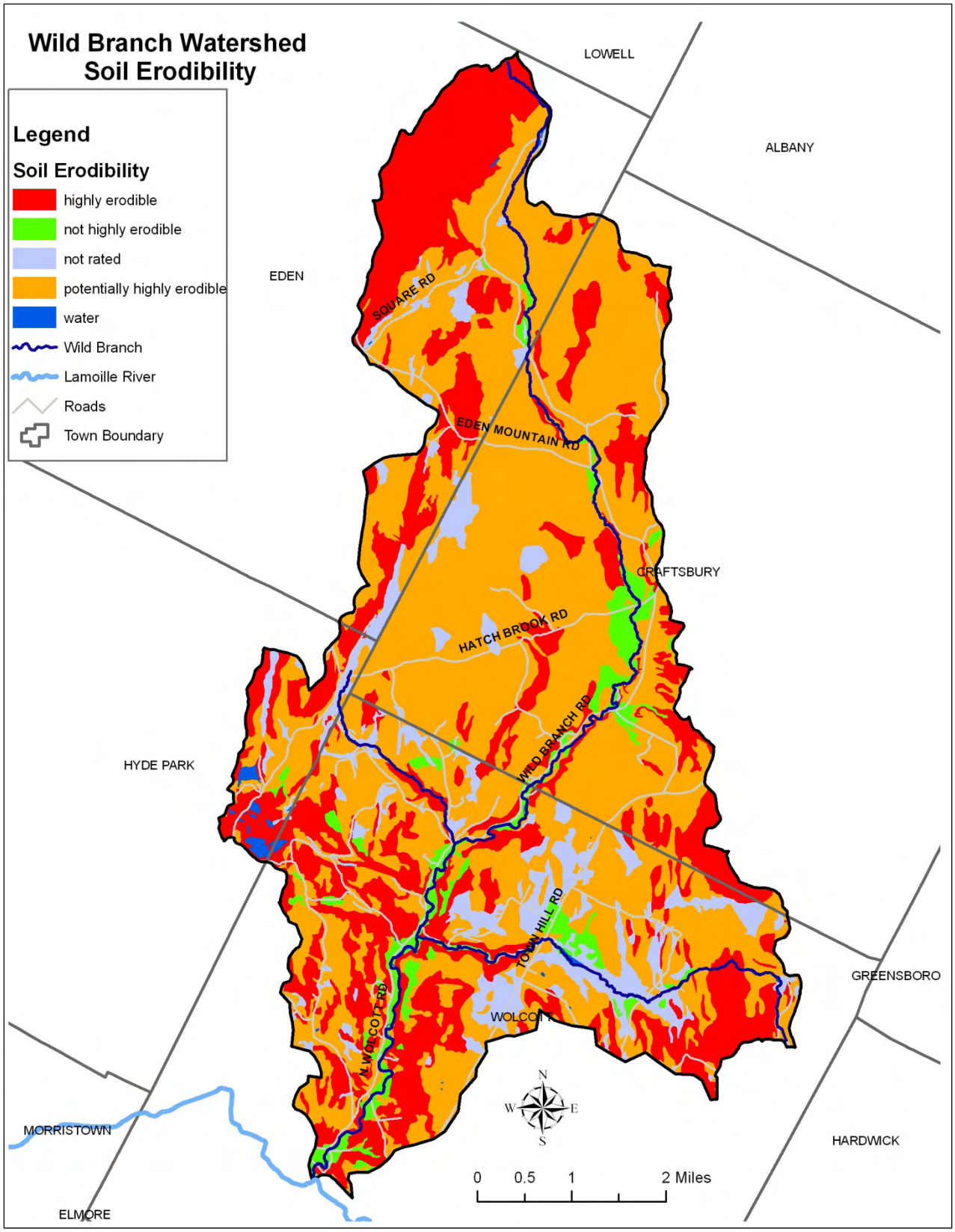

Figure 3.5 Wild Branch Soil Erodibility

3.3 Geomorphic Setting

A Phase 1 Stream Geomorphic Assessment was conducted on 35 reaches of the main stem of the Wild Branch and two major tributaries (Tamarack Brook and an unnamed tributary to the Wild Branch). The Phase 2 study focused on nineteen stream reaches on the main stem of the Wild Branch within the Towns of Wolcott, Craftsbury and Eden and one reach near the mouth of an unnamed tributary. The combined length of the stream reaches assessed during the phase 2 study is approximately 12.2 miles (Figure 3.6). Each reach represents a similar section of the stream based on physical attributes such as valley confinement, slope, sinuosity, bed material, dominant bedform, land use, and other hydrologic characteristics. Each point represents the downstream end of the reach.

Reference stream types are based on the valley type, geology and climate of a region and describe what the channel would look like in the absence of human-related changes to the channel, floodplain, and/or watershed. Stream and valley characteristics including valley confinement, and slope were determined from digital USGS topographic maps. The reference reach characteristics were refined during the windshield survey and Phase 2 Assessment. Reference reach typing was based on both the Rosgen (1996) and the Montgomery and Buffington (1997) classification systems. Table 1 shows the typical characteristics used to determine reference stream types (VANR, 2007b). Reference stream types for the assessed reaches are listed in Table 2. All of the twenty Phase 2 assessment reaches are "C" channels by reference**.** Reference "C" channels have unconfined valleys with moderate to gentle valley slopes and moderate to high width to depth ratios and sinuosity. E channels have wide valleys, high sinuosity, low width to depth ratios, and moderate to gentle gradients. B channels have moderate to steep slopes and have narrower valleys than "C" and "E" channels. "A" channels have a confined (narrow) valley and are very steep systems with low width to depth ratios and low sinuosity.

Table 1: Reference Stream Type

Stream Type	Confinement	Valley Slope	Bed Form
A	Narrowly Confined	Very steep > 6.5 %	Cascade
A	Confined	Very steep 4.0 - 6.5 %	Step-Pool
B	Confined or Semi-confined	Steep 3.0 – 4.0 %	Step-Pool
B	Confined, Semi-confined or Narrow	Moderate to Steep 2.0 – 3.0 %	Plane Bed
C or E	Unconfined (Narrow, Broad or Very Broad)	Moderate to Gentle <2.0 %	Riffle-Pool or Dune-Ripple

Table 1: Reference Stream Type

Stream Type	Confinement	Valley Slope	Bed Form
D	Unconfined (Narrow, Broad or Very Broad)	Moderate to Gentle <4.0 %	Braided Channel

Table 2: Geomorphic Setting of Assessed Reaches

Reach ID	Reference Stream Type	Confinement	Valley Slope	Bedform
T01	C	Very Broad	0.52	Riffle-Pool
T02	C	Broad	0.46	Riffle-Pool
T03	C	Very Broad	0.59	Riffle-Pool
T04	C	Very Broad	0.87	Riffle-Pool
T05	C	Very Broad	0.63	Riffle-Pool
T06	C	Broad	0.65	Riffle-Pool
T07	C	Very Broad	0.86	Riffle-Pool
T08	C	Very Broad	0.88	Riffle-Pool
T09	C	Very Broad	0.91	Riffle-Pool
T10	C	Very Broad	1.48	Riffle-Pool
T11	C	Very Broad	1.40	Riffle-Pool
T12	C	Very Broad	1.33	Riffle-Pool
T13	C	Very Broad	0.52	Riffle-Pool
T14	C	Very Broad	0.43	Riffle-Pool
T15	C	Very Broad	0.67	Riffle-Pool
T16	C	Very Broad	0.76	Riffle-Pool
T17	C	Very Broad	1.44	Riffle-Pool
T18	C	Broad	1.53	Riffle-Pool
T19	C	Very Broad	1.59	Riffle-Pool
T10.01	C	Broad	0.34	Riffle-Pool

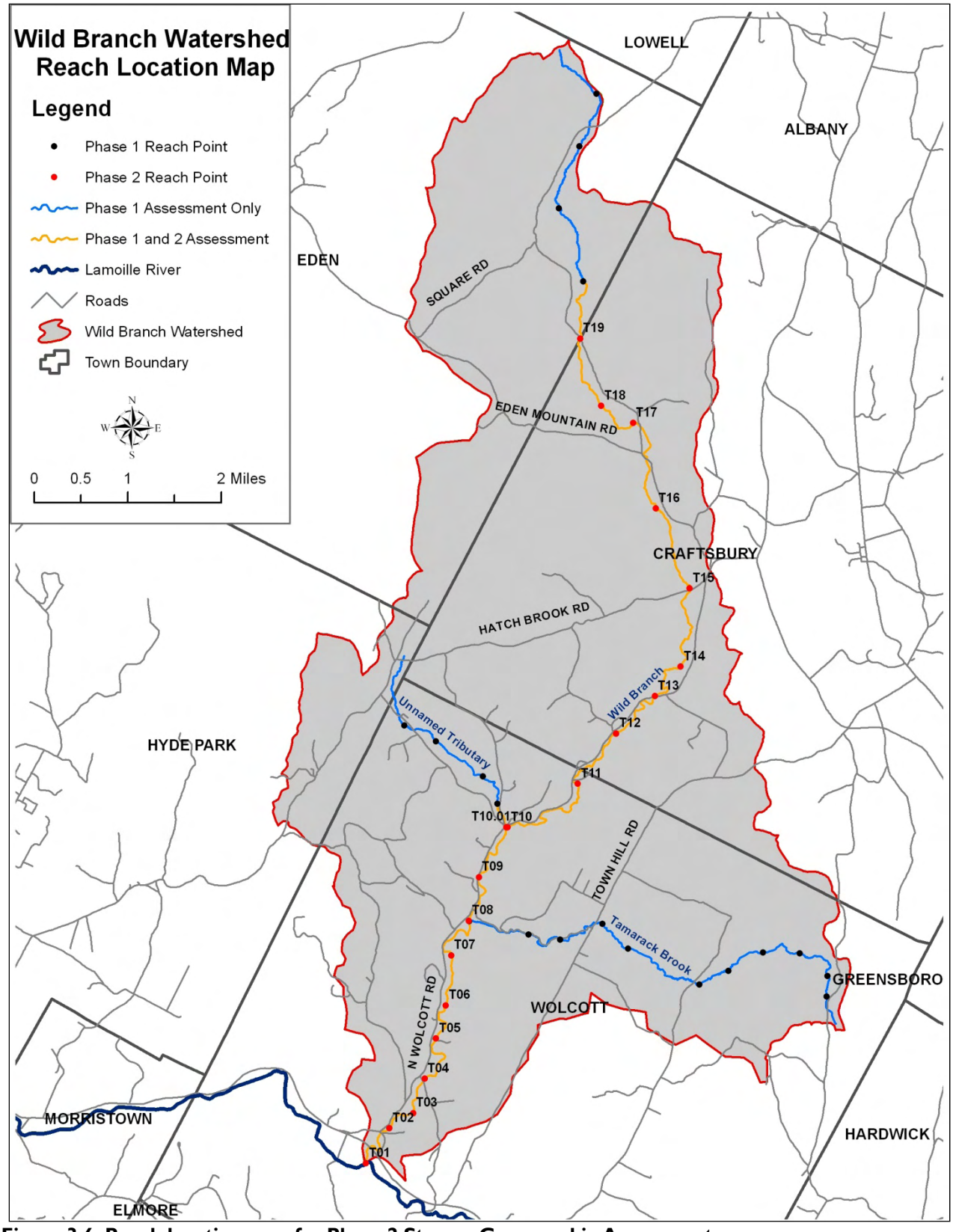

Figure 3.6. Reach location map for Phase 2 Stream Geomorphic Assessments

Natural bedrock grade controls were noted in two of the twenty assessed reaches (T01 and T15). The steepness of the valley side slopes was determined using a combination of a topographic map and the soils layer. No alluvial fans were identified in the study area.

3.4 Hydrology

In order to better understand the flood history of the Wild Branch, long term data from the U.S. Department of the Interior, U.S. Geological Survey (USGS) gauge on the Lamoille River in Johnson, VT and data from a smaller brook, Stony Brook in Eden, VT, were obtained (USGS 2007). Eighty-two years of record (1912-1913 and 1929-2008) are available for the Lamoille River gauge at Johnson, VT. A total of twenty-one years of record (1964-1974 and 1999-2008) are currently available for Stony Brook.

The long term record for Lamoille River and Stony Brook both show that 1973 was a high flow year. The long term record on the Lamoille gauge indicates major flood events also occurred in the years 1912, 1936, 1984, 1995 and 1997. The two graphs below (Figure 3.7 and 3.8) provide a flood frequency analysis for the Lamoille River gauge and the Stony Brook gauge respectively. The floods of 1995 and 1997 ranked first and fifth in terms of peak discharge. The 1995 flood had a peak discharge of 19,000 cubic feet per second (cfs) and a recurrence interval of 83 years. According to Ryan (2001), the 1995 flood was estimated by Robert Hammond of the USGS in 1999 to be a 500-year recurrence interval. The 1997 and 1998 floods were estimated by Hammond to 100-year recurrence intervals.

Of all the natural hazards experienced in Vermont, flooding is the most frequent, damaging, and costly. Over the last 50 years, flood recovery has cost Vermonters an average of 14 Million dollars a year. During the period of 1995-1998 alone, flood losses in Vermont totaled nearly $57 Million. While some flood losses are caused by inundation (i.e. waters rise, fill, and damage low-lying structures), most flood losses in Vermont are caused by "fluvial erosion". Fluvial erosion is erosion caused by rivers and streams, and can range from gradual bank erosion to catastrophic changes in river channel location and dimension during flood events (Vermont Agency of Natural Resources 2006).

Closer study of our rivers and streams reveals that Vermont's erosion hazard problems are largely due to pervasive, human-caused alteration during the past 150 to 200 years of our waterways and landscapes they drain. By the end of the nineteenth century, forests had been cleared from many watersheds, resulting in major changes in watershed hydrology and sediment production. Towns and villages, the centers of commerce, grew on the banks of rivers, whose role in power generation and transportation at first outweighed flood risks. In addition, many watersheds were changed by development, agriculture, log drives, roads and railways. The legacy of this landscape manipulation is river instability. Rivers, such as the Wild Branch, which are unstable, are prone to fluvial erosion (Vermont Agency of Natural Resources 2006).

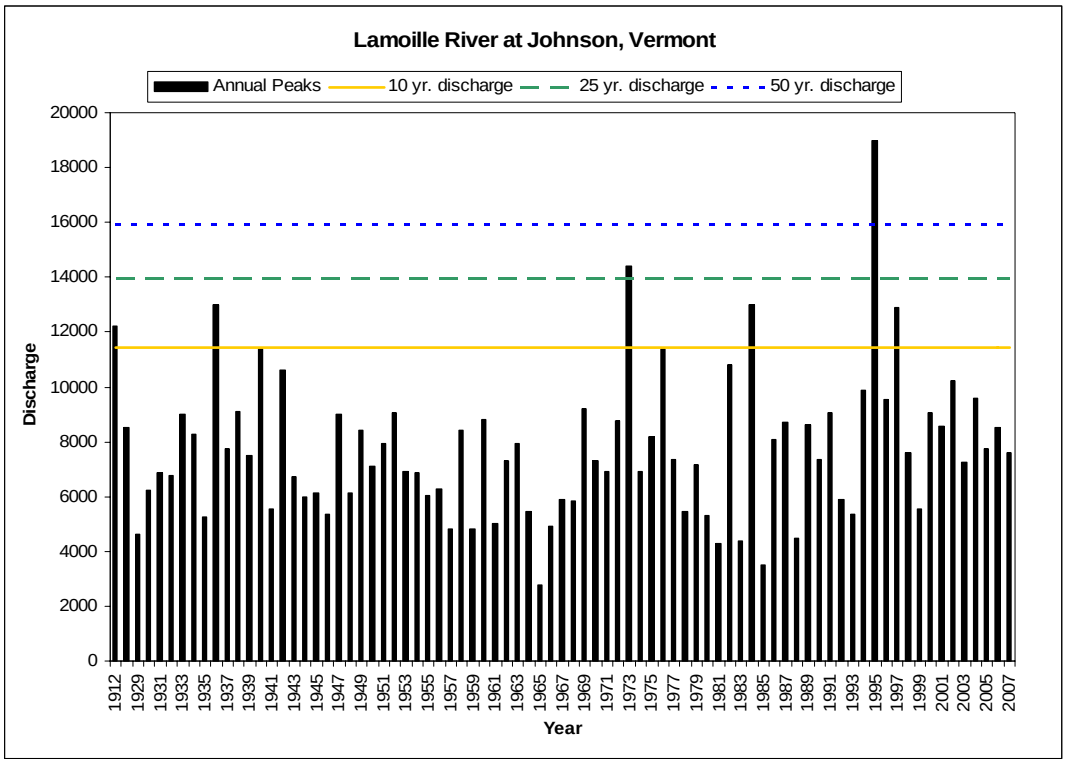

Figure 3.7. Flood frequency analysis for Lamoille River at Johnson, VT

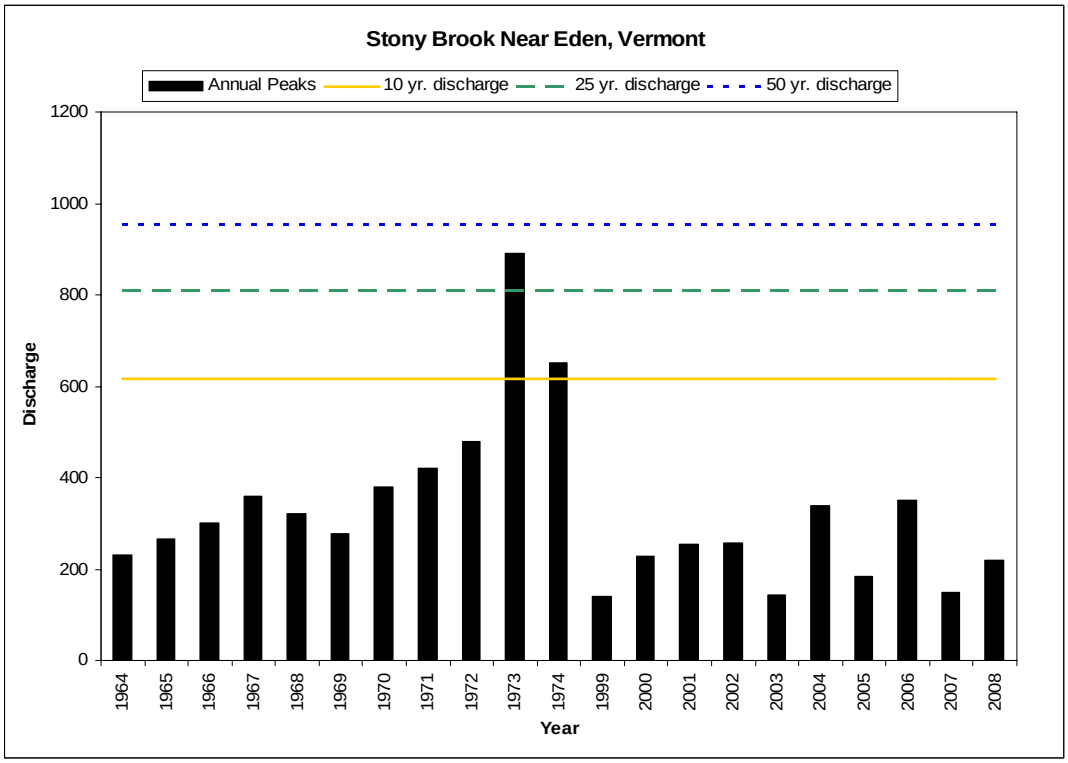

Figure 3.8. Flood frequency analysis for Stony Brook, Eden, VT

Through Vermont's history, flood waters in the Lamoille River Basin have destroyed property. During the flood events of 1995, 1997 and 1998, numerous culverts and bridges failed catastrophically in the watershed (Draft VANR, 2009). Considerable sediment entered the Lamoille River Watershed in several towns including Eden, Craftsbury and Wolcott. The Wild Branch is one of the streams that was affected by the flooding in the mid to late 1990s (Draft VANR, 2009). In a more recent flood, severe storms and flooding from July 21 through August 12, 2008 resulted in a federal disaster (DR 1790) to be declared in Addison, Caledonia, Essex, Lamoille, Orange, Washington and Windsor counties on September 12, 2008 (FEMA 2008). According to Gary Schelley of the Vermont Agency of Transportation (VTrans), $78,716 of federal funds and $13,119 of state funds were allocated for public assistance within the Town of Eden and $74,226 of federal funds and $14,845 of state funds were leveraged for public assistance for Wolcott following the summer 2008 flooding (personal communication between Schelley and Andrew Flagg of LCPC). Public assistance money can be used towards infrastructure for projects such as debris clean up and bridge and road repair/maintenance.

3.5 Ecological Setting

The Wild Branch watershed lies almost exclusively within the Northern Green Mountains biophysical region (Figure 3.8). This region is characterized by Thompson and Sorenson (2005) as having high elevations and cool summers. The Green Mountains have a strong influence on the weather resulting in an abundance of precipitation in the form of both rain and snow. Northern hardwood forest is the dominant community in this biophysical region. The Northern Green Mountains provide important habitat for both aquatic and terrestrial animals. According to Thompson and Sorenson (2005), the Green Mountains offer extensive habitat for black bear, white-tailed deer, bob cat, fisher, beaver and red squirrel. Birds such as blackpoll warbles, Swainson's thrush and the rare Bicknell's thrush nest in the high elevation forests. Deer wintering areas identified by the Vermont Department of Fish and Wildlife (Figure 3.8) are common adjacent to the Wild Branch in the lower part of the watershed in Wolcott.

The Wild Branch Wildlife Management Area is located in the Town of Eden. The following information about the Wild Branch WMA is provided by the Vermont Fish and Wildlife Department (2010). The WMA is almost completely forested. There are beaver-created wetlands. White-tailed deer, black bear, moose, bobcat, ruffed grouse and woodcock are common. The small streams running through the WMA are not fishable. Hunting and trapping are allowed uses within the WMA. Further information about the Wildlife Management Area can be acquired by contacting the Vermont Fish and Wildlife Department (802-476-0199).

A seven mile section of the Wild Branch from North Wolcott Road (upstream of Wolcott-Craftsbury line) to the Route 15 Bridge in Wolcott is identified as an important Class II-III White Water (Vermont's White Water Rivers cited in VANR 2009).

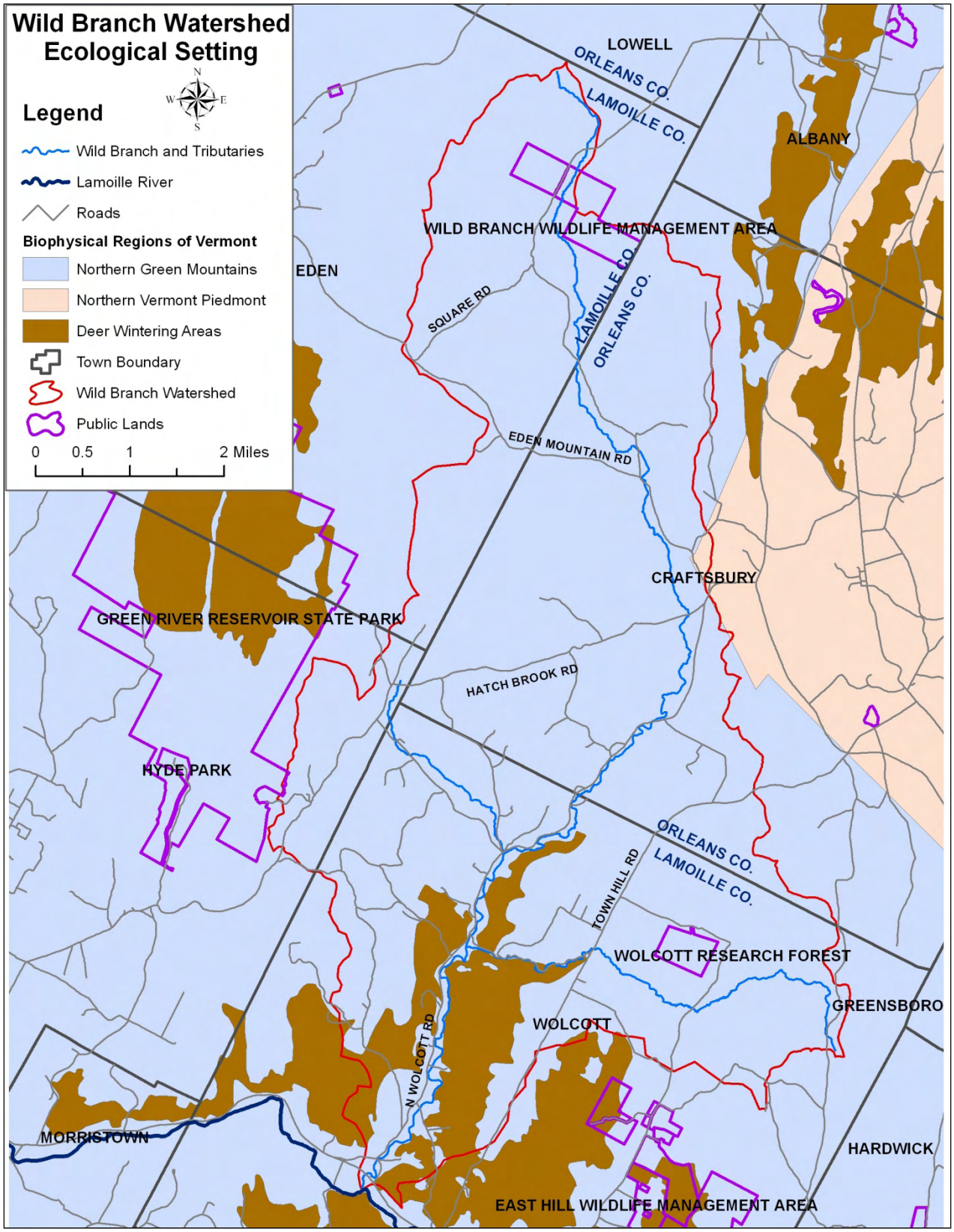

Figure 3.8. The ecologic setting of the Wild Branch watershed includes WMAs and deer wintering areas. The watershed lies with the Northern Green Mountains biophysical region.

4.0 METHODS

4.1 Phase 1 Methodology

A Stream Geomorphic Assessment process is divided into three phases, based on VANR protocols. Phase 1, the remote sensing phase, involves the collection of data from topographic maps and aerial photographs, from existing studies, and from very limited field studies, called "windshield surveys." The Phase 1 assessment provides an overview of the general physical nature of the watershed, identifies which reaches are in particular need. A Phase 1 Assessment of the Wild Branch watershed was completed by the Lamoille County Planning Commission in 2005.

4.2 Phase 2 Methodology

The Phase 2 assessment of the Wild Branch followed procedures specified in the Vermont Stream Geomorphic Assessment Handbook Phase 2 (Vermont Agency of Natural Resources, 2007b). All assessment data were recorded on the Agency of Natural Resources Phase 2 data sheets, and were entered in to the ANR Stream Geomorphic Assessment data management system (DMS). The Phase 1 database was updated using the field data from the Phase 2 assessment in 2007.

The parameters and protocols used for undertaking each of the above steps are outlined in the Phase 2 Handbook (Vermont Agency of Natural Resources, 2007b). The entire length of each Phase 2 reach was walked to determine segment breaks. Bank erosion, grade control structures, bank revetments, debris jams, depositional features, stormwater inputs, flood chutes, valley walls and other important features were mapped within all segments. BCE used the Stream Geomorphic Assessment Tool (SGAT) version 4.56 to index features that were mapped during the Phase 2 assessment. SGAT is an ArcView extension.

4.3 Bridge and Culvert

A stream crossing inventory and assessment was conducted by LCPC in 2004 within the Town of Wolcott to determine if stream crossings were contributing to localized streambank erosion, sedimentation, and reduced fish passage. Culverts on tributaries to the Wild Branch or on small tributaries that flow directly into the Lamoille were assessed. The Agency of Natural Resources Bridge and Culvert protocols were employed (VANR, 2003). The Vermont Culvert Geomorphic Screening Tool (Milone and MacBroom, Inc., 2008a) and the Vermont Culvert Aquatic Organism Passage Screening Tool (Milone and MacBroom, Inc, 2008b) were used to identify culverts within the Wild Branch watershed that are highest priority for replacement/retrofit due to geomorphic incompatibility and/or for being potential barriers to movement and migration of aquatic organisms.

Stream crossings within the Phase 2 study areas were evaluated based on the channel constriction information collected in the field. The size of the structure relative to the bankfull width, sediment continuity, and aquatic organism passage were areas that were evaluated to assign a priority for replacement/retrofit.

4.4 River Corridor Plan

The Vermont Agency of Natural Resources River Corridor Planning Guide (2007a) and Draft 9 of Chapter 5 of the plan dated October 2, 2007 were followed to generate a series of stressor maps, which are included in Section 6.0. The stressor maps were created using indexed data from the Phase 1 and Phase 2 Stream Geomorphic Assessments along with existing data available from VCGI, including e911 roads, e911 buildings and e911 driveways. The stressor maps were then used to identify potential project locations that have few constraints to channel adjustment.

4.5 Quality Control/Quality Assurance Procedures

To assure a high level of confidence in the Phase 1 and 2 SGA data, strict quality assurance/quality control (QA/QC) procedures were followed by BCE. These procedures involved a thorough in-house review of all data as well as automated and manual QC checks with the DEC River Management Program.

In 2008, BCE completed its own in-house QA review after all the Phase 2 data were entered into the DMS and the Phase 1 data were updated. The Phase 1 DMS and ArcView shapefiles were updated by Colleen Sullivan and Mary Nealon based on the Phase 2 field assessment work during the Phase 2 QA/QC process. The DMS and the ArcView shapefiles for the Wild Branch Phase 2 study were submitted to Staci Pomeroy of the ANR for a Quality Assurance review in spring 2008. Some minor revisions were made by BCE to the DMS following this review and the ANR QA review was completed in October 2008.

5.0 RESULTS

5.1 Phase 2 Results

During the Phase 2 assessments, the nineteen reaches on the mainstem of the Wild Branch were broken into 28 segments based on detailed field observations. One reach near the mouth of a major tributary was also assessed. The reference and existing stream type for each assessed segment is included in Figure 5.1. The reference stream type is assigned based on physical parameters such as geology, valley landform and valley slope during the Phase 1 assessment. The existing stream type is based on the cross-section data collected as part of the Phase 2 assessment. Detailed segment summary data are provided in Appendix A on pages 1 through 58. The stream geometry report and the rapid geomorphic assessment report from the DMS are included on pages 59 and 60.

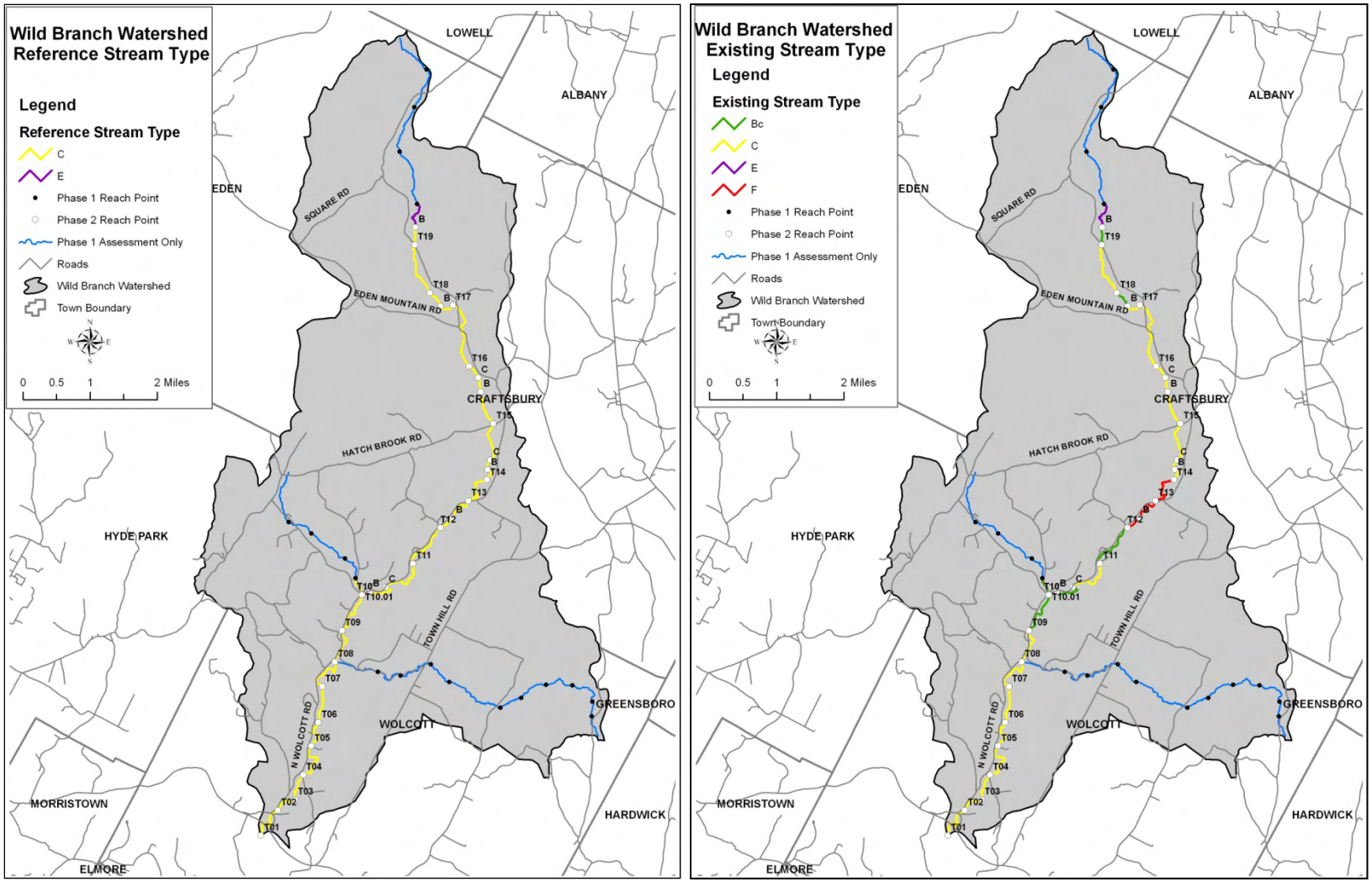

Figure 5.1. Comparison of reference (left) and existing stream (right) types of the Wild Branch. Differences in reference and existing stream types represent a stream type departure.

Functioning floodplains play a crucial role in providing long term stability to a river system. Natural and anthropogenic impacts may alter the equilibrium of sediment and discharge in natural stream systems and set in motion a series of morphological responses (aggradation, degradation, and widening and/or planform adjustment) as the channel tries to reestablish a dynamic equilibrium. Small to moderate changes in slope, discharge, and/or sediment supply can alter the size of transported sediment as well as the geometry of the channel; while large changes can transform reach level channel types (Ryan 2001). Practices that have contributed to stream instability within the Wild Branch watershed include:

- Floodplain encroachments
- Channelization and bank armoring
- Removal of woody riparian vegetation
- Roads and stream crossings
- Gravel mining

These anthropogenic practices have altered the balance between water and sediment discharges within the Wild Branch watershed. Channel morphologic responses to these practices contribute to channel adjustment (e.g. degradation, aggradation, widening, and planform changes) that may further create unstable channels. Degradation is the term used to describe the process whereby the stream bed lowers in elevation through erosion or scouring of bed material. Aggradation is a term used to describe the raising of the bed elevation through an accumulation of sediment. The planform is the channel shape as seen from the air. Planform change can be the result of a straightened course imposed on the river through different channel management activities, or a channel response to other adjustment processes such as aggradation and widening. Channel widening occurs when stream flows are contained in a channel as a result of degradation or floodplain encroachment or when sediments overwhelm the stream channel and the erosive energy is concentrated into both banks.

The existing geomorphic condition is depicted in Figure 5.2. The assessed segments and reaches in the Wild Branch watershed were found to be in "fair" and "poor" geomorphic condition. Geomorphic condition is determined based on the degree (if any) of channel degradation, aggradation, widening and planform adjustment. Two segments (T14-B and T19-B) were not assessed because they were heavily influenced by beaver dams.

The reach condition ratings of the Wild Branch indicate that most of the reaches are actively, or have historically, undergone a process of minor, major or even extreme geomorphic adjustment. All of the reaches studied in the Wild Branch watershed are undergoing a channel evolution process in response to large scale changes in its sediment, slope, and/or discharge associated with the human influences on the watershed. Table 3 below summarizes the channel evolution stage of each study reach and the primary adjustment processes that are occurring.

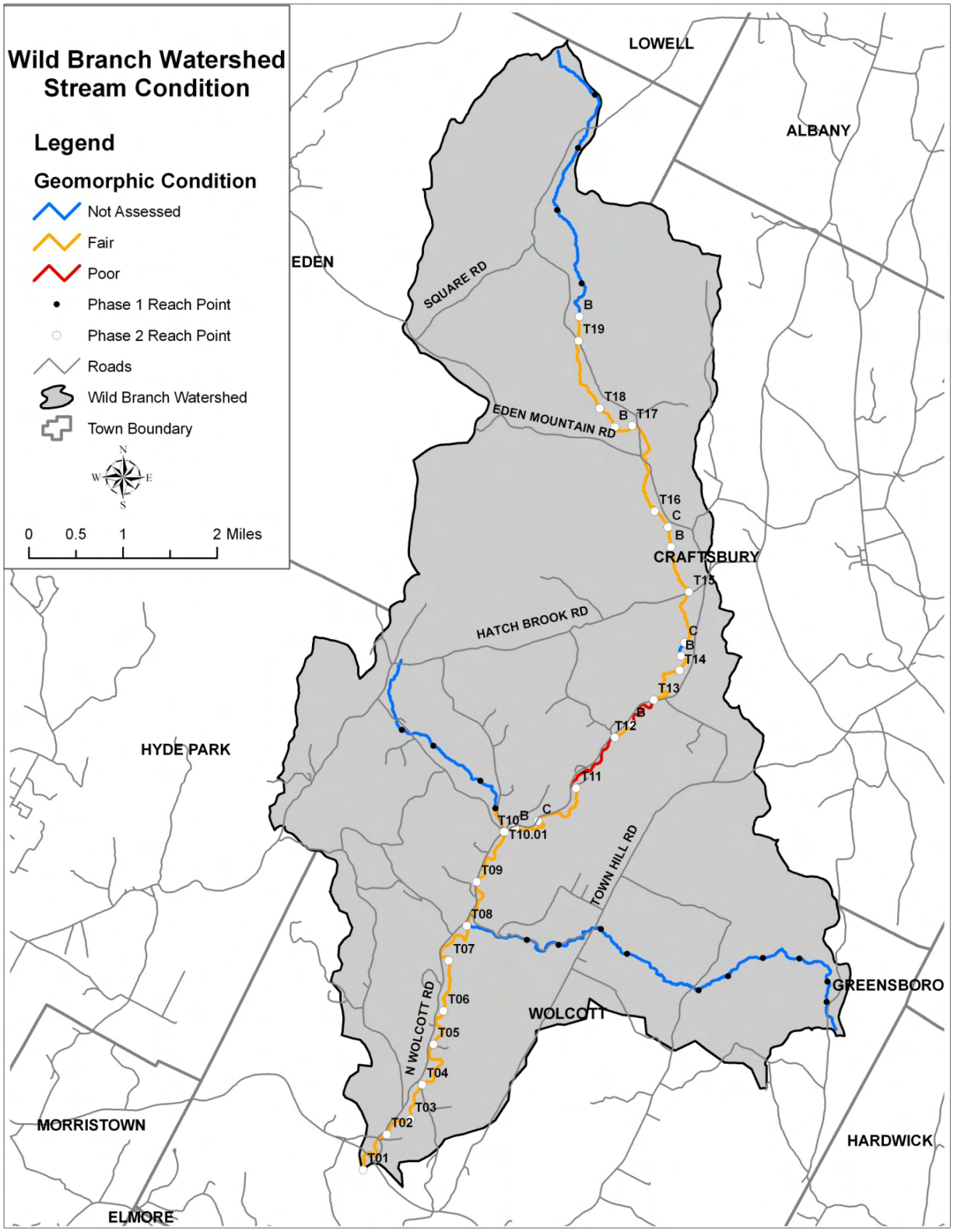

Figure 5.2. Phase 2 Geomorphic condition of the Wild Branch Watershed

Both the "D" stage and "F" stage channel evolution model (Vermont Agency of Natural Resources, 2004) are helpful for explaining the channel adjustment processes underway in the Wild Branch watershed. The "F" stage channel evolution model is used to understand the process that occurs when a stream degrades (incises). The more dominant adjustment process for the "D" stage channel evolution is aggradation.

The common stages of the "F" channel evolution stage, as depicted in Figure 5.3 include:

- A pre-disturbance period
- Incision – channel degradation
- Aggradation and channel widening
- The gradual formation of a stable channel with access to its floodplain at a lower elevation

The more dominant adjustment process for the "D" stage channel evolution is aggradation, widening, and planform change.

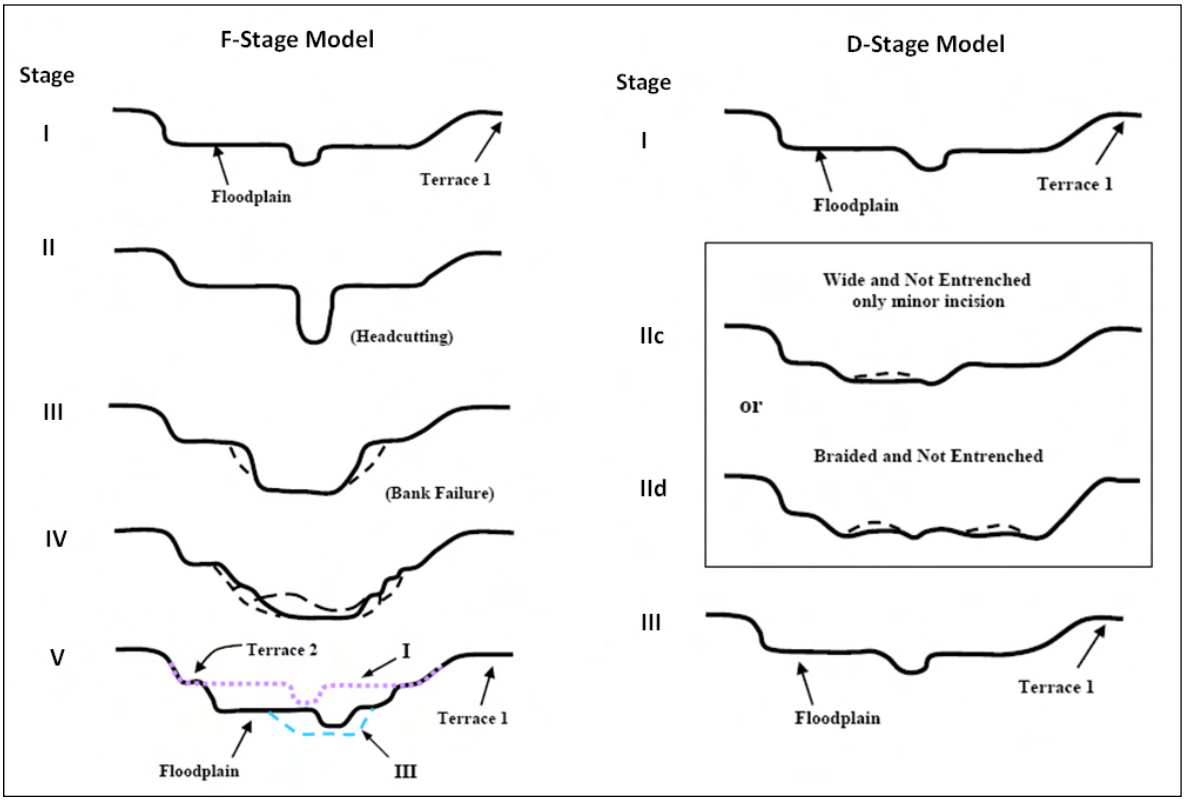

Figure 5.3 Typical channel evolution model for F-Stage and D-Stage (Vermont Agency of Natural Resources, 2007b)

In terms of the ANR channel evolution model, the lower Wild Branch mainstem is best represented by the D-stage channel evolution model. The "D-stage" channel evolution model applies to reaches where there may have been some minor historic incision; however, the more dominant active adjustment process is aggradation, which then in turn leads to channel widening and planform adjustment. The D-stage adjustment process

typically occurs in unconfined, low to moderate gradient valleys where the stream is not entrenched and has access to its floodplain or flood prone area at the 1-2 year flood stage. In the D-IId stage, the channel becomes extremely depositional and may even be braided with water flowing in multiple channels. As summarized in Table 3, Reaches T01 through T05 of the Wild Branch are in stage D-IId. These reaches have minor or no incision (e.g. incision ratios close to one) and aggradation and planform adjustment are the primary adjustment processes.

In the upper mainstem Wild Branch reaches and the lower reach on the unnamed tributary, the channel has undergone historic degradation as evidenced by abandoned terraces and rejuvenating tributaries. All of the cross sections on these upper reaches were found to be incised. Along many of the reaches and near the mouths of the tributaries, the system is actively adjusting to this lower bed elevation by moving laterally and widening in order to create a new floodplain at a lower elevation. This widening and planform adjustment is leading to another adjustment process, aggradation. Aggradation in the Wild Branch study is created as the stream widens and erodes its banks to reestablish a new floodplain. Unvegetated mid-channel bars, diagonal bars, historic and active flood chutes, channel avulsions, and high lateral bank erosion confirm the channel is undergoing extensive lateral migration.

The bed erosion that occurs when a meandering river is straightened in its valley is a problem that translates to other sections of the stream. Localized incision will travel upstream and into tributaries eroding sediments from otherwise stable streambeds. These bed sediments will move into and clog reaches downstream leading to lateral scour and erosion of the streambanks. Channel evolution processes may take decades to play out. Even landowners that have maintained wooded areas along their stream and riverbanks may have experienced eroding banks as stream channel slopes adjust to match the valley slopes. It is difficult for streams to attain a new equilibrium where the placement of roads and other infrastructure has resulted in little or no valley space for the stream to access or to create a floodplain.

	Table 3. Stream Type and Channel Evolution Stage (Note: color codes are provided at the bottom of the table)						
Segment Number	**Entrenchment Ratio**	**Width to Depth Ratio**	**Reference Stream Type**	**Incision Ratio**	**Existing Stream Type**	**Channel Evolution Stage**	**Active Adjustment Process**
T01	8.0	18.9	C4	1.26	C4	D-IId	**Aggradation** Widening **Planform**
T02	2.0	27.1	C4	1.15	C4	D-IId	**Aggradation** Widening Planform
T03	4.1	24.4	C4	1.00	C4	D-IId	**Aggradation** Widening Planform
T04	13.1	20.7	C4	1.00	C4	D-IId	**Aggradation** Widening **Planform**
T05	5.2	21.8	C4	1.00	C4	D-IId	**Aggradation** Widening **Planform**
T06	2.7	19.1	C3	1.33	C3	F-III	**Aggradation** Widening **Planform**
T07	4.5	33.1	C4	1.52	C4	F-III	**Aggradation Widening Planform**
T08	4.2	30.2	C4	1.39	C4	F-III	**Aggradation Widening Planform**
T09	1.8	31.5	C4	2.28	B4c	F-III	**Aggradation Widening Planform**
T10-A	1.1	18.1	C3	2.22	F3	F-II	Aggradation Widening Planform
T10-B	1.5	21.0	C4	1.76	B4c	F-III	Aggradation Widening Planform
T10-C	3.2	33.8	C4	1.73	C4	F-III	**Aggradation Widening** Planform
T11	2.1	48.2	C4	2.04	B4c	F-III	**Aggradation Widening Planform**
T12-A	1.2	28.1	C4	3.73	F4	F-III	Aggradation **Widening** Planform
T12-B	1.2	42.0	C4	1.69	F4	F-III	**Aggradation Widening Planform**

	Table 3. Stream Type and Channel Evolution Stage (Note: color codes are provided at the bottom of the table)						
Segment Number	**Entrenchment Ratio**	**Width to Depth Ratio**	**Reference Stream Type**	**Incision Ratio**	**Existing Stream Type**	**Channel Evolution Stage**	**Active Adjustment Process**
T13	1.3	18.0	C4	2.08	F4	F-III	**Aggradation** Widening Planform
T14-A	2.6	15.5	C4	1.39	C4	F-III	Aggradation Widening Planform
T14-C	2.0	18.4	C4	1.47	C4	F-III	**Aggradation Widening Planform**
T15-A	5.4	17.6	C4	1.77	C4	F-III	**Aggradation** Widening Planform
T15-B	5.0	18.6	C4	1.47	C4	F-III	**Aggradation** Widening
T15-C	2.3	26.8	C4	1.64	C4	F-III	Aggradation Widening Planform
T16	2.4	30.1	C4	1.52	C4	F-III	**Aggradation Widening** Planform
T17-A	4.4	25.8	C4	1.87	C4	F-III	**Aggradation** Widening **Planform**
T17-B	1.9	16.6	C4	1.85	B4c	F-III	Aggradation Widening Planform
T18	2.2	15.5	C4	1.52	C4	F-III	Aggradation Widening **Planform**
T19-A	1.3	34.2	C4	2.89	B4c	F-III	Aggradation **Widening** Planform
T10.01	1.5	19.1	C3	2.95	B3c	F-III	Aggradation Widening Planform

Bold Red lettering – denotes extreme adjustment process
Bold Black lettering – denotes major adjustment process
Black lettering (no bold) – denotes minor adjustment process
Pink denotes high width to depth ratio
Red denotes severe incision ratio
Blue denotes moderate incision ratio
Green denotes a stream type departure

5.2 Bridge and Culvert Assessment

A total of 18 structures (17 bridges and 1 culvert) are located within the study area of Wild Branch where Phase 2 assessments were conducted in 2007 (see Figure 5.4 and Figure 5.5). The LCPC assessed one of these structures (the culvert on a tributary to the Wild Branch) during fall 2004 using the ANR Bridge and Culvert Assessment Protocol. General notes during the Phase 2 assessment were taken of the 17 bridges. A list of resources for towns regarding funding, planning and design for replacement and retrofit of stream crossings is available on the Vermont River Management and the Vermont Department of Fish and Wildlife's web sites:
http://www.vtwaterquality.org/rivers/htm/rv_EducationalResources.htm
http://www.vtfishandwildlife.com/library.cfm?libbase_=Reports_and_Documents).

Table 4 summarizes the data collected for the one structure that was assessed using the ANR Bridge and Culvert Assessment protocol that is located within the Phase 2 study reach. The final column of Table 4 includes a prioritization of structures for replacement or retrofit based on three criteria: structure width in relation to bankfull channel width, aquatic organism passage (AOP) and geomorphic compatibility. The culvert on Brook Road was found to be mostly incompatible in terms of geomorphic compatibility and is resulting in reduced AOP. The mild bend and the small diameter relative to the bankfull width are contributing to this instability. A steep riffle was noted upstream of the structure indicating sediment transport is an issue. Significant scour is occurring below the structure, as evidenced by the 10 foot deep scour hole. The Brook Road culvert has been assigned a high priority for replacement based on the results of the geomorphic screening tool. The culvert does not contain sediment throughout the structure resulting in reduced AOP. Based on the AOP coarse screening tool, there is a low probability the existing culvert can be retrofitted to improve passage for strong, moderate and weak swimmers. The Brook Road culvert in T10.01 was also evaluated using the Phase 2 data (see Table 5).

Table 4
Wild Branch Watershed
Evaluation using VANR Geomorphic Compatibility Screening Tool

Reach/ Segment No.	Road Name, Town	Structure Type	Condition/ Observation	Percent Bankfull Channel Width[1]	Aquatic Organism Passage (AOP)	Geomorphic Compatibility	Priority for Replacement or Retrofit
T10.01	Brook Road	Culvert	Mild bend	20%[2]	Reduced AOP	Mostly incompatible	High

[1]Shaded for bankfull width percentage less than 50%, [2]Percent bankfull width measured in the field, [3]Percent bankfull width based on Vermont Hydraulic Geometry Curves

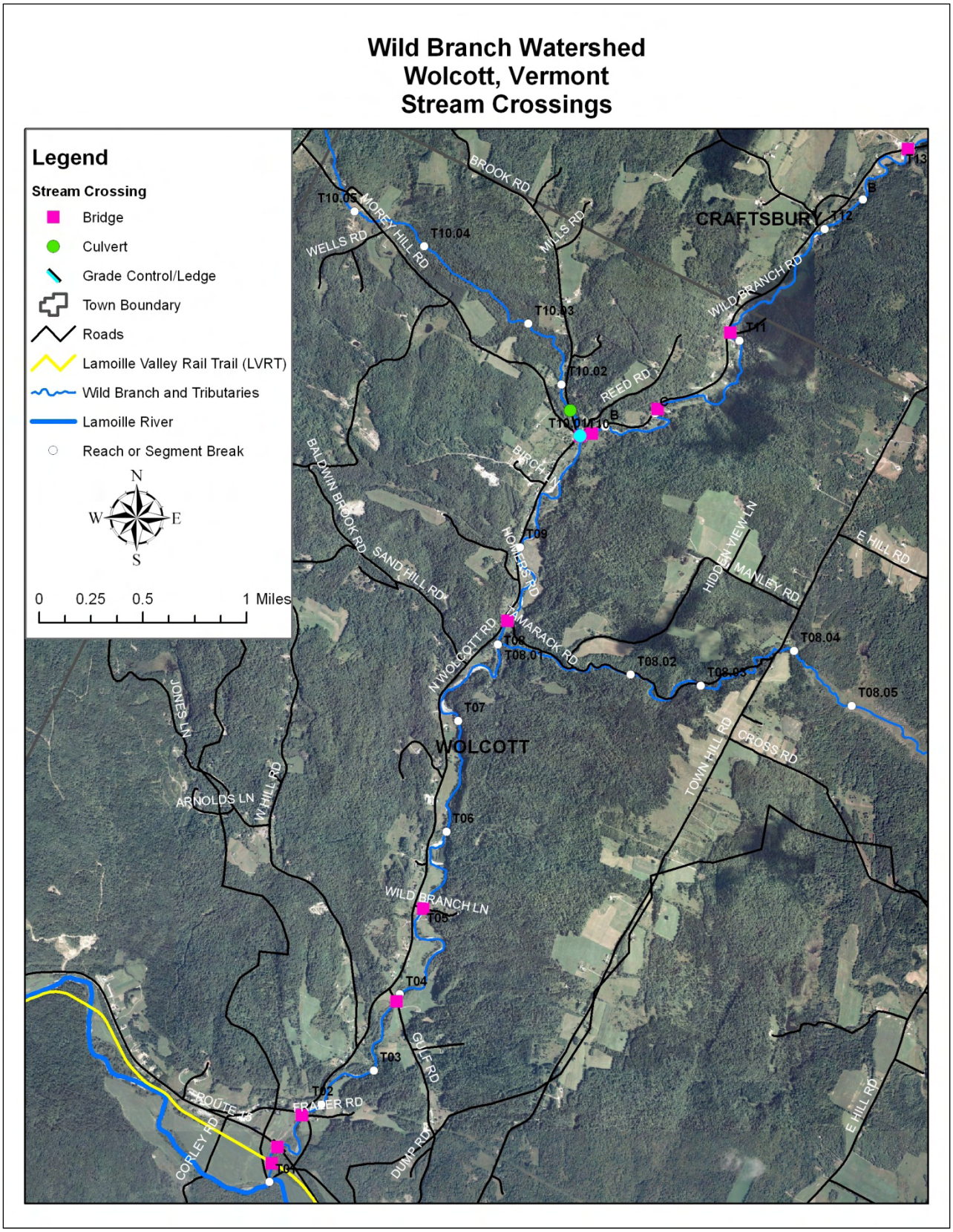

Figure 5.4. Stream Crossings within the Wild Branch Watershed in Wolcott, VT

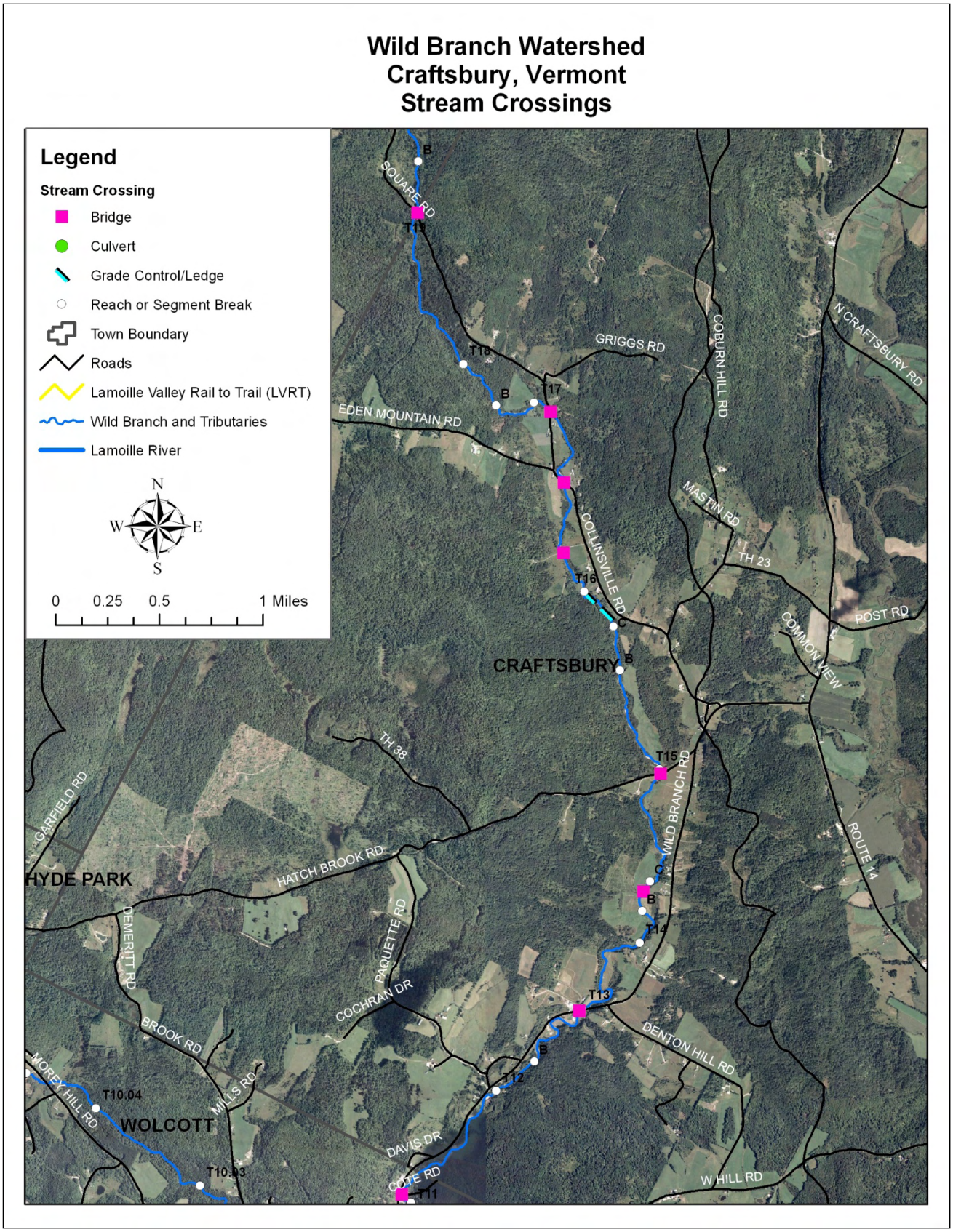

Figure 5.5. Stream Crossings within the Wild Branch Watershed in Craftsbury, Vermont

The following general criteria were used to evaluate the structures which were included within the Phase 2 reaches but did not receive a full bridge and culvert assessment. The bridge span and culvert diameter was used as a first cut in prioritizing the structures for replacement. Geomorphic stability and aquatic organism passage was also considered when prioritizing bridges and culverts for replacement or retrofit.

High Priority: Structures with spans of approximately 50 percent of the bankfull width or less, which are significantly impeding natural sediment transport. Culverts that are impeding the passage of aquatic organisms are automatically placed in the high priority category (e.g. free fall outlet).

Moderate Priority: Structures with spans less than 50 percent that are not causing significant geomorphic instability and structures with spans greater than 50 percent that are causing instability. Culverts that are resulting in reduced aquatic organism passage (e.g. do not have material throughout the structure or have a cascade outfall) result in at least moderate priority.

Low Priority: Stream crossing structures that are not included in either of the two categories above.

Stream crossings identified as high priority for replacement/retrofit are included in the project identification table (Table 6) in Section 7. It is recommended that stream crossings that have not yet been assessed within the Wild Branch watershed be assessed by the LCPC using the latest version of the ANR Bridge and Culvert Assessment protocols. This assessment will further refine the priority for replacement/retrofit of structures that are impeding aquatic organism passage or are undersized

A total of four structures within the Phase 2 study area have been identified as high priority for replacement or retrofits (see Table 5). Three of these structures are bridges and one structure is the Brook Road culvert that was identified as high priority for replacement based on the Geomorphic Screening tool. These four stream crossing are discussed below.

Table 5. Wild Branch Stream Crossing Structures Evaluation using Phase 2 Data

Reach/ Segment No.	Structure Type	Road Name/ Location	Notes[1]	Span (feet)	Percent Channel Width[2]	Problems Noted		Priority for Replacement
						Sediment Transport	Alignment	
T01	Bridge	Old Railroad - LVRT	Clearance 7.4', DB	46.5	60[3]			Low
T01	Bridge	Route 15	DB, SA	128	164[3]	√		Low to Moderate
T01	Bridge	N. Wolcott Rd	Clearance 7.8'; DB	90	115[3]			Low
T03	Bridge	Gulf Rd	Clearance 11'; DA, SA	43	51[3]	√		Low to Moderate
T04	Bridge	Wild Branch Ln	Clearance 8.6'; No problems	67	108[3]			NR[5]
T08	Bridge	Tamarack Road	Clearance 11.5'; DA, DB, A	47	62[3]	√	√	Moderate
T10-A	Bridge	Anthony Lane	No problems	54	106[3]			NR[5]
T10-C	Bridge	Private	DA, DB, SB	52.5	70[3]	√		Moderate
T11	Bridge	Cote Rd	DA, DB	51	74[3]			Low to Moderate
T12-B	Bridge	Wild Branch Rd	Clearance 9.5'; DB, SA, A	40.5	51[3]	√	√	Moderate
T14-B	Bridge	Private Farm	Clearance 5.0'; SA, SB	25	59[4]	√		Low to moderate
T14-C	Bridge	Hatch Brook Rd	Clearance 8.0'; DA, DB, A	20	48[3]	√	√	High
T16	Bridge	Private Farm	Clearance 6.0'; DA, SB	18	38[3]	√		Moderate
T16	Bridge	Collinsville Rd - south	Clearance 6.0'; DB	28	59[3]			Low
T16	Bridge	Collinsville Rd - north	Problem with alignment during floods; DA, DB, SA	28	59[3]	√	√	High
T19-A	Bridge	Square Rd	Clearance 8.0'; DA, DB, SA, SB, A	24	61[3]	√	√	High
T10.01	Bridge	North Wolcott Rd	Clearance 12'; DA, DB, SB	29	118[3]	√		Moderate
T10.01	Culvert	Brook Road	Reduced AOP; DA, SA, SB	7	29[3]	√		High

[1] DA-deposition above , DB- deposition below, SA- scour above, SB – scour below, A- alignment; [2]Shaded for bankfull width percentage less than 50%, [3]Percent bankfull width based on cross section data from Phase 2 assessment conducted by Bear Creek Environmental, LLC and LCPC, [4]Percent bankfull width based on Vermont Hydraulic Geometry Curves, [5]NR- not recommended for replacement or retrofit at this time

The Hatch Brook Road Bridge is undersized relative to the bankfull channel width and has poor alignment. The deposition above and below the Hatch Brook Road Bridge suggests there is a localized problem with sediment transport in segment T14-C as a result of this stream crossing. This bridge crossing has been rated as high priority for replacement based on cursory information from the Phase 2 geomorphic assessment. A full bridge and culvert assessment using the VANR's protocols is recommended to verify this structure is a high priority for replacement.

Figure 5.6 The Hatch Brook Road Bridge is undersized relative to the bankfull channel width.

The upper Collinsville Road Bridge in reach T16 has been identified as high priority for replacement because it is causing localized geomorphic instability. The bridge was noted to have poor alignment. Considerable sediment is depositing upstream, within, and downstream of the structure (Figures 5.7 and 5.8).

Figure 5.7 Steep riffle and mid-channel bar showing considerable deposition upstream of Collinsville Road upper stream crossing.

Figure 5.8 Large side bar within and downstream of Collinsville Road upper stream crossing. The alignment of the structure is poor and is causing localized geomorphic instability.

The 24 foot wide Square Road Bridge in segment T19-A was identified as causing localized geomorphic instability during the Phase 2 assessment due to scour and deposition above and below the structure (Figure 5.9) as well as poor alignment (Figure 5.10). The span relative to the bankfull width is 61 percent. This structure is high priority for replacement.

The Brook Road culvert in reach T10.01, located on a major tributary to the Wild Branch, is undersized. The culvert diameter is only 7 feet compared with a measured bankfull width of 24.5 feet (Figure 5.9). The small diameter is causing sediment transport problems including deposition and scour above the structure and a large scour pool immediately below the structure. Undersized bridges and culverts are not designed to accommodate both flow and sediment. During flood events large point bars can consequently deposit upstream of undersized bridges and culverts. During catastrophic flood events crossings can become outflanked, taking out large sections of roads and driveways. Significant sediment discharges to waterways can result. Sedimentation of the river poses water quality and aquatic habitat concerns.

Figure 5.9 Deposition and scour above and below the Square Road Bridge. The bridge has poor alignment.

Figure 5.10 This undersized Brook Road stream crossing on a tributary to the Wild Branch is causing significant sediment transport problems as well as reduced aquatic organism passage.

The LCPC assessed 26 culverts within the Town of Wolcott on tributaries to the Wild Branch and small tributaries that flow directly to the Lamoille River using the Vermont ANR's Bridge and Culvert Assessment Protocol during 2004. These data were analyzed using the AOP Coarse Screen and the Geomorphic Compatibility screen. The outcome of this screening analysis is provided on page 61 of the Appendix. Most of these structures are undersized and have culvert diameters that are less than 50 percent of the bankfull channel width. Four of the structures (two culverts on a tributary to the Wild Branch on Brook Road, one culvert on a tributary to the Lamoille River on Corley Road, and one culvert on a tributary to the Wild Branch on Gulf Road) were identified as being mostly incompatible using the geomorphic screening tool (see map on page 62 of the Appendix). The remaining culverts ranged from partially to fully compatible. All of the culverts were identified as reducing aquatic organism passage because they lack natural substrate throughout the structure. The culvert on Gulf Road has a freefall outlet and was flagged as having no

aquatic organism passage including adult salmonids. No information on culverts within the Town of Craftsbury and Eden were available in the ANR's data management system (DMS).

6.0 Stressor, Departure and Sensitivity Analysis

Stressor, departure and sensitivity maps are presented here as a means of displaying the effects of all significant physical processes occurring within the Wild Branch watershed that were observed during the Phase 1 and Phase 2 Stream Geomorphic Assessments. These maps also provide an indication of the degree to which the channel adjustment processes within the watershed have been altered at both the watershed scale and the reach scale. The analysis of existing and historic departures from equilibrium conditions along a stream network allows for the prediction of future adjustments within the watershed. This is helpful in developing and prioritizing potential protection and restoration projects.

6.1 Stressor Identification

6.1.1 Hydrologic Regime Stressors

The hydrologic regime is the timing, volume, and duration of flow events throughout the year and over time and is characterized by the input and manipulation of water at the watershed scale. When the hydrologic regime has been significantly changed, stream channels will respond by undergoing a series of channel adjustments. The land use within the watershed plays a role in the hydrology of the receiving waters. The percentage of urban and cropland development within the watershed are factors which change a watershed's response to precipitation. The most common effects of urban and cropland development is increasing peak discharges and runoff by reducing infiltration and travel time (United States Department of Agriculture 1986).

The dominant watershed land cover/land use within the Wild Branch watershed is forest. T10.01 (Wild Branch Tributary) was the only Phase 2 reach which resulted in a watershed land cover/land use impact rating of high (10% or more is crop and/or urban). Analysis of hydric soils located where current land uses are agricultural or urban indicates some loss of wetland attenuation (Figure 6.1). Historical deforestation in the Wild Branch watershed may also have contributed to historic incision.

The Wild Branch watershed has a modest network of roads as shown in Figure 6.1. Extensive road networks can contribute significantly to increased flows within a river resulting both from increased runoff and stormwater ditching. According to Foreman and Alexander (1998), increased peak flows in streams may be evident at road densities of 3.2 miles/square mile. Subwatersheds with road densities of greater than 3.2 miles/ square mile account for only about 6 percent of the Wild Branch watershed. The highest road densities are along the lower end of Tamarack Brook and in the headwaters of an unnamed tributary to the Wild Branch.

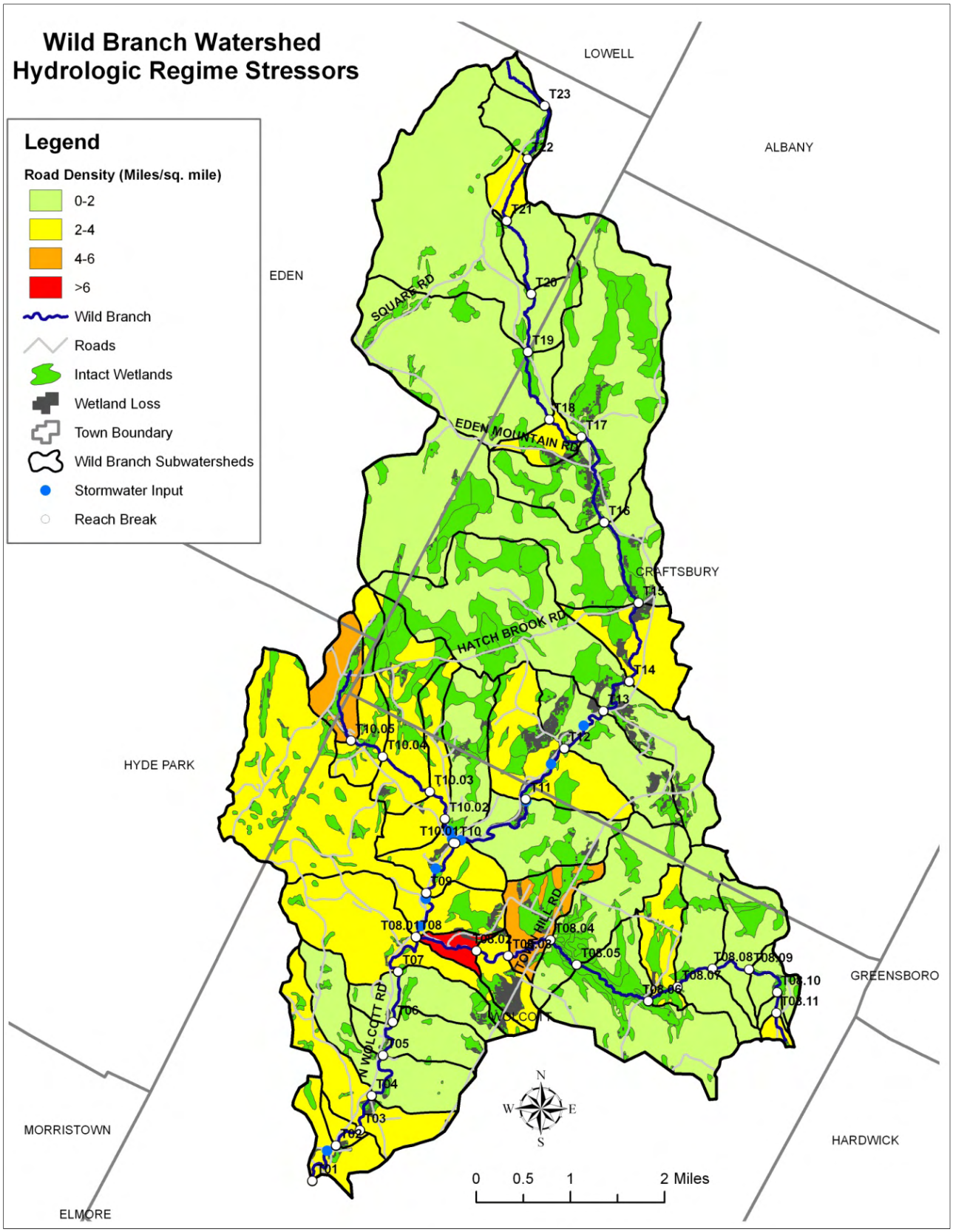

Figure 6.1. Land use map showing cumulative percent of urban land use, road density and lost wetland.

6.1.2 Sediment Regime Stressors

The sediment regime is the quantity, size, transport, sorting and distribution of sediments. The sediment regime may be influenced by the proximity of sediment sources, the hydrologic regime, and the specific morphology of the valley, floodplain, and stream. The Sediment Load Indicators Maps for Wolcott (Figure 6.2) and Craftsbury (Figure 6.3) show the distribution of sediment load indicators in the Wild Branch watershed at the watershed scale. Both Figures 6.2 and 6.3 illustrate the cumulative percentage of agricultural land (based on the percentage of cropland) for each subwatershed. As discussed in Section 3.1.3. Land Use, the Wild Branch watershed is 83 percent forested.

Bank erosion and mass failures contribute significant sediment inputs within the Wild Branch watershed. Bank erosion is defined as "an area of raw and barren soils where the vegetation does not have the ability to hold the soil and/or the soil has slumped or fallen into the channel". Mass failures can occur when "a perennial stream erodes into or undercuts a high erodible landform, such as glacial lacustrine terrace". (Vermont Agency of Natural Resources, 2007b). A mass failure is characterized by rock or easily erodible soil being transferred by gravity downslope along a valley wall. This transfer of material can be exaggerated due to various factors including: slope, soil type, groundwater movement, frost action, and/or lack of stabilizing vegetation.

Bank erosion mapped during the Phase 2 study totals approximately 25 percent on both the east and west banks of the twenty reaches assessed indicating a high level of erosion. Twenty-eight mass wasting sites were mapped during the Phase 2 assessment. The total length of mass failures on the Wild Branch Phase 2 reaches is about 2000 feet. Mass failures are prevalent in the vicinity of the Wild Branch Road at the southern end of Craftsbury (near Paquette Road and Denton Hill Road) within reaches T11 and T12. These two reaches account for about one-quarter of the mass failures by length of the Phase 2 study area.

Depositional features per mile are mapped to show areas of deposition and planform adjustment. Steep riffles, mid-channel bars, delta bars, flood chutes, avulsions and braiding are parameters included in this depositional features parameter. This parameter does not necessarily explain the sources of sediment, but these depositional and channel bifurcation features are common in areas where the sediment transport capacity of the channel has been exceeded (VANR, 2007a). Channel migration features (avulsions and flood chutes) are included on the map to show areas of significant planform adjustment. Over 75 percent of the Phase 2 reaches assessed have a high number (>5) depositional features per mile. Only one short segment (T10-A), located upstream of a major tributary to the Wild Branch in Wolcott, has a low (<2) number of depositional features per mile.

The high bank erosion and the prevalent mass failures illustrate the Wild Branch has a high source of sediment input. This is resulting in the channel being overwhelmed by sediment, thereby exceeding the sediment transport capability. The high level of aggradation is especially evident in the lower five reaches of the main stem.

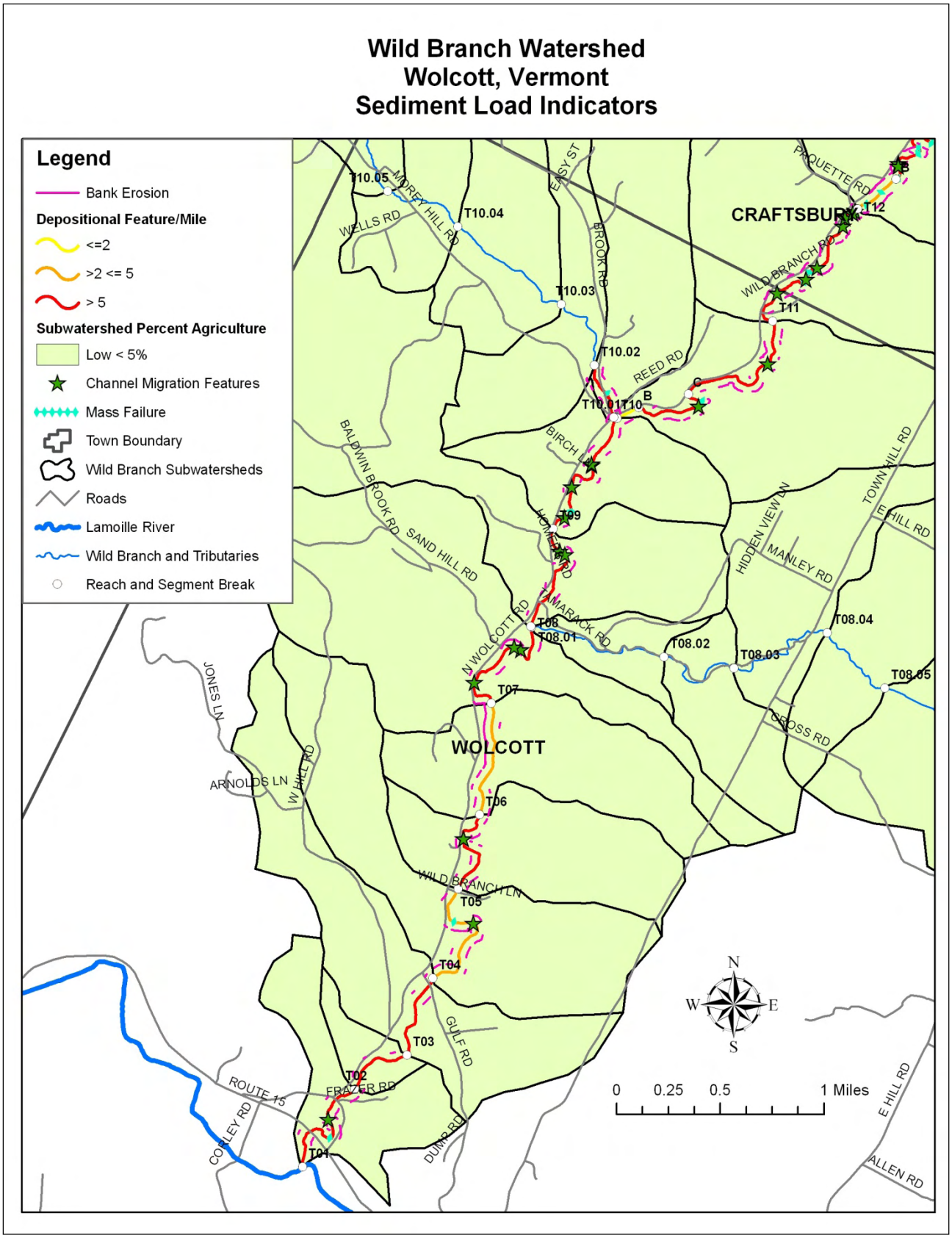

Figure 6.2. Sediment load indicators map for the Wild Branch in Wolcott.

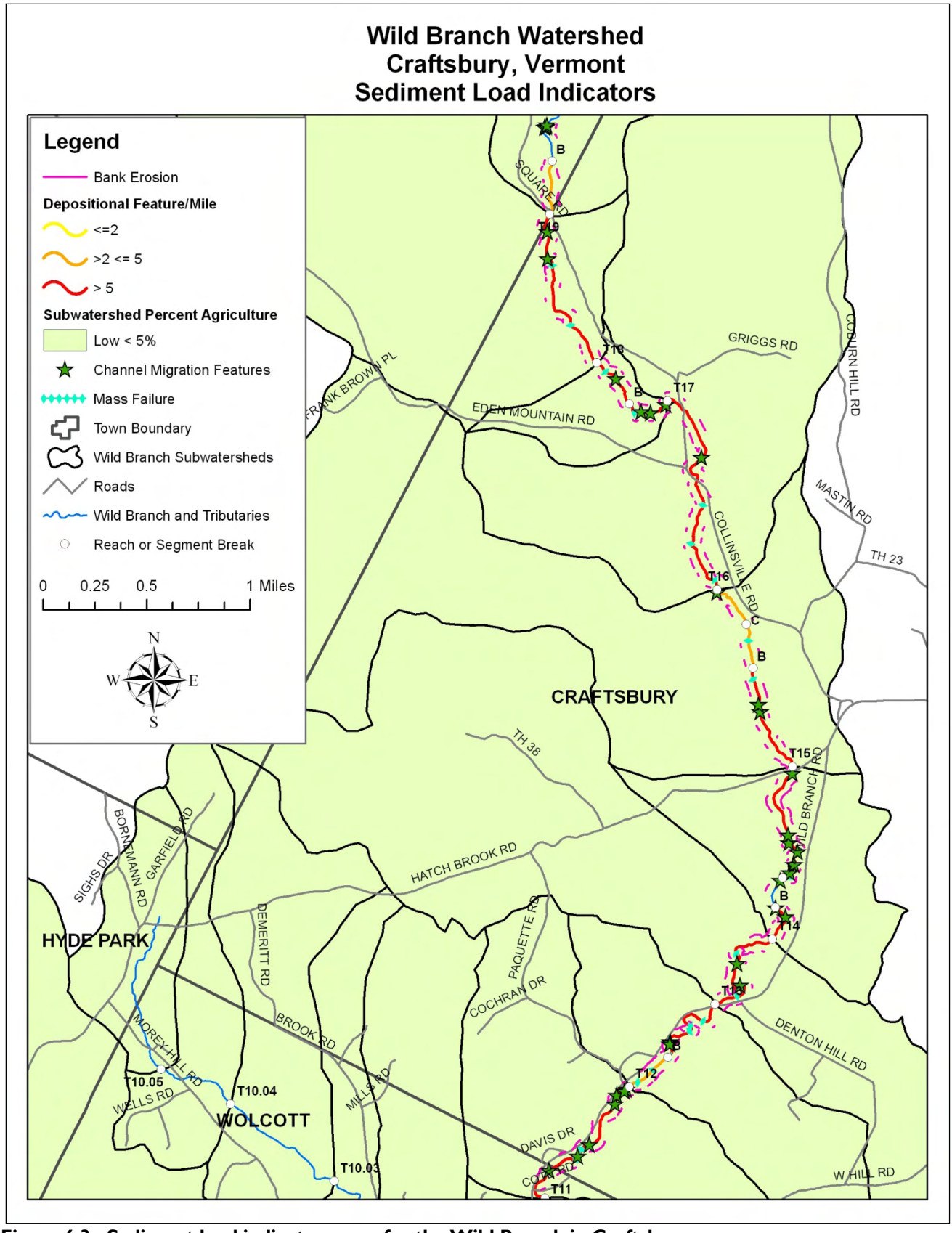

Figure 6.3. Sediment load indicators map for the Wild Branch in Craftsbury.

6.1.3 Channel Modifiers

Channel straightening, floodplain encroachment, and berms and roads can increase the slope of a channel resulting in increased stream power. Increases in stream power (shown in red or orange in Figures 6.4 and 6.5) can initiate streambed erosion resulting in incision. The most extensive areas of channel straightening and floodplain encroachment (both development and adjacent berms and roads) are in the middle of the watershed between reaches T05 and T12. The channel within the middle reaches run predominantly along North Wolcott Road and Wild Branch Road. The majority of the channel straightening within the Wild Branch watershed is associated with roads that run parallel to the stream. The extensive areas with increases in stream power explain the high degree of channel adjustment that is occurring within the watershed.

Grade controls (waterfalls and ledge), natural and manmade dams and constrictions (such bridges and culverts) constrict flows or raise the bed elevation. The backwater conditions and sediment deposition that result typically reduces channel slope and stream power (ANR 2007a). Localized areas where slope decreases are expected in the Wild Branch watershed are shown in blue and green in Figures 6.4 and 6.5.

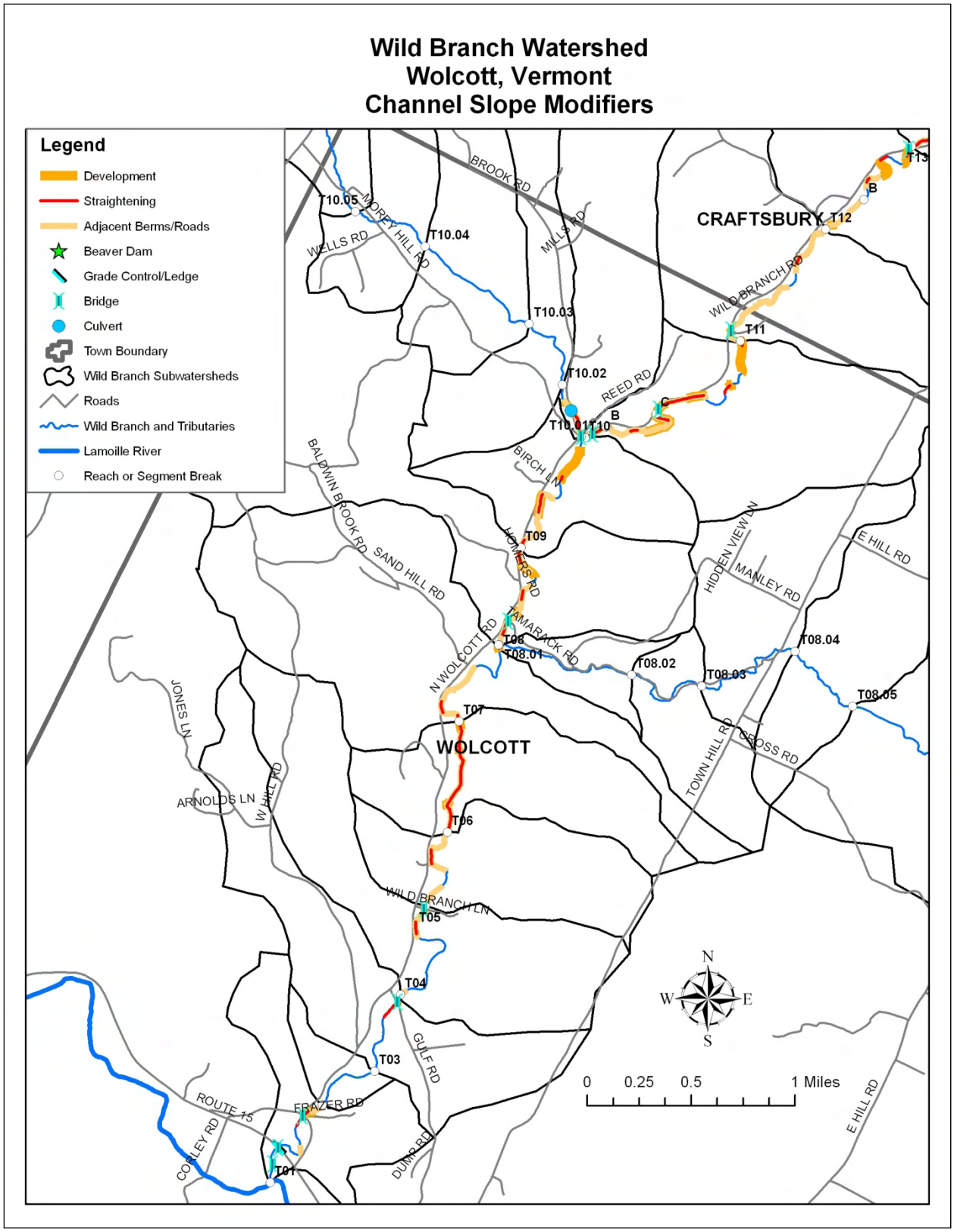

Figure 6.4. Channel slope modifiers map for Wolcott showing parameters contributing to increases (red and orange) or decreases (blue and green) in slope.

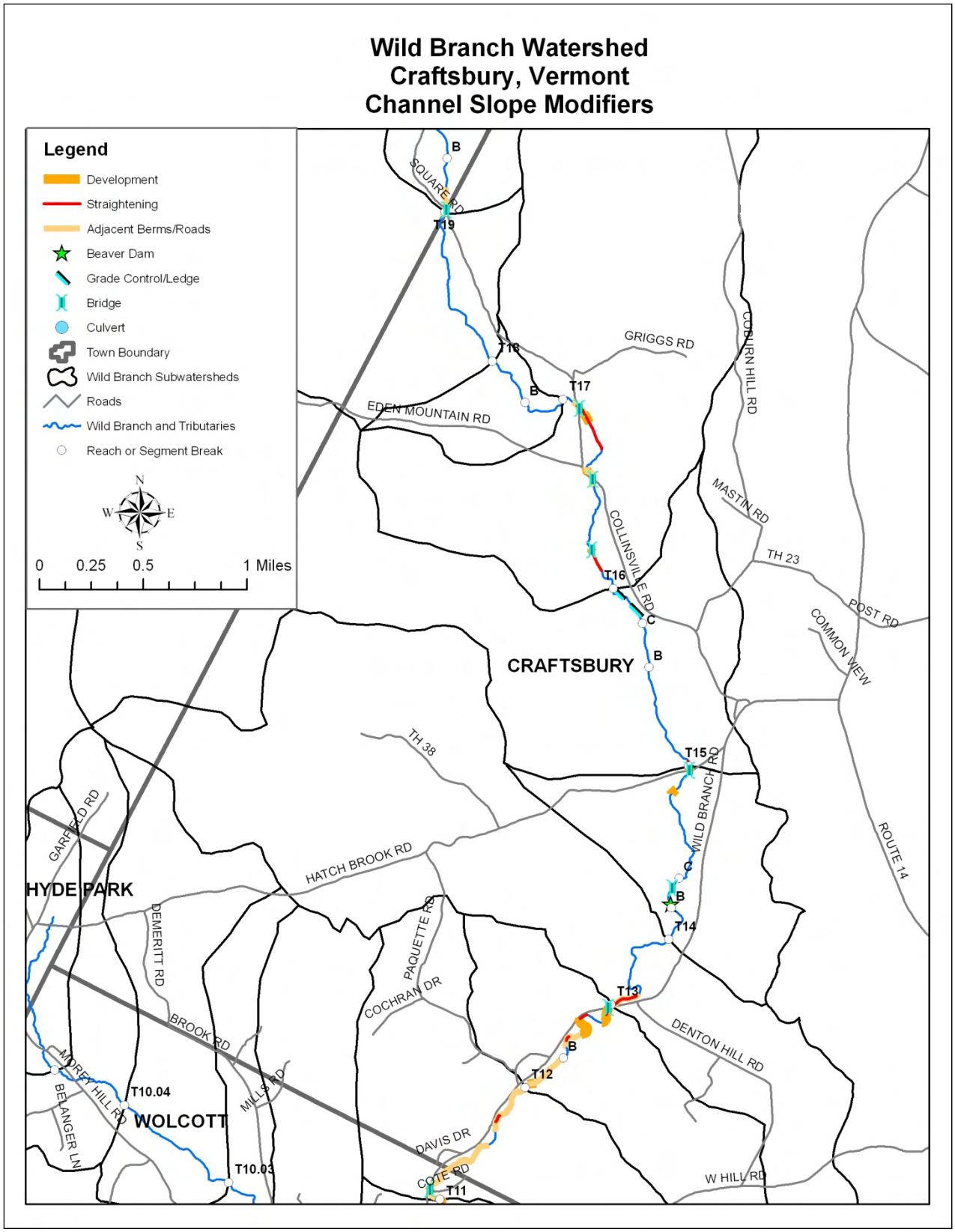

Figure 6.5. Channel slope modifiers map for Craftsbury showing parameters contributing to increases (red and orange) or decreases (blue and green) in slope.

6.1.4 Boundary Conditions and Riparian Modifiers

The resistance of the channel boundary materials is important for understanding the sensitivity of a channel and for predicting when a channel will undergo adjustment process from stressors in the watershed. There are a number of factors that can result in decreased boundary condition. One of the most important factors is the quality of the riparian buffer. Riparian buffers provide many benefits. Some of these benefits are protecting and enhancing water quality, providing fish and wildlife habitat, providing streamside shading, and providing root structure to prevent bank erosion. Woody vegetation is essential for holding the bank soils to provide resistance to streambank erosion. There are many locations along the Wild Branch mainstem, especially in the Town of Wolcott, where there is little or no buffer as defined by buffers less than 25 feet in width (Figures 6.6 and 6.7). These stream reaches which lack a high quality riparian buffer are at a significantly higher risk of experiencing high rates of lateral erosion.

Parameters which are indicative of a decrease in boundary condition are shown in red and orange in Figures 6.6 and 6.7. While bank armoring may temporarily increase the boundary condition, it is indicative of where the stream power has resulted in bank erosion or widening of the channel. Extensive bank armoring may increase the stream power, resulting in erosion of banks located downstream. Areas where woody debris, bed substrate and plant material were removed from the channel also result in increased stream power. Gravel mining is a practice that can significantly decrease the boundary resistance. General areas where gravel mining has taken place were mapped by the LCPC during the Phase 1 portion of the study based on information provided by VANR.

Important factors that result in an increase in boundary condition are included in Figures 6.6 and 6.7 with aqua colored symbols. Natural and man-made grade controls increase the resistance of the bed to erosion. There were only two areas on the Wild Branch mainstem where natural grade controls (ledge) were mapped as channel spanning based on the Phase 2 fieldwork. The lower area of ledge is located on reach T01 just upstream of the confluence with the Lamoille River in Wolcott (Figure 6.6). The second area of ledge is located at the top of Reach 15 that starts at the Hatch Brook crossing in the Town of Craftsbury. The lack of natural grade controls may be one reason the Wild Branch watershed has undergone so much incision and channel adjustment. The cohesiveness of the lower bank materials is another factor that was considered in evaluating boundary resistance. Cohesive bank material can increase the boundary condition. Reach T10 in the northern part of Wolcott was the only reach that had cohesive lower banks.

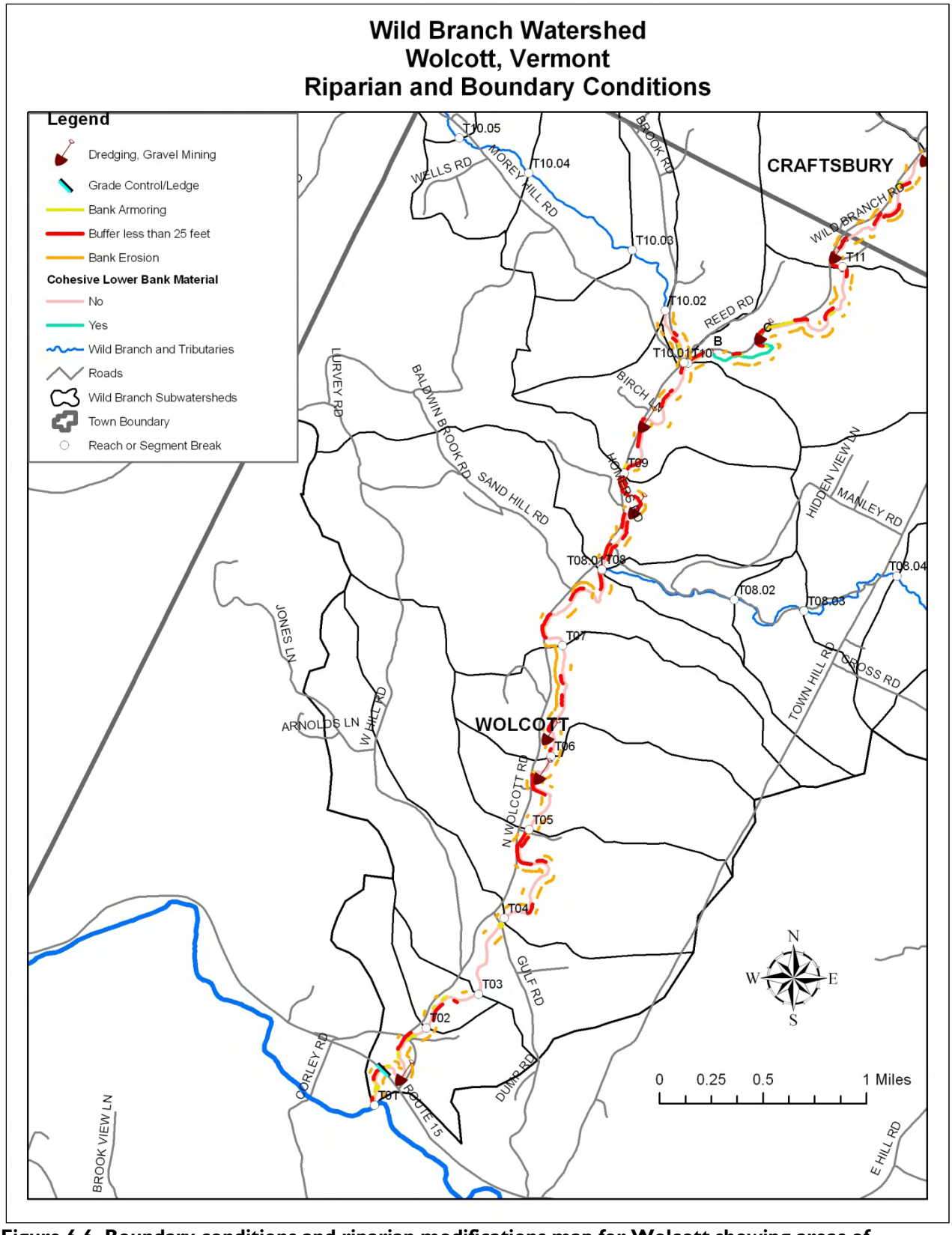

Figure 6.6. Boundary conditions and riparian modifications map for Wolcott showing areas of decreased boundary condition (red and orange) and increased boundary condition (aqua).

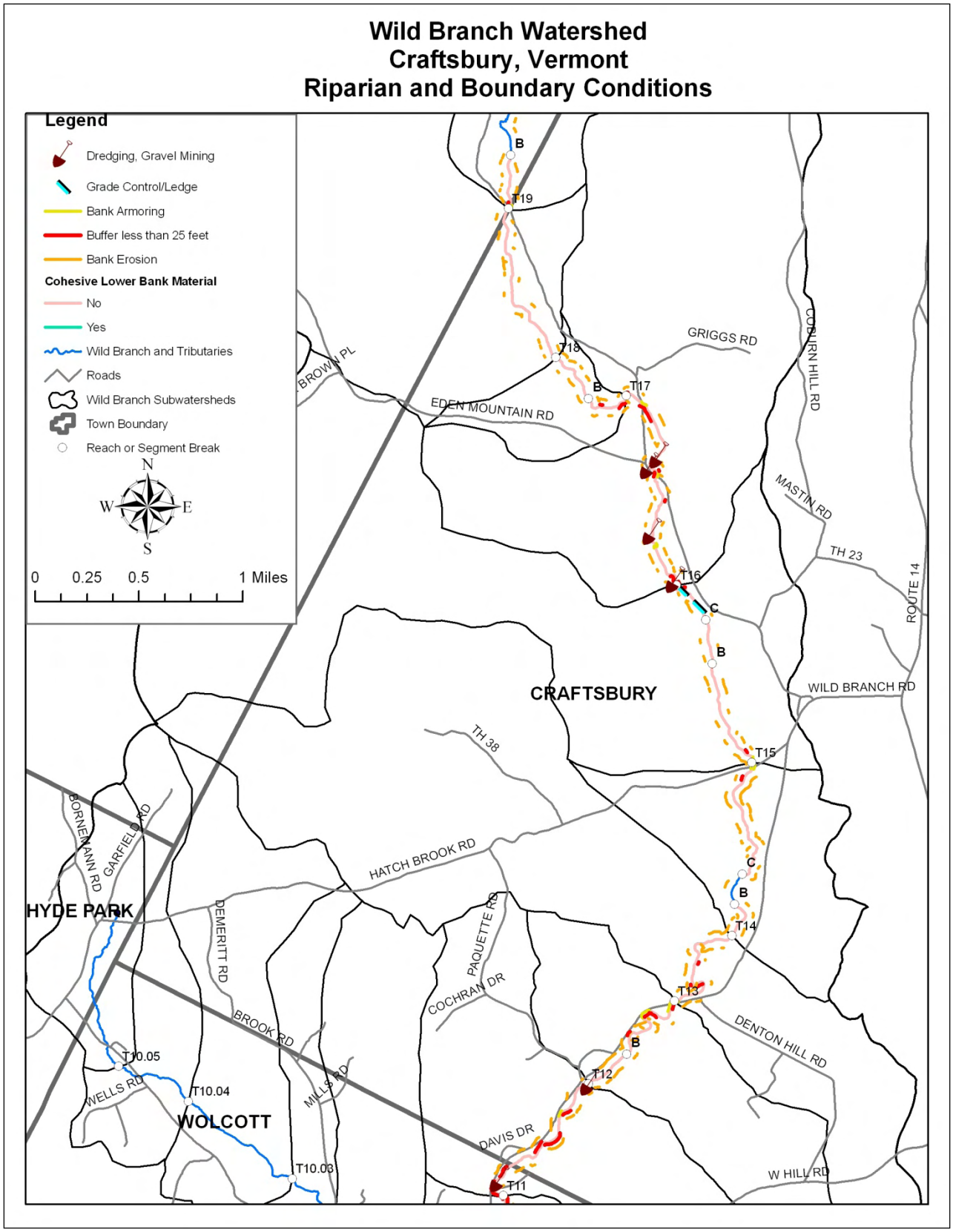

Figure 6.7. Boundary conditions and riparian modifications map for Craftsbury showing areas of decreased boundary condition (red and orange) and increased boundary condition (aqua).

6.2 Departure Analysis

Successful river corridor restoration and protection projects depend on a thorough understanding of the sources, volumes, and attenuation of flood flows and sediment loads within the stream network. If increased loads are transported through the network to a sensitive reach, where conflicts with human investments are creating a management expectation, little success can be expected unless the restoration design accommodates the increased load or finds a way to attenuate the loads upstream (Vermont Agency of Natural Resources, 2007a).

Within a reach, the principles of stream equilibrium dictate that stream power and sediment will tend to distribute evenly over time (Leopold, 1994). Changes or modifications to watershed inputs and hydraulic geometry create disequilibrium and lead to an uneven distribution of power and sediment. Large channel adjustments observed as dramatic erosional and depositional features may be the result of this uneven distribution of power and sediment, and these adjustments may continue until a state of equilibrium is reached.

The analysis of sediment regimes at the watershed scale is useful for summarizing the stressors affecting the equilibrium condition of river channels. Sediment regime mapping provides a context for understanding the sediment transport and channel evolution processes which govern changes in geometry and planform for river channels in a state of disequilibrium. Sediment Regime Maps have been prepared to show departure from reference conditions due to human alterations.

The reference sediment regime map (Figure 6.8) shows the Phase 1 reference stream sediment conditions for each reach within the stream network. In the reference condition, streams use available floodplain access as a means to store sediment within the watershed. All segments of the Phase 2 study area have a reference sediment regime of *Coarse Equilibrium (in=out)& Fine Deposition* (*Equilibrium*) or *Transport*. The majority of the stream network has a reference sediment regime of *Equilibrium*. *Equilibrium* channels are unconfined on at least one side, and they transport and deposit sediment in equilibrium, wherein the stream power is balanced by the sediment load, sediment size, and channel boundary resistance. *Transport* channels, on the other hand, are steep, dominated by bedrock and boulder/cobble substrates, and are typically in confined valleys. Transport channels do not supply appreciable quantities of sediments to downstream reaches. [Vermont Agency of Natural Resources, 2007a VANR, 2007a)].

Changes in hydrology (such as development and agriculture within the riparian corridor) and sediment storage within the watershed have altered the reference sediment regime types for some reach segments. All departures were derived from the DMS according to the sediment regime criteria established by the Vermont Agency of Natural Resources (2007a). Existing sediment regimes have not been established for reaches that were not assessed during the phase 2 stream geomorphic assessment. Some segments that were *Coarse Equilibrium (in=out) & Fine Deposition* type segments by reference have been converted to *Fine Source and Transport & Coarse Deposition* sediment regimes based on the

Phase 2 Stream Geomorphic Assessment data (Figure 6.9). This means that most fine sediment entering the stream is transported through without being deposited as a result of channel incision and reduced floodplain access. Additionally, coarse sediment storage is increased due to increased load along with lower transport capacity.

The existing sediment regime for the Wild Branch watershed includes reduced floodplain access, increased stream power, reduced boundary resistance, and lateral constraints, such as roads, at various locations throughout the stream network. Watersheds which have lost attenuation or sediment storage areas, due to human related constraints, are generally more sensitive to erosion hazards, transport greater quantities of sediment and nutrients to receiving waters, and lack the sediment storage and distribution processes that create and maintain habitat (Vermont Agency of Natural Resources, 2007a). The lower five reaches on the Wild Branch mainstem are acting as attenuation assets. Reaches T14 through T17 have very few corridor encroachments and are important attenuation assets for the upper part of the watershed. It is important to consider attenuation when designing stream corridor protection and restoration projects within the stream network.

6.3 Sensitivity Analysis

Stream sensitivity refers to the likelihood that a stream will respond to a watershed or local disturbance or stressor, such as: floodplain encroachment, channel straightening or armoring, changes in sediment or flow inputs, and/or disturbance of riparian vegetation (Vermont Agency of Natural Resources, 2007b).

Assigning a sensitivity rating to a stream is done with the assumption that some streams, due to their setting and location within the watershed, are more likely to be in an episodic, rapid, and/or measurable state of change or adjustment. A stream's inherent sensitivity may be heightened when human activities alter the setting characteristics that influence a stream's natural adjustment rate including: boundary conditions; sediment and flow regimes; and the degree of confinement within the valley. Streams that are currently in adjustment, especially those undergoing degradation or aggradation, may become acutely sensitive (Vermont Agency of Natural Resources, 2007b). Stream sensitivity is assigned based on the existing stream type and condition. For a particular stream type, a segment in "reference" or "good" condition has a lower sensitivity than a reach in "fair" condition. The highest sensitivity is assigned for segments in poor condition and reaches which have undergone a stream type departure.

There are many variables that are contributing to the sensitivity of the reaches in the Wild Branch watershed. The lack of bedrock and cohesive lower banks decrease the resistance to lateral and vertical adjustments; thereby, making the channel more sensitive. Additionally, bank vegetation and roots which hold the soil are lacking especially in the middle of the watershed. Reaches that are lacking high quality riparian vegetation are more sensitive to channel adjustment.

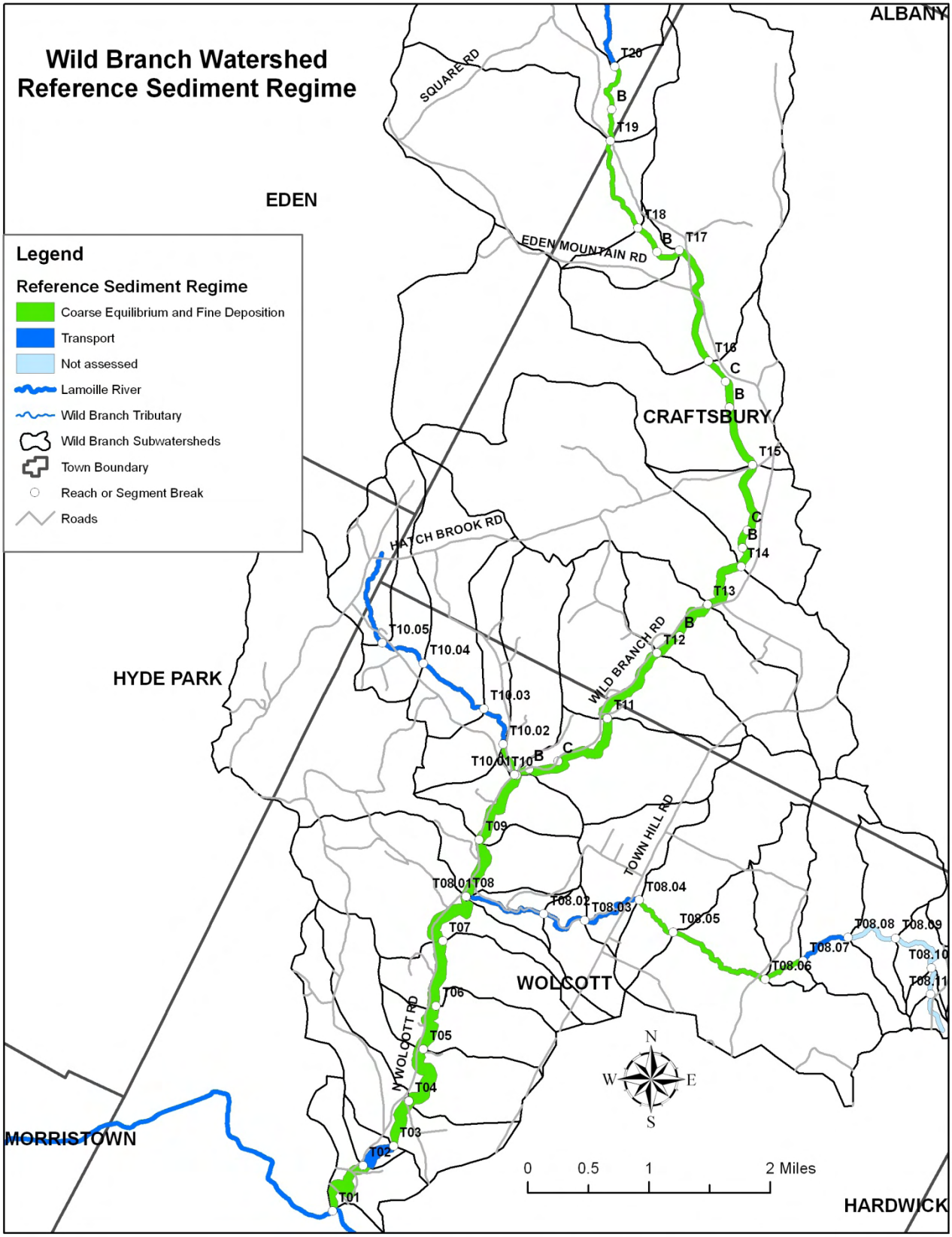

Figure 6.8. Exisitng Sediment Regime Departure Map showing areas of coarse equilibrium and fine deposition and transport reaches.

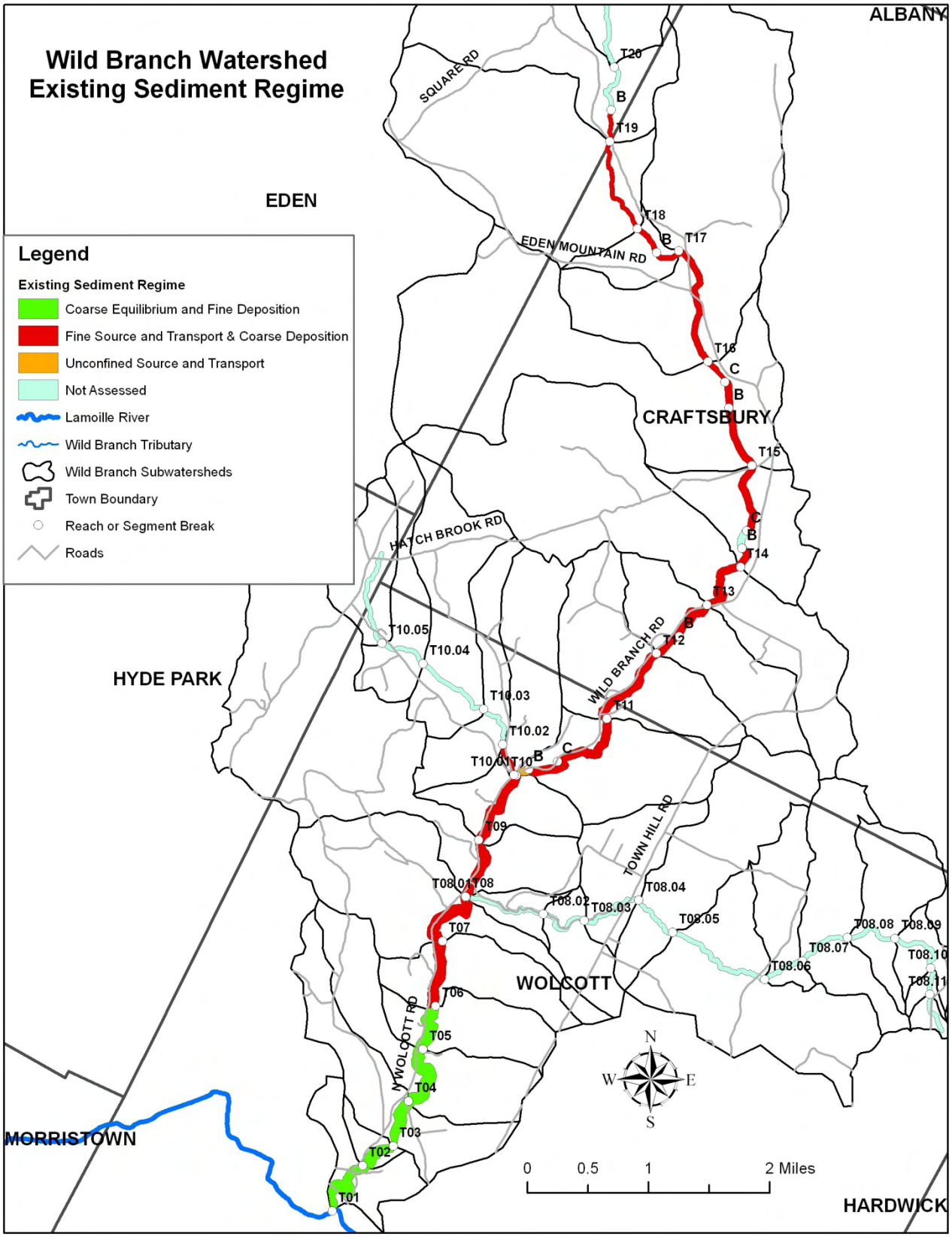

Figure 6.9. Exisitng Sediment Regime Departure Map showing areas of coarse equilibrium and fine deposition and transport reaches.

The location and slope of a stream also affects its morphology and sensitivity. Streams that are transporting sediment through the channel are less sensitive than streams that are storing and responding to sediment. Low gradient streams, like the Wild Branch, with high sediment supplies are very sensitive and may undergo adjustment following minor changes in channel geometry or boundary condition. Additionally, flow regime and floodplain constrictions may be affecting the sensitivity of the Wild Branch watershed. Changes in land use and land cover that increase impervious cover, peak discharges, and/or the frequency of high flows will heighten a stream's sensitivity to change and adjustment. Confinement becomes a significant sensitivity concern when structures such as roads, railroads, and berms significantly change the confinement ratio, reduce or restrict a stream's access to floodplain, and result in higher stream power during flood stage.

Figure 6.10 is a map presenting the stream sensitivity, generalized according to stream type and condition as per the VANR protocol, and current adjustments for each reach segment in the Wild Branch watershed. Sensitivity ratings have not been assigned for bedrock dominated segments and impounded segments that were not assessed. Segments T12-A, T12-B, T13 are gravel dominated segments that have undergone a stream type departure from a reference "C" channel to an "F" channel. This has resulted in a change in sensitivity from high to extreme (Figure 6.10). Segment T10-A, a cobble dominated segment, has also undergone a sensitivity change (moderate to extreme) because of a stream type departure from a "C" channel to an "F" channel. These stream type departures are attributed to historic incision. No vertical channel adjustments were noted to be actively occurring within the watershed during the 2007 Phase 2 assessment. However, both Jim Ryan (personal communication, 2010) and South Mountain Research & Consulting (2002) have noted active incision in the form of head cutting in the past in Reach T12 between Denton Hill Road and Paquette Road.

Major aggradation adjustment processes are displayed on the corridor where they were found to be actively occurring and not evaluated as historic. Aggradation is a current major active process for the majority of Wild Branch mainstem reaches. This information is useful in prioritizing the implementation of the projects identified in Section 7 of this report, as certain management actions may be influenced by these active adjustment processes.

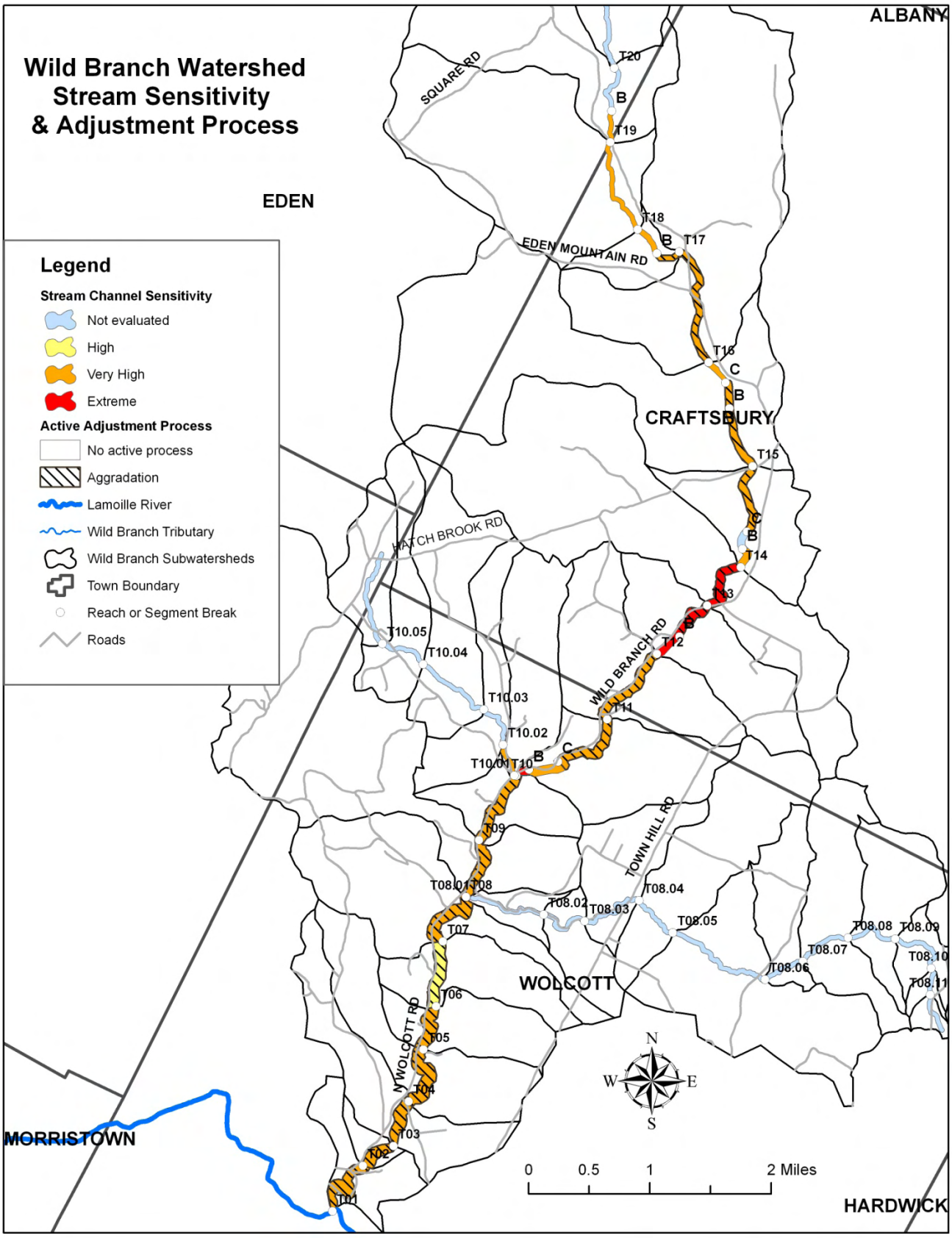

Figure 6.10. Stream sensitivity and current adjustment of the Wild Branch.

7.0 PRELIMINARY PROJECT IDENTIFICATION AND PRIORITIZATION

The departure and sensitivity analyses presented in Section 6.0 of this report provide beneficial background for selecting potential projects that will effectively help the channel return to equilibrium conditions by assessing limiting factors and by identifying underlying causes of channel instability. The stream reaches evaluated in this study present a variety of planning and management strategies which can be classified under one of the following categories: Active Geomorphic Restoration, Passive Geomorphic Restoration, and Conservation.

Active Geomorphic Restoration implies the management of rivers to a state of geomorphic equilibrium through active, physical alteration of the channel and/or floodplain. Often this approach involves the removal or reduction of human constructed constraints or the construction of meanders, floodplains or stable banks. Active riparian buffer revegetation and long-term protection of a river corridor is essential to this alternative.

Passive Geomorphic Restoration allows rivers to return to a state of geomorphic equilibrium by removing factors adversely impacting the river and subsequently using the river's own energy and watershed inputs to re-establish its meanders, floodplains and equilibrium conditions. In many cases, passive restoration projects may require varying degrees of active measures to achieve the ideal results. Active riparian buffer revegetation and long-term protection of a river corridor is also essential to this alternative.

Conservation is an option to consider when stream conditions are generally "good" and nearing a state of dynamic equilibrium. Typically, conservation is applied to minimally disturbed stream reaches where river structure and function and vegetation associations are relatively intact.

There are a number of voluntary programs available for river protection. Two of the primary programs are the Conservation Reserve Enhancement Program (CREP) and the River Corridor Easement (RCE). CREP is a program that helps protect environmentally sensitive land, decrease erosion, and restore wildlife habitat by taking land out of agricultural production. An overview of the Conservation Reserve Enhancement Program is found at http://www.fsa.usda.gov/FSA/webapp?area=home&subject=lown&topic=cep. The River Corridor Easement is designed to promote the long term physical stability of the river by allowing the river to achieve a state of equilibrium (where sediment and water loads are in balance). River corridor easements are vital for a passive geomorphic restoration approach and can also be used for conserving rivers that are in "good" condition (equilibrium). Rivers that are in equilibrium have access to their floodplains and therefore experience less erosion and negative impacts from flooding events. A description of each of the programs prepared by the Vermont River Management Program is provided below.

Conservation Reserve Enhancement Program

- CREP can be either a 15 or 30 year contract to plant trees.

- 90% of the practice costs are covered with the remaining 10% either resting with the participants or could be paid by the US Partners for Fish and Wildlife. Examples of the practice costs include fencing, watering facilities, and trees. There are some costs that are capped, but generally all the practice costs can be paid through the program.
- To provide additional incentives to enroll in CREP, the program offers upfront and annual rental payments for the land where agricultural production is lost during the contract period.

River Corridor Easement (RCE)

- Easements are in perpetuity, meaning the agreement stays with the land forever.
- A onetime payment is received by the landowner for transferal of channel management rights to a second party (a land trust).
- Transferal of channel management rights means that the landowner would no longer be able to rock line river banks or remove gravel for personal use.
- A management plan accompanies the easement outlining the management and land use practices expected to occur within the corridor and describe any accommodations that must be made for existing structures (e.g. outbuildings, stream crossing, etc.).
- A RCE requires a minimum 50 foot buffer that floats with the river. No active land use is allowed within the buffer. The buffer can be actively planted or allowed to revegetate passively.
- The easement does not take away the agricultural land use rights, so the landowner could continue to crop or pasture the farm land mapped outside of the buffer, yet within the corridor, for as long as the river allows.

7.1Watershed-Level Opportunities

Fluvial Erosion Hazard Zones

Of all types of natural hazards experienced in Vermont, flash flooding represents the most frequent disaster mode and has resulted in by far the greatest magnitude of damage suffered by private property and public infrastructure. While inundation-related flood loss is a significant component of flood disasters, the predominant mode of damage is associated with the dynamic, and oftentimes catastrophic, physical adjustment of stream channel dimensions and location during storm events due to bed and bank erosion, debris and ice jams, structural failures, flow diversion, or flow modification by man-made structures. These channel adjustments and their devastating consequences have frequently been documented wherein such adjustments are related to historic channel management activities, floodplain encroachments, adjacent land use practices and/or changes to watershed hydrology associated with land use and drainage.

The purpose of defining Fluvial Erosion Hazard (FEH) Zones is to reduce fluvial erosion conflicts resulting from development in identified fluvial erosion hazard areas and to minimize property loss and damage due to fluvial erosion. Development is prohibited in fluvial erosion hazard areas that pose a danger to health and safety. The basis of a Fluvial Erosion Hazard Zone is a defined river corridor which includes the course of a river and its adjacent lands. The width of the corridor is defined by the lateral extent of the river

meanders, called the meander belt width, which is governed by valley landforms, surficial geology, and the length and slope requirements of the river channel. The width of the corridor is also governed by the stream type and sensitivity of the stream. River corridors, defined through VANR Stream Geomorphic Assessment (2007b), are intended to provide landowners, land use planners, and river managers with a meander belt width which would accommodate the meanders and slope of a balanced or equilibrium channel, which when achieved, would serve to maximize channel stability and minimize fluvial erosion hazards. Information collected during the Phase 2 Assessment including reach sensitivity, reach condition, and stream type is used to develop these zones. Towns have the opportunity to work with the Vermont River Management Program to develop fluvial erosion hazard zones to reduce conflicts within the river corridor.

STORMWATER

Stormwater runoff rates are of particular concern in urbanized and agricultural watersheds because stormwater runs off from impervious surfaces rather than naturally infiltrating the soil. The cumulative effect of the increased frequency, volume, and rate of stormwater runoff results in increases in wash-off pollutant loading to streams and destabilization of stream channels. All potential restoration projects within the Wild Branch watershed should be evaluated in terms of their effects on stormwater.

7.2 Reach-Level Opportunities

A description of each reach/segment is provided in this section along with general recommendations for restoration and protection strategies. The reaches are listed from downstream to upstream. Further details about project types for each reach will be discussed in Section 7.3. The reaches are broken into sections based on floodplain access and evolution stage (see section 5.1).

Section A: Town of Wolcott Reaches with Good Floodplain Access

The lower 2.6 miles are located in a depositional zone and are in stage DII-d of the channel evolution model. This lower section includes reaches T01 through T05, where the channel is not incised.

Reach T01

River Corridor Protection

Wild Branch reach T01 is 3,374 feet in length and begins at the confluence of the Lamoille River and the Wild Branch. It continues north to about 250 feet south of the intersection of Frazer Road and North Wolcott Road. T01 has a very broad valley. As shown in Figure 7.1, this reach is very depositional and has multiple mid channel bars. Erosion is common along the east bank. About 15 percent of the reach has been straightened along roads within the corridor. Hay is the sub-dominant land use within the west corridor, and approximately one-third of the west bank was mapped as having a buffer width of less than 25 feet.

According to Jim Ryan (personal communication, 2010) trees and willows been planted within reach T01 on Vermont Fish and Wildlife Department lands along the west bank. The first set of plantings was supervised by Christa Alexander, Restoration Specialist with the Vermont Fish and Wildlife Department, about five years ago (circa 2005). The Lamoille County Natural Resources Conservation District (LCNRCD) was responsible for the second round of plantings that were installed below the railroad crossing in 2006. This location on the Wild Branch is really incised, and trees were planted on top of a historic berm located on the west bank. This berm was not mapped by Bear Creek Environmental, LLC during the Phase 2 assessment in 2007, but was noted by South Mountain Research and Consulting Services in 2001 (South Mountain Research & Consulting Services, 2002). The berm may have been hidden by vegetation at the time of the field work in 2007.

The lower end of reach T01 is one of the twelve areas that have been identified as a gravel mining area. The areas of buffer less than 25 feet and areas that have been gravel mined have decreased boundary resistance. Bank armoring is prevalent along the west bank (40 percent of the channel length) and is especially noticeable on the outside of meander bends. The armoring has been put in place to attempt to reduce the major planform adjustment that is occurring within the reach. The ledge downstream of the Route 15 Bridge in reach T01 provides a localized vertical grade control (Figure 7.2).

Figure 7.1. Mid channel bar near confluence with the Lamoille River in Reach T01

Figure 7.2. Downstream end of Route 15 Bridge showing deposition and ledge grade control within Reach T01

The rapid geomorphic assessment (RGA) scored in the "fair" category due to minor historic degradation, minor widening and major aggradation and planform adjustment. This reach is a "C" gravel dominated segment with relatively good floodplain access. The rapid habitat assessment (RHA) rated in the "fair" category. Cover for fish, embeddedness, sediment deposition, and bank stability and riparian vegetative width on the west side were rated as fair. Riparian vegetative width on the east bank was rated as reference, indicating this may be a good area for buffer protection. T01 is an important attenuation reach and is recommended for river corridor protection.

Reach T02
River Corridor Protection

T02 begins about 250 feet north of the intersection of Frazer Road and North Wolcott Road and extends upstream for 1,833 feet. The valley is narrower in T02 than the upstream (T03) or downstream (T01) reaches. T02 is a gravel dominated "C" channel that has an entrenchment ratio that borders on a "B" channel. The low entrenchment ratio is due to an old terrace/field and the wide channel width at the cross section location (Figure 7.3). No human caused changes in valley confinement were noted in this reach.

A couple of mid-channel bars, diagonal bars, and steep riffles were mapped in Reach T02, indicating this reach is also depositional. The dominant buffer width on the west side of the channel is greater than 100 feet in width; however, areas adjacent to North Wolcott Road have buffer widths between 51 and 100 feet. The dominant buffer width on the east bank is 51 to 100 feet; about one-third of the east bank has buffers less than 25 feet. These areas of minimal buffer are associated with hay fields. CREP is one possible program that could be used to improve water quality in Reach T02 by establishing buffers adjacent to hay fields.

Figure 7.3. Reach T02 has a wide depositional channel in this cross section location.

The RGA rated in the "fair" category as aggradation is a major process and widening and planform adjustment were identified as minor processes. The RHA, however, scored in the "good" category with velocity/depth patterns, channel alteration and frequency of riffles getting a rating of reference. This indicates Reach T02 is providing habitat diversity. Fish cover, substrate embeddedness, sediment deposition, and riparian buffer width along the east bank were rated as fair.

Reach T03
River Corridor Protection

The total length of Reach T03 is 2,263 feet. The upper end of the reach is located about 200 feet upstream of the Gulf Road Bridge. T03 has a very broad valley with only a minor human-caused change in valley confinement from North Wolcott Road and Gulf Road. There is abundant bedrock at the downstream end of the reach, but no ledge that completely spans the channel to act as a grade control. The Gulf Road Bridge is a channel constriction, which is resulting in deposition of sediment above and scour below the structure. Multiple revetments, including minor rip rap and hard bank stabilization are found in the vicinity of the bridge crossing. The span of the Gulf Road Bridge is approximately 50 percent of the bankfull channel width (Figure 7.4).

Reach T03 is also depositional. A mid-channel bar, four diagonal bars, and four steep riffles indicate aggradation is an important process. The RGA rated in the "fair" category due to major aggradation, minor widening and planform adjustment. The RHA scored at the low end of the "good" category. The frequency of riffles, bank vegetative protection, and riparian zone width (buffer) scored in the reference category. With the exception of Gulf Road, Reach T03 is a good distance from roads and the dominant buffer width is greater than 100 feet along both banks (Figure 7.5). Very little bank erosion was mapped within Reach T03, showing the importance of high quality buffers with root structure that holds the soils in place. Fish cover, embeddedness, sediment deposition, channel alteration are parameters that were rated in the "fair" category.

Figure 7.4. Rip rap and hard bank armoring is associated with the Gulf Road Bridge in Reach T03. The bridge is resulting in deposition of sediment.

Figure 7.5. Reach T03 has a dominant buffer width of greater than 100 feet.

Reach T04
Streambank Plantings
River Corridor Protection
Alternatives Analysis for Berm Removal

Wild Branch reach T04 starts above the Gulf Road crossing and extends upstream 3,629 feet to the Wild Branch Lane Bridge. The Wild Branch Lane Bridge at the top of the reach has a span that is similar to the bankfull channel width. No significant geomorphic compatibility issues were noted as a result of this stream crossing (Figure 7.6).

The valley confinement is very broad and there is a minor human-caused change in valley width due to North Wolcott Road. Residential land use adjacent to North Wolcott Road dominates the riparian corridor on the west side, while forest dominates the corridor on the east. Approximately one-fourth of both banks have buffers less than 25 feet in width. The dominant buffer width is 26-50 feet on the west bank and 51-100 feet on the east bank. Some clay (cohesive material) was noted in the stream banks, but overall the banks were of non-cohesive material (cobble on the lower banks and sand on the upper banks). Bank erosion is moderate and averages 30 percent for the two banks. There is a mass failure

downstream of where the Wild Branch flows away from North Wolcott Road (Figure 7.7) near the upstream end of the reach. This mass failure is about 15 feet high by 40 feet wide.

Large depositional features were noted in reach T04 indicating significant aggradation is occurring. The RGA scored "fair" with aggradation and planform adjustment as major processes and widening as a minor process. Channelization along North Wolcott Road near the upper end of the reach, moderate sediment deposition, poor substrate embeddedness, fair bank stability, and narrow buffer widths are all factors that contribute to a RHA score of "fair".

A short berm approximately 170 feet in length is located along the east bank at the downstream end of reach T04 (just upstream of Gulf Road). Additional assessment work is recommended to determine if removal of this berm would be beneficial. Protecting the river corridor and buffer improvement is important for providing long term stability in this reach.

Figure 7.6. The Wild Branch Lane Bridge is a floodprone constriction and not a channel constriction.

Figure 7.7. A mass failure about 15 feet high is on west bank where the Wild Branch flows away from North Wolcott Road in reach T04.

Reach T05
Streambank Plantings
River Corridor Protection

T05 is the fifth and final reach that is grouped in with the lower section where the channel is not incised (i.e. stream has good floodplain access) and the major process is aggradation. The channel is gravel dominated "C" channel. The reach begins just upstream of Wild Branch Lane and continues upstream for 2,622 feet. North Wolcott Road is within the corridor along 85 percent of this reach. This has resulted in a significant human-caused change in valley confinement from very broad to broad. Straightening has occurred along 15 percent of the reach and is most noticeable upstream of Heath Road, where North Wolcott Road runs close to the Wild Branch.

Approximately one-fourth of the west bank has buffers less than 25 feet in width with a dominant buffer width of 26-50 feet on that side. The dominant buffer width on the east side is greater than 100 feet. Residential land use is the dominant land use within the west corridor, while the east corridor is primarily forested. Gravel mining was indexed in a general location in this reach based on LCPC's interviews with the DEC. Moderate bank erosion was noted within the reach with moderate to high lateral bank erosion on most outside bends. Streamside plantings are recommended in this reach to improve bank stability.

Reach T05 is characterized as having large depositional features, such as the mid-channel bar shown in Figure 7.8. Multiple mid-channel and diagonal bars are present within the reach. There is evidence of channel migration, including a channel avulsion. The geomorphic condition of the channel is "fair" based on the RGA. Aggradation and planform adjustment are major processes, while widening appeared to be a minor process. The stream condition rating for habitat also is "fair". Fair substrate embeddedness, heavy deposition of sediment, fair bank stability on the east bank, and a dominant riparian buffer of 26-50 feet on the west bank are all contributing to the "fair" habitat condition.

Figure 7.8. Reach T05 has large depositional features with aggradation as the primary process.

Section B: Town of Wolcott Reaches with Fair Floodplain Access

Section B includes reaches T06 through T08, where the channel is moderately incised and the existing stream type is the same as the reference stream type. This 1.8 mile long section is a transition point between the severely incised middle reaches and the lower depositional reaches. Section B is best characterized as stage III of the F channel evolution model with minor to moderate historic incision, current major aggradation and planform adjustment, and minor to major widening.

Reach T06

Buffer Restoration
River Corridor Protection

The stream type for Reach T06 is a cobble dominated "C" channel. The reach is 3,013 feet in length. The middle of the reach is near the Greenwood Road and North Wolcott Road intersection. The valley confinement is broad and there is a minor human-caused change in channel confinement from the North Wolcott Road. The Wild Branch runs along the eastern valley wall for the entire reach. It appears that the virtually the entire channel length was historically straightened. This was likely done to keep agricultural fields dry.

The dominant land use for the east river corridor is forest, while the west river corridor that runs parallel to North Wolcott Road is mostly residential with some hayfields (recreation fields). Over a quarter of the west buffer is less than 25 feet in width. Moderate to high scour and erosion was noted at the base of both banks, with stream bank erosion especially prevalent on the west bank (approximately 75% of the bank with erosion). Buffer restoration in the form of natural regeneration or low cost plantings would greatly enhance this reach. Tamarack Brook is contributing considerable sediment to the Wild Branch due to excessive lateral migration and For this reason, reaches T07 through T0 are high priority for river corridor protection.

Historic gravel mining and extensive straightening of this reach likely contributed to channel adjustments that resulted in the downcutting of the bed leading to minor historic degradation. This reach is currently undergoing major aggradation and planform adjustment and minor widening. Multiple diagonal bars and steep riffles were mapped in the reach (see Figure 7.9). Both the RGA and RHA were rated as "fair" condition. Poor cover for fish, high substrate embeddedness, moderate deposition of sediment, a narrow riparian buffer on the west bank and poor bank stability on the west bank are factors contributing to the RHA score of "fair".

Figure 7.9. Reach T06 has multiple steep riffles and diagonal bars indicating sediment is building up.

Reach T07

Buffer Restoration
River Corridor Protection

Reach T07 is 3,706 feet in length and ends at the confluence with Tamarack Brook (T8.01). The reach is "C" gravel dominated, riffle-pool channel. North Wolcott Road runs parallel to the Wild Branch resulting in a significant human-caused change in channel confinement in this reach from very broad to broad. Slightly more than 10 percent of the reach has been straightened and armored. This straightening and armoring is primarily associated with North Wolcott Road.

The east bank has a buffer width of greater than 100 feet along the entire reach, and the dominant corridor land use is forest. The west corridor is largely residential. Buffer widths of less than 25 feet are present along approximately half of the reach. Reach T07 had moderate to high scour and erosion along both banks, with erosion along one-third of the west bank. Some areas of bedrock were noted along the east bank, resulting in an increase in boundary condition.

Large depositional features and flood chutes are common within reach T07. The channel bankfull width measured at the cross section (94.9 feet) is substantially wider than the reference bankfull channel width of 63.1 feet as shown in Figure 7.10. The channel dimensions suggest widening is occurring and explains why the stream channel is aggrading. Historic degradation, current aggradation, widening and planform adjustment are all major processes in reach T07. The geomorphic stream condition was rated as "fair". The channel is just beginning to create a juvenile floodplain at a lower elevation. The RHA was also rated as "fair". Fair substrate embeddedness, and sediment deposition, bank stability (west bank) and riparian buffer zone (west side) are contributing to the "fair" RHA score.

Figure 7.10. Typical wide cross section in reach T07.

Reach T08
Buffer Restoration
River Corridor Protection

The North Wolcott road parallels the Wild Branch within reach T08 and is a corridor encroachment along the west side in almost 90 percent of the reach. The downstream end of the reach starts at the confluence of Tamarack Brook and continues upstream to about 900 feet north of the intersection of Homers Road and North Wolcott Road for a total reach length of 3,024 feet. The reference and existing stream type is a "C" riffle-pool channel that is gravel dominated.

The close proximity of North Wolcott Road to the Wild Branch has resulted in a significant human-caused change in channel confinement from a very broad to a broad valley. About one-third of the reach has been historically straightened with bank revetments extensive on the west bank where the Wild Branch is close to North Wolcott Road. The proximity of the road to the river has made gravel mining convenient. Minor bar scalping was noted during the Phase 2 assessment. The Tamarack Brook crossing was identified in Section 5.2 as being a moderate priority for replacement. The span relative to the bankfull channel width is 62 percent. Sediment transport problems in the form of deposition above and below the structure were noted during the Phase 2 assessment. Hard bank armoring in the vicinity of the Tamarack Bridge is shown in Figure 7.11.

Approximately 50 percent of the west bank and 60 percent of the east bank in reach T08 have riparian buffer widths of less than 25 feet. The dominant and subdominant land use within the west corridor is residential and hay, respectively. The eastern corridor is primarily hay and pasture. Herbaceous vegetation dominates the riparian corridor on both

sides. Figure 7.12 shows bank failure on an outer bend where the buffer is less than 25 feet in width.

The channel in reach T08 is moderately incised. The RGA scored "fair" with minor historic degradation, and major aggradation, widening and planform adjustment. Similar to reach T07, reach T08 is overwide with moderate to high scour and erosion at the base of both banks. Moderate to high lateral bank erosion on most outside bends is also prevalent. The RHA also scored in the "fair" range due to a number of factors including: substrate embeddedness, sediment deposition, channel alteration, bank stability and buffer widths.

Figure 7.11. Sediment deposition upstream Tamarack Road Bridge. The bridge is undersized relative to the bankfull channel width and has poor alignment.

Figure 7.12. Bank failure on outside bend in reach T08 where the buffer is less than 25 feet in width.

Section C: Town of Wolcott and Craftsbury Reaches with Poor Floodplain Access

Reaches T09 and T10 in Wolcott and T11 through T13 in Craftsbury are moderately to severely incised and have undergone a stream type departure. This means the existing stream type is different than the reference stream type. This 4.2 mile long section is best characterized as stage III of the F channel evolution model with major to extreme historic incision. Aggradation, widening, and planform adjustment range from minor to extreme in Section C. It is critical that no further roads and development occur with the river corridor in this section. The implementation of FEH zones is highly recommended along the entire Wild Branch mainstem and major tributaries to prevent further loss of floodplain.

Reach T09
River Corridor Protection (FEH Overlay District)

The downstream end of Reach T09 starts about 850 feet upstream of the intersection of North Wolcott Road and Homers Road. The reach is ¾ of a mile in length. North Wolcott Road runs parallel to the Wild Branch within the river corridor for about half of the reach length and results in a significant human-caused change in channel confinement (from very broad to broad) within reach T09 (Figure 7.13). The channel has undergone a stream type departure from a "C" reference stream type to an existing stream type of "Bc" that is more entrenched. The Wild Branch is severely incised (incision ratio of 2.3) within the reach, and has lost access to its historic floodplain. BCE spoke with a landowner within this reach during the phase 2 fieldwork. This landowner mentioned the west bank floods in approximately a 100 year event, and is not accessed during a bankfull event that occurs on a frequency of 1 to 2 years. Although there used to be a much wider bench on the west side, the riparian landowner mentioned this bench has been lost to erosion.

Figure 7.13. Rock riprap along North Wolcott Road in reach T09

Woody vegetation to help reduce bank erosion is lacking on the west bank. Almost 40 percent of the reach has a buffer width of less than 25 feet on the west bank. Buffers of less than 25 feet are less common along the east bank, which has a dominant buffer of over 100 feet in width. Residential is the dominant corridor land use on the west side, while forest is dominant adjacent to the east bank. Mass failures and minor to moderate bank erosion are sources of sediment to downstream reaches. Historic gravel mining in this reach may have also disrupted the native vegetation and led to increased stream power and channel incision.

Reach T09 is undergoing major aggradation, widening and planform adjustment. The RGA scored at the low end of the "fair" category. Some channel widening has already occurred, as evidenced by the existing bankfull width being significantly wider than the reference channel width and the high width to depth ratio of 31.5. T09 has a number of steep riffles and diagonal bars with at least one mapped mid channel bar. The channel is responding to a major alteration of channel planform from channel straightening and the reduction in the width of the floodprone area from floodplain encroachments, such as the North Wolcott Road. These activities have set off a chain of planform adjustments leading to flood chutes and a channel avulsion. The historic degradation has led to a weak riffle-pool channel with a bed profile that is dominated by runs. This lack of deep pools carries over to the habitat assessment as the RHA also rated as "fair". Fair fish cover, moderate sediment deposition, exposed riffle substrates from an overwide channel, channel alteration, and poor vegetative

cover and riparian zone on the west side are all contributing factors to the "fair" habitat conditions.

Reaches T09 and T10 are within the North Wolcott Village. Multiple property owners in the Village make river corridor protection in the form of river corridor easements impractical. The development and adoption of FEH zones within North Wolcott Village is a high priority for protecting the corridor from further development in a section of the river that already has significant encroachments within the corridor. This will go a long way towards improving geomorphic stability and reducing conflicts with the river and property damage from fluvial erosion.

Reach T10

River Corridor Protection (FEH Overlay District)

Reach T10 is the most upstream reach that falls completely within the Town of Wolcott. This reach was split into three segments due to differences in channel dimensions (i.e. difference existing stream types).

Segment T10-A is the most downstream of the three segments and begins just above the intersection of Morey Hill Road and North Wolcott Road, where a major tributary enters the Wild Branch. The 611 foot long segment is almost entirely channelized along North Wolcott Road. Rock riprap armors the west bank along 75 percent of the reach. This channelization has increased sheer stress and stream power resulting in degradation of the stream bed. This has led to a stream type departure from a C, riffle–pool to an F plane bed due to encroachments and lack a developed floodplain.

Figure 7.14. Segment T10-A has been extensively straightened and riprapped along the entire length.

Extreme historic degradation and minor aggradation, widening and planform adjustment explain the channel adjustment processes for Segment T10-A. The channel is incised and has been prevented from going through a widening process due to riprap along North Wolcott Road (Figure 7.14). Both the RGA and the RHA rated as "fair" condition.

Figure 7.15. Stream channel in the vicinity of the cross section within segment T10-B.

North Wolcott Road also is within the corridor for the entire length of segment T10-B, but the river is not in as close proximity to the road as T10-A. The channel has been straightened and ripraped along North Wolcott Road for about 20 percent of the segment length. The channel is not as incised in

segment B, as it is in segment A. However, there is still a stream type departure from a "C" channel to a "Bc" channel. The channel in the vicinity of the T10-B cross section is shown in Figure 7.15.

The RGA received a rating of "fair" condition for segment T10-B. This segment has undergone major historic degradation and is currently undergoing minor aggradation, widening and planform adjustment. The RGA scored within the high end of the "fair" category, indicating the habitat was slightly better than some of the adjacent segments. The wider buffers and cohesive bank materials on the lower east bank are factors which likely contributed to less erosion in this segment.

The most upstream segment within reach T10 (T10-C) is a weak riffle-pool "C" channel. This is the only segment within Section C with poor floodplain access that does not have a stream type departure. In other words, the reference stream type is the same as the existing stream type. Nonetheless, the channel within T10-C is moderately incised, and the segment has only fair floodplain access. The channel is much wider than the reference channel width. North Wolcott Road runs parallel and in close proximity to the Wild Branch at the lower end of the segment. This has resulted in a significant human-caused change in valley confinement from a very broad to a broad valley.

Figure 7.16. A mass failure along the east bank of segment T10-C contains clay soils. A diagonal bar is shown in the foreground of the photo above.

Some localized areas within segment T10-C have clay soils along the bank. One such area is a mass failure on the east bank in the mid to upper end of the segment (Figure 7.16). Diagonal bars and steep riffles are prevalent within the segment, suggesting aggradation is a dominant adjustment process. Major historic degradation has led to stream widening. A juvenile floodplain is starting to develop at a lower elevation than the historic floodplain. The segment is moving from stage F-III to F-IV of the channel evolution model. Both the RGA and RHA rated as "fair" condition. Sediment deposition and channelization have led to poor habitat diversity. The segment had few areas with deep water that could provide habitat for trout and other resident fish.

Reach T11

The lower end of reach T11 begins just south of Cote Road in Wolcott and extends upstream 4,423 feet to the southern end of Glenn Anderson Loop in Craftsbury. This reach has undergone a stream type departure from a "C" riffle-pool channel to a "Bc" channel with a weak riffle-pool bedform. The entrenchment ratio was near the cut-off between a "B" and "C" channel. The North Wolcott Road becomes the Wild Branch Road in Craftsbury. The North Wolcott Road or Wild Branch Road run parallel to the Wild Branch within the river corridor for almost the entire reach length, and has resulted in a

significant human-caused change in channel confinement from a very broad to a broad valley. Riprap is found for 600 feet along the west bank where the Wild Branch and North Wolcott Road are in close proximity to each other. According to Ryan (2001), the Wild Branch Road was relocated just north of the Craftsbury-Wolcott Town line as part of a major road relocation and paving project in the 1960s and 1970s to reduce road curvature (Figure 7.17). The road project significantly reduced the width of the active floodplain of the Wild Branch as shown in the historical orthophoto analysis (see Figure 7.18) conducted by South Mountain Research & Consulting Services.

Localized and active gravel scalping on point bars was noted by river scientists during the fall 2007 Phase 2 assessment. Both mass failures and bank erosion are contributing sediment to the Wild Branch within reach T11 (Figure 7.19). Extreme historic degradation has led to current extreme aggradation, widening and planform adjustment. The stream is very wide and had a width to depth ratio of 48.2 at the representative cross section. Extreme planform adjustment is apparent from the numerous diagonal bars that are located upstream of bends, split flow in the form of mid-channel bars and braiding is common, and numerous flood chutes (Figure 7.20). Reach T11 is experiencing heavy deposition of sediment with filling of pools. The Wild Branch is cutting back through the depositional material in some locations. The stream condition based on the RGA is "poor". The habitat condition was rated as "fair" using the RHA. Cover for fish and sediment deposition are habitat parameters that scored in the "poor" category.

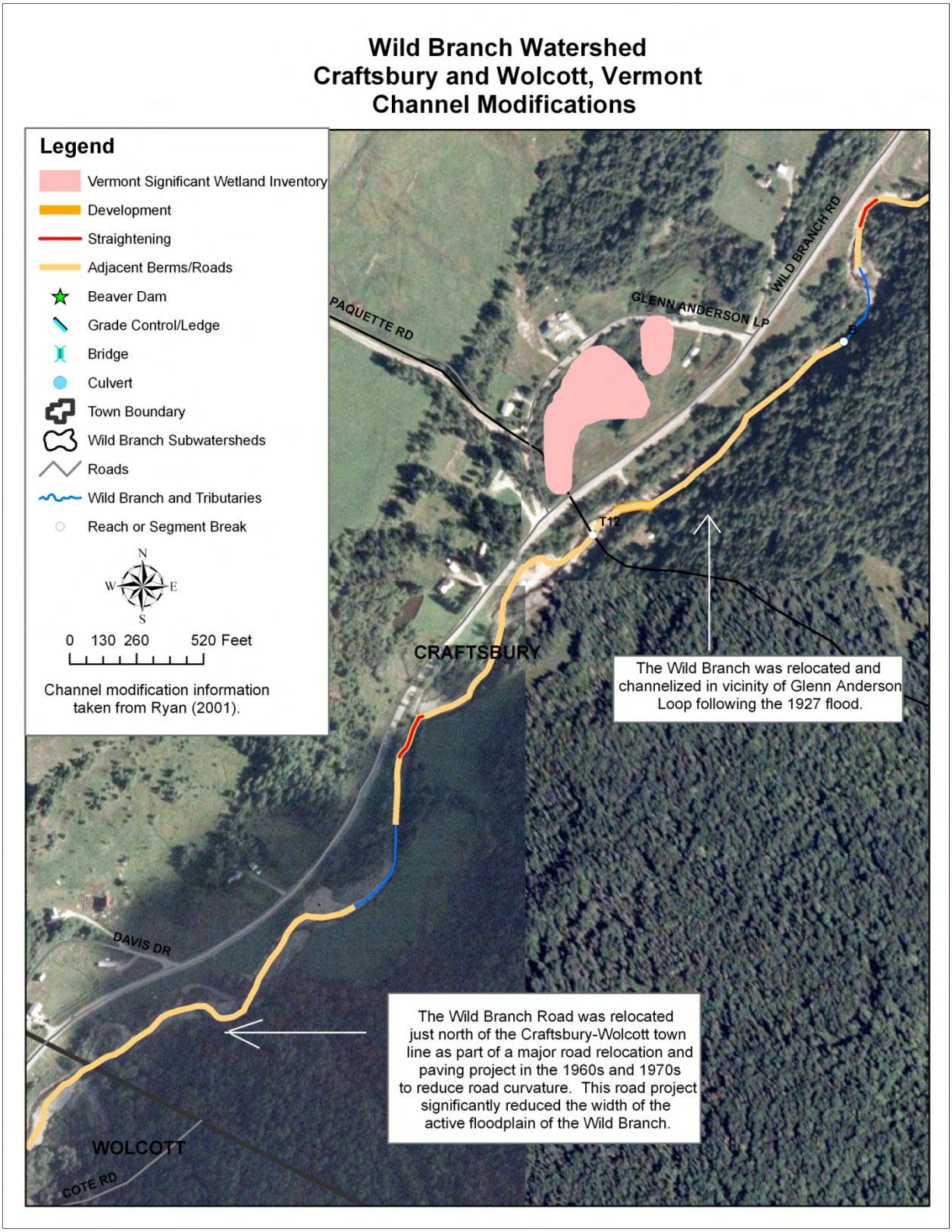

Figure 7.17. Historic channel modifications and the relocation of the Wild Branch Road in Craftsbury have significantly reduced the width of the active floodplain.

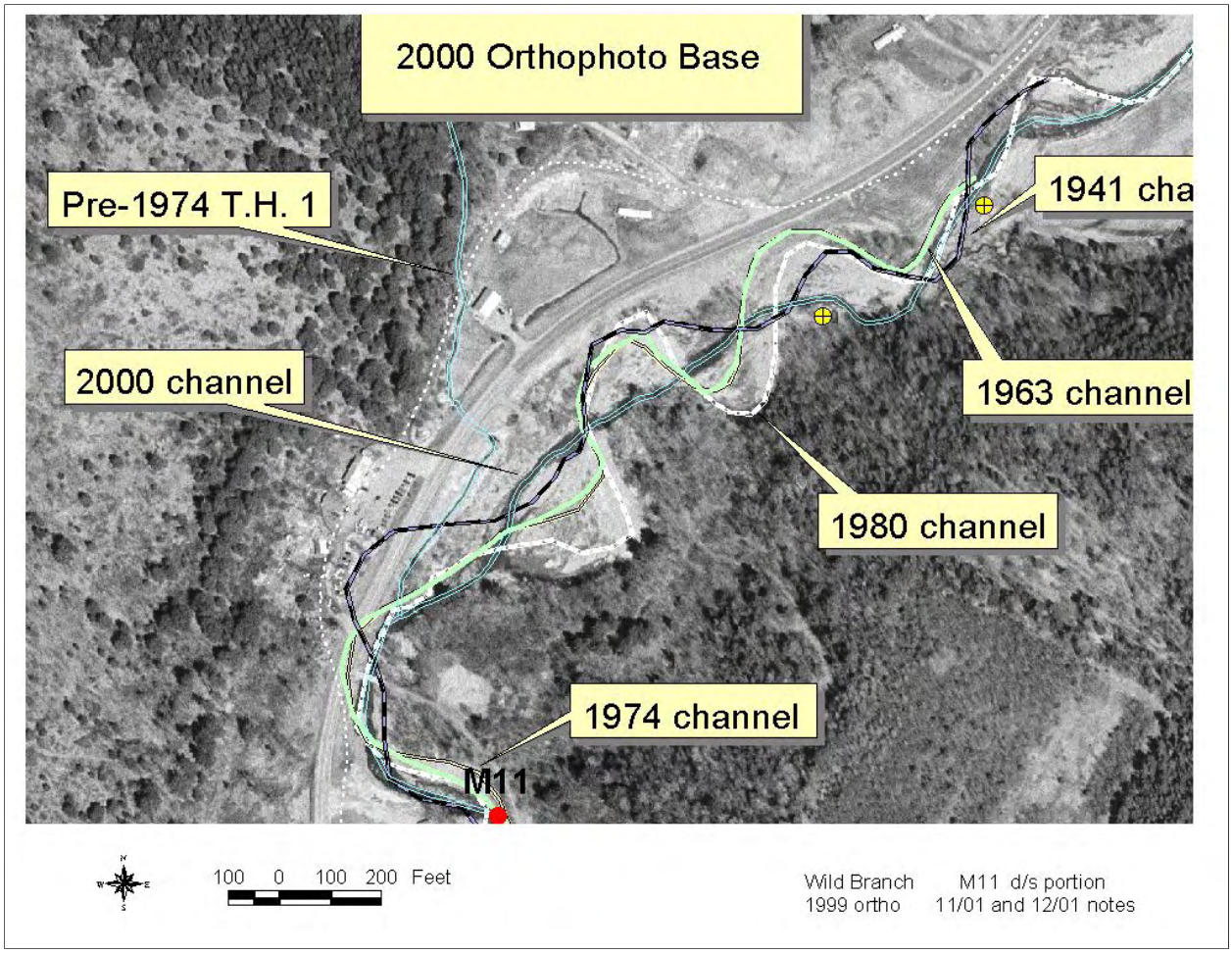

Figure 7.18. The active flooplain of the Wild Branch was significantly reduced by the road relocation that occurred in the 1960s and 1970s. The location of the Wild Branch has changed considerably over time. This image is provided courtesy of South Mountain Research & Consulting Services.

Figure 7.19. A mass failure approximately 15 feet high and 150 feet wide is located along the west bank of reachT11.

Figure 7.20. Split flow (braiding) is occurring within reach T11.

Reach T12
Arrest Possible Active Incision

Reach T12, which is about ¾ of a mile in length, was split into two segments based on a change in banks and buffers. The lower segment T12-A starts at the southern end of Glenn Anderson Road and extends to the northern end of Glenn Anderson Road. Segment T12-B continues just west of Denton Hill where the river flows under Wild Branch Road. Both segments are currently entrenched F channels that are a stream type departure from a "C" reference channel.

Although segment T12-A is very straight and lacks meanders, there was no evidence of bank revetments along the stream. Based on research from Ryan (2001), the Wild Branch was relocated and channelized in the vicinity of Glenn Anderson Loop following the 1927 flood. It appears the Wild Branch used to run through a wetland on the opposite side of Wild Branch Road from where the Wild Branch is currently flowing (Figure 7.17). The Wild Branch is channelized just upstream of this segment, and extreme historic incision both upstream and within T12-A has led to a straightened planform (Figure 7.21).

No buffers less than 25 feet were mapped within segment T12-A, although bank erosion was present on both the west and east banks for approximately half of the segment. The east bank frequently contains clay material, but this was not the dominant bank texture in the segment. The dominant buffer width is greater than 100 feet on the east bank and 26-50 feet on the west bank.

Segment T12-A deviates from its reference bedform of riffle-pool and is currently plane bed. The segment is experiencing moderate deposition of sediment, which is contributing to lack of deep habitat (pools). The stream condition based on both the RGA and RHA is "fair". Adjustment processes include: extreme historic degradation, minor aggradation and planform adjustment and major widening.

Segment T12-B also has undergone extreme historic degradation, but is in "poor" geomorphic condition. There is active and extreme widening occurring (e.g. numerous mass failures as shown in Figure 7.22) and major aggradation and planform adjustment. The RHA scored in the "fair" category. Fish cover, embeddedness, diversity of velocity/depth patterns, sediment deposition, channel flow status, bank vegetative protection along both banks, and width of the west riparian buffer are habitat parameters that received a "fair" rating.

Both South Mountain Research & Consulting (2002) and Ryan (personal communication, 2010) noted active incision within segment T12-B. Additional assessment and fieldwork are recommended in reach T12 to determine if degradation is an active process. If there is an active head cut, installation of rock weirs or other restoration measures are recommended to stabilize the elevation of the bed and provide vertical stability within the reach.

Figure 7.21. Typical incised channel in segment T12-A.

Figure 7.22. Debris jam in front of clay, east bank of T12-B. Mass failures as shown in this photo were common along the east bank.

Reach 13 is the most upstream reach in Section C, where the Wild Branch has poor floodplain access. Reach T13 has undergone a stream type departure from a "C" channel with good floodplain access to an entrenched "F" channel that is incised as shown in Figure 7.23. The entrenchment ratio was on the border between an "F" and "B" channel. The Wild Branch Road is also present within the river corridor at the downstream end of the reach (last 790 feet). There is only a minor human-caused change in channel confinement but no change in valley type, which is very broad by reference. The channel has undergone extreme historic degradation and is currently experiencing minor planform adjustment and major aggradation. Moderate to high lateral bank erosion was noted on most outside bends. Both the RGA and RHA resulted in a rating of "fair" condition.

Figure 7.23. The channel in reach T13 is a stream type departure from reference condition.

A recent restoration and enhancement project was completed within Reach T13 on the western side of the Wild Branch near Denton Hill Road. The project was funded through CREP and the Trees for Stream Program. The LCNRCD was responsible for the tree plantings.

Section D: Craftsbury Reaches with Fair Floodplain Access

Section D includes reaches T14 through T19. For the most part there is only minor intrusion within the corridor from roads and development within Section D. The reaches are surprisingly incised given the minimal corridor encroachments in the upper watershed. Reaches T14 through T18 are characterized as having incision ratios between 1.4 and 2.0. These reaches have fair floodplain access. All of the moderately incised segments have reference stream types and existing stream types that are channels with gravel dominated

substrate with the exception of segment T17-B. The lower segment of reach T19 is severely incised (incision ratio of 2.89) and is a stream type departure.

Reach T14
River Corridor Protection
Buffer Plantings
Bridge Assessment and Possible Replacement

The most downstream reach (T14) in Section D is a mile in length. T14 ends near the Hatch Brook Road stream crossing and was segmented into three parts because of active beaver activity in the middle of the reach. River Corridor Protection is recommended to prevent development of roads, houses and other infrastructure within this relatively undeveloped river corridor.

T14-A, the most downstream segment, has a remnant beaver dam at the upstream end of the segment that is no longer impounding the channel. There are no corridor encroachments and no buffers less than 25 feet in width. Bank erosion is found along about 1/3 of the length of the channel on both sides of the brook. Forest dominates the east corridor while hay is the dominant corridor land type on the west side. As shown in Figure 7.24, trees are the dominant buffer vegetation on both sides of the channel.

Both the RGA and RHA resulted in a score in the high "fair" range. The channel has undergone minor historic incision and is currently undergoing minor aggradation, widening and planform adjustment. The habitat is generally better than downstream reaches with good fish cover and a lack of channelization that brings greater habitat diversity in terms of velocity depth patterns and frequency of riffles. Moderately unstable stream banks, a dominant buffer width of 25-50 feet on the west bank, fair embeddedness and moderate deposition of sediment are factors that contributed to a "fair" score for habitat condition.

Figure 7.24. Wooded buffer adjacent to channel in reach T14-A. Dominant buffer widths are greater than 100 feet on the east bank and 26-50 feet on the west side.

Segment T14-B was not assessed due to a beaver dam that was impounding the channel (Figure 7.25). This segment was too deep to be able to wade in the stream, and water backed up for the length of the segment. There is farm land on both sides of the Wild Branch. A private farm bridge is a stream crossing within this segment (Figure 7.25).

Figure 7.25. This beaver dam is impounding the channel in segment T14-B.

Figure 7.26. Farm bridge in T14-B with a span of 25 feet and a clearance of 5 feet.

Segment T14-C is a 2/3 mile long reach with Hatch Brook Road at the upper end. There is evidence of a remnant beaver activity in this segment. A Christmas tree farm is located in the west corridor. There is some minor corridor encroachment in the form of development; however, no roads lie within the river corridor. The entrenchment ratio makes the existing stream channel on the border between a "C" and a "Bc" stream type.

The Hatch Brook Road bridge has a span that is approximately half the reference and measured bankfull width and represents a significant channel constriction. The alignment of the structure may also be an issue. It is recommended that a bridge and culvert assessment using the VT River Management's protocol be conducted to better evaluate geomorphic compatibility of this structure. This evaluation is especially important given the geomorphic instability in this segment.

Figure 7.27. The bank erosion in segment T14-C is evidence that the stream channel is widening in response to incision.

T14-C has undergone major historic incision and is currently undergoing major aggradation, widening (see Figure 7.27), and planform adjustment. The dominant active adjustment process for the segment T14-C is planform. The planform adjustment is apparent from the moderate to high lateral bank erosion on the most outside bends, multiple flood chutes, and additional depositional and scour features in the channel. The RGA and the RHA both scored in the "fair" range.

Reach T15
River Corridor Protection

Reach T15 starts just upstream of the Hatch Brook Road Bridge and extends upstream about one mile. The reach was split into three segments based primarily on a change in depositional features. The valley width and grade control were additional factors that were considered as part of segmenting. This is one of the few reaches on the Wild Branch where there are no corridor encroachments. All three of the segments in reach T15 are "C" channels both existing and by reference.

The lower segment (T15-A) is by far the most depositional of the three segments and has the widest valley (1,250 feet). Segment T15-A not only has large depositional features, but also has multiple diagonal bars and steep riffles suggesting aggradation is a major process in this segment (Figure 7.28). Generally, buffers are good within segment T15-A. The dominant buffer width on the west bank is greater than 100 feet. The dominant and subdominant buffer widths on the east side are 26-50 feet and greater than 100 feet, respectively. The west corridor is primarily forested, while the east bank has a dominant corridor land use of pasture.

Figure 7.28. Segment T15-A has multiple diagonal bars and large depositional features.

Segment T15-A has undergone major historic incision. The channel is just starting to develop a floodplain bench. Active adjustment processes include major aggradation and minor widening and planform adjustment. The RGA and the RHA received a score of "fair" condition. Habitat scores for embeddedness, sediment deposition, and channel flow status reflect the deposition that is occurring within this segment.

T15-B is a very short (1,152 foot) segment that appears to be naturally straight (Figure 7.29). There are no roads within the corridor and no evidence of channel straightening. No bank revetments were noted in the field to suggest historic or recent channel straightening had taken place. Stream buffers are generally greater than 100 feet along both banks and the dominant buffer vegetation is mixed trees, making for a healthy riparian buffer. In a few areas, the buffer width on the east side of the channel is 51 to 100 feet. Forest dominates both the east and west corridor, and hay is the subdominant corridor land use within the east corridor.

The channel adjustment processes in T15-B include: major historic incision, major aggradation and minor widening. Riffles are sedimented and there are very few deep pools. There was one major steep riffle in this segment. With the exception of major active aggradation, the geomorphic condition was better than the downstream segment and was scored at the high end of the "fair" range. The habitat was also better than T15-A with the RHA scoring "good". None of the ten habitat parameters making up the RHA scored in the fair or poor category.

Figure 7.29. Segment T15-B is naturally straight.

Segment T15-C differs from the lower two segments in reach T15 because of the narrow valley confinement and ledge grade control structures. There is evidence of two old dam abutments near the ledge grade controls (Figures 7.30 and 7.31)

Figure 7.30. Remnants of possible historic dam in segment T15-C.

Figure 7.31. Ledge in segment T15-C is acting as a grade control.

It is likely that the Wild Branch historically incised down to the elevation of the ledge because the channel is moderately incised. The Wild Branch within segment T15-C is currently undergoing minor aggradation, widening and planform adjustment. Similar to segment T15-B, the geomorphic stability within the segment is better than many of the other reaches/segments assessed and is at the high end of the "fair" range for geomorphic condition. The habitat was also superior to most of the other reaches with the RHA resulting in a score of "good". Bank stability on the west bank was the only parameter that was scored in the fair or poor range. T15-C had a diversity of velocity depth patterns, a good frequency of riffles and a mix of fish habitat cover. The lack of channelization in this segment contributed to the greater habitat diversity.

Reach T16
River Corridor Protection
Bridge Assessment and Possible Replacement

Reach T16 is just over 6,000 feet in length. The reach extends from the uppermost ledge grade control in segment T15-C to the northern most Collinsville Road stream crossing. Two other bridges are located in reach T16 (the southern Collinsville Road crossing and a private farm bridge). The northern Collinsville Road Bridge (most upstream) was noted during the Phase 2 assessment to have significant geomorphic compatibility issues (see Section 5.2) and is recommended for replacement. The valley type is very broad; there is minor human-caused change in valley confinement from Collinsville Road. Approximately 2,000 feet of the Wild Branch has been historically straightened due to the stream crossings and the close proximity of Collinsville Road to the Wild Branch. There was evidence of minor bar scalping on many large point bars at the time of the Phase 2 assessment in October 2007.

The moderate incision ratio (1.52) and the high width to depth ratio (30) indicate reach T16 is in late stage III of the channel evolution model. Both the RGA and the RHA scored "fair". The Wild Branch has undergone major historic degradation and currently aggradation and widening are the primary adjustment processes within the reach. Tributaries are also affected by the lowering of the bed of the Wild Branch. As the bed of the main stem is lowered, head cuts begin at the mouth of the tributary thereby "rejuvenating" the tributary. As shown in Figure 7.32, a tributary to the Wild Branch is rejuvenating following the historic incision of the mainstem. Also shown in the photo is the presence of clay on the mainstem in reach T16.

Figure 7.32. A tributary that enters the Wild Branch within reach T16 is rejuvenating following historic incision of the main stem.

Reach T17
A change in channel dimensions that resulted in different existing stream types was the primary reason for splitting reach T17 into two segments. Depositional features and banks and buffers were also factors that supported segmentation. Both segment T17-A and T17-B are "C" channels by reference. Both segments are incised, but T17-B was more entrenched resulting in a "Bc" channel rather than a "C" channel. Segment T17-A was more depositional and was starting to build a juvenile bankfull bench. The riparian buffers were of higher quality in T17-B than T17-A. The dominant buffer width in T17-B is greater than 100 feet, and there were no buffers less than 25 feet within the segment. Segment T17-A also has dominant buffer widths of greater than 100 feet, but about 10 percent of the channel length has buffers less than 25 feet. No roads or development are located within the river

corridor in either of the segments. Clay is present within both segments; however, non-cohesive bank materials are dominant.

The lower segment, T17-A, begins about 500 feet upstream of the northern Collinsville Road crossing and is 1,285 feet in length. The segment is currently undergoing major aggradation (see large gravel bar in Figure 7.33), major planform adjustment with minor widening. As shown in Figure 7.34, there is a weak riffle-pool bedform due to significant filling of pools with sediment. Planform adjustment was evident from the active flood chutes crossing inside of meander bends.

Figure 7.33. A large unvegetated gravel bar in segment T17-A reflects the major aggradation that is occurring in the Wild Branch.

Figure 7.34. Segment T17-A has a weak riffle-pool bedform and lacks deep pools.

Segment T17-B is 1,460 feet in length. As previously mentioned, there is a stream type departure from the reference stream type. Some areas of the segment are more depositional (as shown in Figure 7.35) than where the cross section was measured and are wider and shallower, but have better floodplain access. The RGA scored as "fair", while the habitat was in RHA was in the "good" category. The high quality riparian zones (Figure 7.36) and the lack of channel modifications in this segment were factors that helped bring the overall habitat score into the "good" range.

Figure 7.35. Some sections of T17-B were more depositional than the cross section location. This is a large diagonal bar near the lower end of the segment

Figure 7.36. Segment T17-B has a high quality riparian zone along both banks. This photo was taken downstream of the cross section location.

Reach T18

Collinsville Road transitions to Square Road immediately upstream of the reach break between T18 and T19. The reach break between T18 and T19 is right on the Craftsbury (Orleans County) and Eden (Lamoille County) Town line. Reach T18 is 4,489 feet in length and is far from roads and development, with the exception of Square Road. Even with minimal corridor encroachments and a buffer width of greater than 100 feet on both banks, reach T18 has major planform adjustment. A channel avulsion (Figure 7.37) was noted during the Phase 2 assessment and there were numerous mid-channel bars, an island, and a flood chute. Similar to reaches T16 and T17 clay was present in some of the banks (Figure 7.38); however, non-cohesive material was the dominant bank material on the upper and lower banks. A mass failure was mapped along both the east and west banks.

Figure 7.37. A channel avulsion was noted during the Phase 2 assessment near the upper end of reach T18.

Figure 7.38. Erosion along the east bank. This bank contains clay.

Reach T18 has undergone minor historic incision, and a small bankfull bench is starting to develop at a lower elevation than the historic floodplain. Currently, there is minor aggradation and widening in addition to the major planform adjustment discussed above. The geomorphic condition rating for reach T18 is "fair", while the habitat condition is "good". All of the habitat parameters, with the exception of sediment deposition and channel flow status (exposed substrate in the riffle) were scored good or reference.

Reach T19
Bridge Assessment and Possible Replacement

The lower end of reach T19 starts just below the Square Road crossing. T19 is just under ¾ of a mile in length and was split into two segments due to differences in channel dimensions and depositional features. The upper segment (T19-B) has multiple channels and is significantly impacted by beaver dams.

Figure 7.39. Segment T19-A has a high quality buffer. The channel is over wide and bank erosion is common.

Segment T19-A has multiple revetments including minor riprap and hard bank armoring in the vicinity of the Square Road Bridge. The Square Road Bridge is causing significant localized geomorphic instability (see Section 5.2 – Bridge and Culvert Assessment). This bridge is high priority for replacement. With the exception of the immediate area by Square Road, the buffer widths are greater than 100 feet (Figure 7.39). Side bars, as shown in Figure 7.39, are common within the segment.

The valley confinement for segment T19-A is very broad. This is only a minor human-caused change in channel confinement that is caused by Square Road, yet the stream has undergone a stream type departure from a "C" channel (slightly entrenched) to "Bc" channel (moderately entrenched). This has resulted in reduced floodplain access for the Wild Branch. The channel adjustment processes include extreme historic degradation, minor aggradation and planform adjustment and major widening. The RGA scored in the "fair" category, while the habitat condition based on the RHA was "good". Bank stability was the only habitat parameter that scored in the fair or poor range. Bank erosion was present along 30 percent of both the east and west banks.

Segment T19-B was partially assessed due to the influence of beaver dams (Figure 7.40). Huge depositional features and multiple channels made this segment difficult to map and assess. The upper most 450 feet of the 2,430 foot segment could not be mapped due to beaver ponds. The upper end of the segment is fairly remote and the closest road (Square Road) is approximately 700 feet to the west of the Wild Branch channel near the reach break between T19 and T20. The lower part of segment T19-B appears to be influenced by upstream beaver dams. While the lower part of this segment was not impounded by beavers, it was heavily influenced by their presence upstream, to the point that the main channel was not always evident. Multiple islands and a channel avulsion within the segment are a result of flow entering the channel from beaver ponds (Figure 7.41). The Phase 2 assessment of the main channel ended at Reach 19.

Figure 7.40. A partial assessment of segment T19-B was conducted due to the influence of beaver dams.

Figure 7.41. The upper 450 feet of segment T19-B could not be mapped due to the presence of beaver ponds.

Unnamed Tributary to Wild Branch

Reach T10.01
Culvert Replacement
River Corridor Protection (FEH Overlay District)

A Phase 2 assessment of the lowest reach of an unnamed tributary to the Wild Branch (Reach T10.01) was also conducted in September 2007 by BCE and the LCPC. Reach T10.01 is 1,497 feet in length and is cobble dominated. There is evidence of historic channel modifications in the reach; approximately 1/3 of the reach appears to be historically straightened along Brook Road as shown in Figure 7.42. Multiple revetments on the west bank include riprap and hard bank armoring associated with the North Wolcott Road Bridge at the downstream end of the reach (Figure 7.42).

The North Wolcott Road Bridge is a floodprone constriction, but is not a channel constriction (Figure 7.43). The Brook Road culvert, within Reach T10.01, however, is a significant channel constriction. This culvert that is seven feet in diameter is a high priority for replace (see section 5.2 and Table 6). There is a minor human-caused change in channel confinement but no change in the reference valley type of broad. Roads are corridor encroachments along 2/3 of the reach, and have likely contributed to the stream type departure from a "C" channel to a "Bc" channel.

Figure 7.42. A steep riffle is shown upstream of the riprap that along Brook Road in Reach T10.01.

The unnamed tributary to the Wild Branch within Reach T10.01 has a weak riffle-pool bedform. The reach has undergone extreme historic degradation (see Figure 7.44) and is currently experiencing minor aggradation, widening and planform adjustment. The RGA was scored "fair", while the RHA was scored at the low end of the "good" range. Bank stability, channel flow status, and channel alteration were a few of the habitat parameters that were not scored as good or reference. Bank stability was only fair suggesting channel widening may become a major adjustment process at some point.

Figure 7.43. Deposition is occurring both upstream and downstream of the North Wolcott Road Bridge. This structure is a moderate priority for replacement.

Figure 7.44. A rejuvenating tributary in reach T10.01 indicates the bed of the Wild Branch mainstem has incised.

7.3 Site Level Opportunities

Site specific projects were identified using the criteria outlined by the ANR in Chapter 6 – Preliminary Identification and Prioritization (Vermont Agency of Natural Resources 2007a). This planning guide is intended to aid in the development of projects that protect and restore river equilibrium. The site level projects that were developed for the Wild Branch watershed are provided below in Table 6. High priority projects include river corridor protection to provide attenuation of sediment and floodwaters through conservation and corridor easements, riparian buffer improvement areas, the replacement or retrofitting of undersized stream crossing structures, and arresting active incision. Information from the Phase 2 stream geomorphic assessment and ANR bridge and culvert assessment could be used to inform the towns of Wolcott, Craftsbury and Eden regarding which stream crossings are contributing to localized instability.

The project strategy, technical feasibility, and priority for each project are listed by project number and reach. A total of fourteen projects were identified to promote the restoration or protection of channel stability and aquatic habitat in the Wild Branch watershed. Table 6 provides information for each project, including the project strategy, technical feasibility, and general cost. The projects are broken down by category as follows: eight passive restoration (corridor protection and buffer improvement projects) and six active

restoration (bridge or culvert replacement or retrofit projects, berm removal, and arresting active incision). The project locations and categories identified for Wild Branch are depicted below in Figure 7.45 for the lower part of the study area in Wolcott and Figure 7.46 for the upper portion in Craftsbury and Eden. These high priority projects include:

Town of Wolcott

- **Passive Restoration** of river corridor in the section of river between the Lamoille River confluence to upstream of the Fort Hill Road crossing in Wolcott (project #1).
- **Passive Restoration** of river corridor upstream of Fort Hill crossing to Gulf Road Bridge (project #2).
- **Active Restoration** of floodplain above Gulf Road through removal of berm. Additional assessment work is needed to determine if floodplain access is improved by this potential project (project #3).
- **Passive Restoration** of river corridor and streamside plantings above Gulf Road Bridge to upstream of Heath Road Intersection with N. Wolcott Road (project #4).
- **Passive Restoration** of river corridor below confluence of Tamarack Brook to Heath Road (project #5).
- **Passive Restoration** of riparian buffer through natural regeneration or low cost plantings in vicinity of Greenwood Road (project #6).
- **Passive Restoration** of riparian buffer through natural regeneration or low cost plantings in vicinity of Tamarack Road (project #7).
- **Passive Restoration** of river corridor through natural development and implementation of fluvial erosion hazard (FEH) zones in North Wolcott Village (project #8).
- **Active Restoration** by replacing undersized culvert that is causing localized geomorphic instability on the lowest reach of Unnamed Tributary to the Wild Branch (project #9).

Town of Craftsbury

- **Active Restoration** to arrest active incision by installing rock weirs or other restoration measures to stabilize the bed. Additional assessment work, as well as an alternatives analysis, is recommended to determine if project should go to design stage (project #10).
- **Passive Restoration** of river corridor and riparian buffer plantings below Hatch Brook Road to the southern Collinsville Road Crossing (project #11).
- **Active Restoration** by possibly replacing the Hatch Brook Road Bridge. An assessment following the Vermont River Management's most current version of the Bridge and Culvert Assessment Protocol is recommended to confirm the need for replacement (project #12).
- **Active Restoration** by possibly replacing the northern Collinsville Road Bridge. An assessment following the Vermont River Management's most current version of the Bridge and Culvert Assessment Protocol is recommended to confirm the need for replacement (project #13).

Town of Eden

- **Active Restoration** by possibly replacing the Square Road Bridge. An assessment following the Vermont River Management's most current version of the Bridge and Culvert Assessment Protocol is recommended to confirm the need for replacement (project #14).

Table 6. Wild Branch Site Level Opportunities for Restoration and Protection

Project # Segment	Type of Project	Site Description Including Stressors and Constraints	Project or Strategy Description	Technical Feasibility and Priority	Other Social Benefits	Costs	Land Use Conversion	Potential Partners
#1 Lamoille River confluence to upstream of Fort Hill Road Crossing Wolcott, VT T01 and lower end of T02	Passive Restoration	This section is located at the lower end of the watershed and is acting as an important depositional area; The buffer in Reach T01has been planted with trees and shrubs within the past five years.	Protect River Corridor through corridor easement and/or CREP; Streamside plantings.	Moderate priority for corridor easement (natural attenuation area)	Flood and sediment attenuation	Cost of corridor easements and CREP; Low cost for plantings	No new structures within corridor; Hay fields to forested buffer	ANR, LCPC, landowners, CREP, land trust
#2 Upstream of Fort Hill Road Crossing to Gulf Road Bridge Wolcott, VT Upper end of T02 to T03	Passive Restoration	The riparian buffers are generally of high quality in this reach. The upper end of T02 and reachT03 are natural attenuation areas.	Protect River Corridor through corridor easement	Moderate priority for corridor easement (natural attenuation area)	Flood and sediment attenuation	Cost of corridor easements	None	ANR, landowner, land trust
#3 Above Gulf Road Crossing Wolcott, VT Lower end of T04	Active Restoration	A short berm (approximately 170 feet in length) is located along the east bank on the lower end of Reach T04,	Alternatives Analysis for Berm Removal	Low priority; this possible berm removal project would need to be investigated further.	Improved floodplain access	Unknown	Unknown	ANR, LCPC, landowner

Table 6. Wild Branch Site Level Opportunities for Restoration and Protection

Project # Segment	Type of Project	Site Description Including Stressors and Constraints	Project or Strategy Description	Technical Feasibility and Priority	Other Social Benefits	Costs	Land Use Conversion	Potential Partners
#4 Above Gulf Road to upstream of Heath Road intersection with N. Wolcott Road Wolcott, VT T04 and T05	Passive Restoration	Reach T04 and T05 are important attenuation reaches. Bank erosion and buffers less than 25 feet in width are common. The proximity of North Wolcott Road impedes a potential buffer improvement projects in places.	Protect River Corridor through corridor easement and/or CREP; Streamside plantings.	High priority for conservation easement; these reaches are located downstream of channelized reach T06; high priority for plantings to provide ecological connection with T03 (which has a good buffer)	Flood and sediment attenuation; Prevent erosion, improve habitat and reduce water temperature	Cost of corridor easements and CREP; Low cost for plantings	No new structures in corridor	ANR, LCPC, landowners, CREP, land trust, LCNRCD, Partners for Wildlife
# 5 Below confluence of Tamarack Brook T06 through T08	Passive Restoration	The section of river location downstream of the North Wolcott Village is an important attenuation area for sediment coming from Tamarack Brook	Protect River Corridor through corridor easement	High priority for corridor protection	Flood and sediment attenuation	Cost of corridor easements	No new structures in corridor	ANR, LCPC, landowners, land trust
#6 Above Heath Road to above Greenwood Road intersection Wolcott, VT T06	Passive Restoration	Buffers less than 25 feet exist along the west bank of the Wild Branch along a hay field in Reach T06. There is considerable erosion along much of the west bank. The river is moderately incised in this location. The entire reach appears to have been straightened.	Buffer restoration – Natural Regeneration: Increase buffer width along hay field to extent feasible with low cost plantings or let vegetation grow back on its own.	Low priority due to moderate incision	Improved water quality	Low cost	Hayfield to vegetated buffer	Landowner LCPC, Partners for Wildlife

Table 6. Wild Branch Site Level Opportunities for Restoration and Protection

Project # Segment	Type of Project	Site Description Including Stressors and Constraints	Project or Strategy Description	Technical Feasibility and Priority	Other Social Benefits	Costs	Land Use Conversion	Potential Partners
#7 In vicinity of Tamarack Road Wolcott, VT T07 and T08	Passive Restoration	Reaches T07 and T08 are moderately incised. The channel is in close proximity and runs parallel to North Wolcott Road. There are isolated areas where buffer width could be increased. The channel is going through a major widening process.	Buffer Restoration-Natural Regeneration: Increase buffer width where feasible with low cost plantings or let vegetation grow back on its own.	Low priority due to moderate incision	Improved water quality	Low cost	Lawn and agricultural land to vegetated buffer	Landowner, ANR, LCPC, Partners for Wildlife
#8 North Wolcott T09, T10, T10.01	Passive Restoration	The North Wolcott Village has multiple property owners along the Wild Branch mainstem and major tributary and is well suited for the adoption of a fluvial erosion overlay district.	Fluvial Erosion Hazard (FEH) overlay district	High priority for corridor protection as FEH overlay district due to multiple landowners	Reduce fluvial erosion hazard and property damage	Unknown	No new structures in corridor	Town of Wolcott, ANR, LCPC
# 9 Brook Road Crossing on Unnamed Tributary Wolcott, VT T10.01	Active Restoration	The Brook Road culvert is undersized and was found to be mostly incompatible using the geomorphic screening tool. The structure is reducing aquatic organism passage.	Culvert Replacement	High priority	Improved geomorphic stability	Moderate cost of replacement	Unknown	Town of Wolcott, ANR, LCPC

Table 6. Wild Branch Site Level Opportunities for Restoration and Protection

Project # Segment	Type of Project	Site Description Including Stressors and Constraints	Project or Strategy Description	Technical Feasibility and Priority	Other Social Benefits	Costs	Land Use Conversion	Potential Partners
# 10 Downstream of Denton Hill Road Crossing Craftsbury, VT T12	Active Restoration	An active head cut was observed by South Mountain Research & Consulting Services and Jim Ryan in 2001.	Arrest the head cut, if present, by installing rock weirs or other restoration measure to keep bed from further incising. Further assessment and design work is required to determine if this project should move forward.	High priority	Improved geomorphic stability	High cost to install rock weirs; access will likely be difficult	Unknown	ANR, LCPC, landowner, Town of Craftsbury
#11 Below Hatch Brook Road to the southern Collinsville Road Crossing Craftsbury, VT T14, T15, T16 and T17	Passive Restoration	Reaches T14 through T17 have minimal development within the river corridor. This is an important section because it is immediately upstream of severely incised reaches.	Protect River Corridor through corridor easement and plant buffer where feasible	Moderate priority for corridor easement and plantings	Flood and sediment attenuation; Prevent erosion, improve habitat and maintain and improve existing buffer	Cost of corridor easements; low cost for plantings	fields to vegetated buffer	ANR, LCPC, landowners, CREP
#12 Hatch Brook Road Bridge Craftsbury, VT T16	Active Restoration	Hatch Brook Road Bridge is undersized and is causing localized geomorphic instability due to sediment transport and alignment.	Assess the crossing using the ANR bridge and culvert assessment protocol. Consider replacing if further assessment work confirms this is a problem.	High priority for replacement	Improved geomorphic stability	High cost for bridge replacement	Unknown	Town of Craftsbury, ANR, LCPC

Table 6. Wild Branch Site Level Opportunities for Restoration and Protection

Project # Segment	Type of Project	Site Description Including Stressors and Constraints	Project or Strategy Description	Technical Feasibility and Priority	Other Social Benefits	Costs	Land Use Conversion	Potential Partners
#13 Northern Collinsville Road Bridge Craftsbury, VT T16	Active Restoration	Northern Collinsville Road Bridge is undersized and is causing localized geomorphic instability due to sediment transport and alignment.	Assess the crossing using the ANR bridge and culvert assessment protocol. Consider replacing if further assessment work confirms this is a problem.	High priority for replacement	Improved geomorphic stability	High cost for bridge replacement	Unknown	Town of Craftsbury, ANR, LCPC
#14 Square Road Crossing Eden, VT T19-A	Active Restoration	The Square Road Bridge is undersized relative to bankfull width. Sediment transport and alignment were problems noted during the Phase 2 assessment.	Assess the crossing using the ANR bridge and culvert assessment protocol. Consider replacing if further assessment work confirms this is a problem.	High priority	Improved geomorphic stability	High cost of replacement	Unknown	Town of Eden, ANR, LCPC

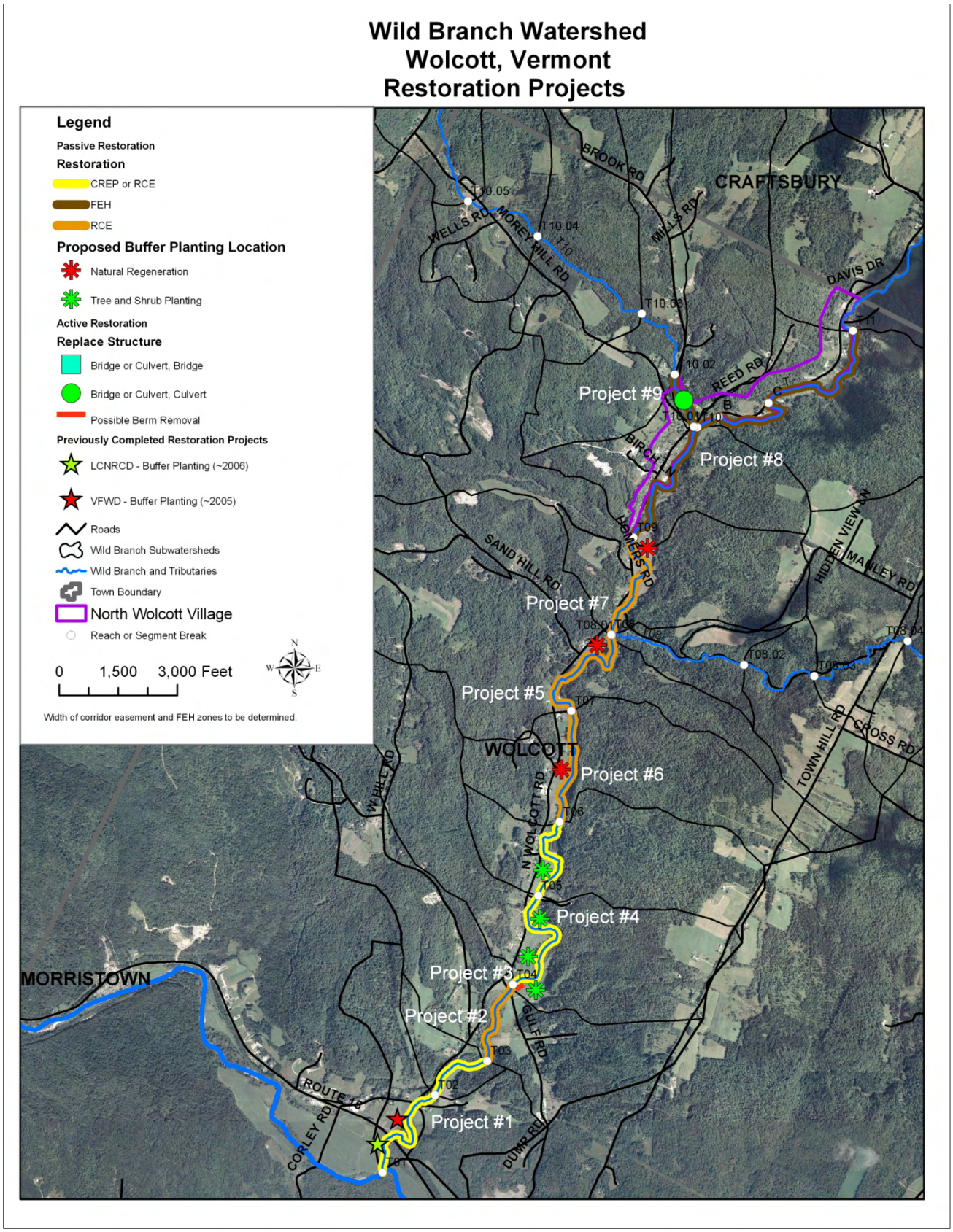

Figure 7.45. Proposed restoration and protection projects for Wild Branch in Wolcott, Vermont

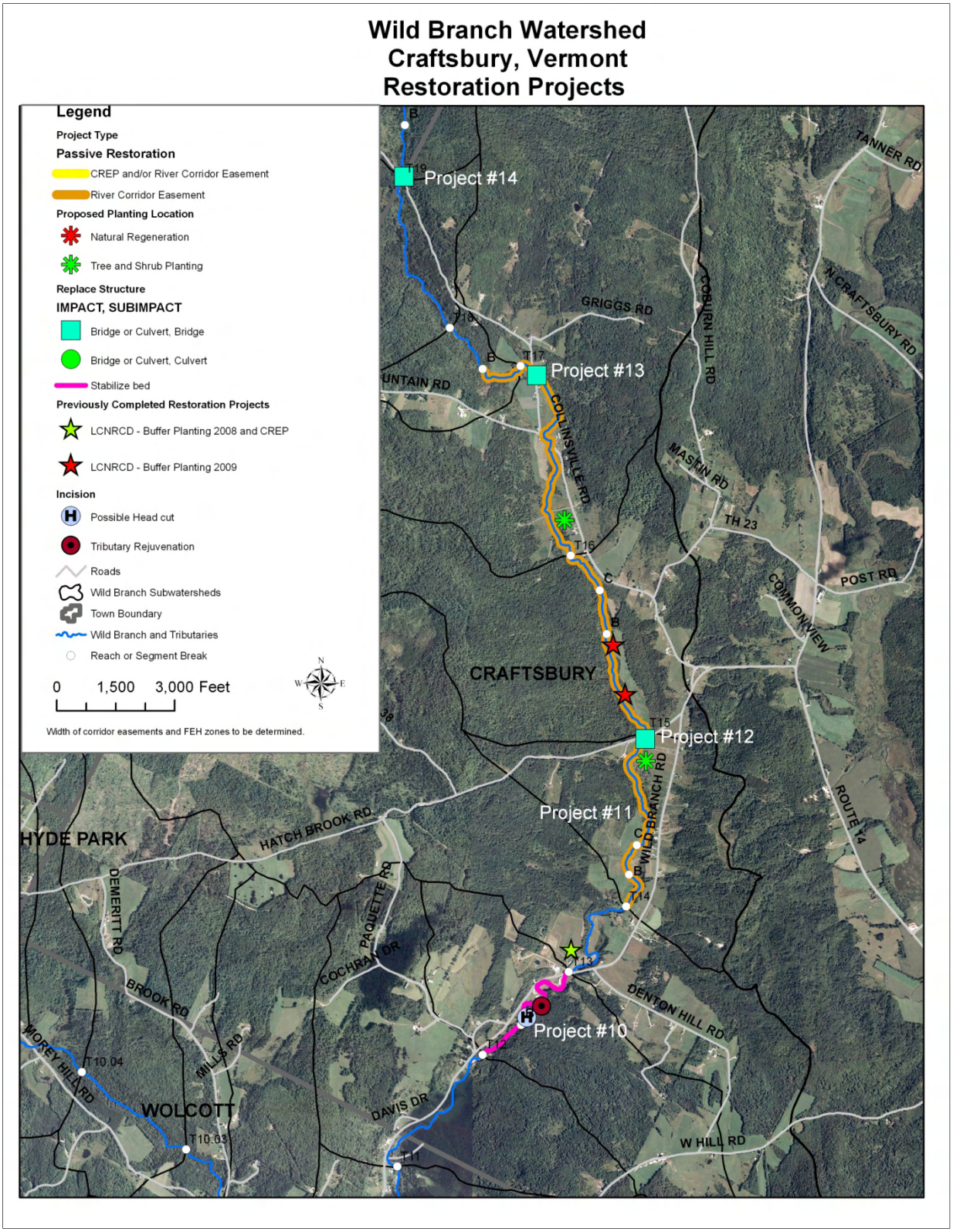

Figure 7.46. Proposed restoration and protection projects for the Wild Branch in Craftsbury, Vermont

7.4 Recommendations for Additional Studies

7.4.1. Phase 2 Assessment of Tamarack Brook

Additional assessment work within the Wild Branch watershed is recommended to better understand both localized and systemic geomorphic instability. Tamarack Brook is a major source of sediment to the Wild Branch main stem due to excessive lateral migration and numerous mass failures. Phase 2 stream geomorphic assessments of Tamarack Brook are recommended to get a handle on adjustment processes that are active within this major tributary to the Wild Branch. This additional Phase 2 data will be useful for prioritizing restoration and protection projects on Tamarack Brook, and should be helpful for reducing a major source of sediment to the lowest seven reaches on the main stem of the Wild Branch.

7.4.2 Stream Crossings

Bridge and culverts assessments of the main stem of the Wild Branch using the most recent version of the ANR Bridge and Culvert Assessment protocol are recommended to identify stream crossings that are leading to localized instability. It is also recommended that the towns of Wolcott and Craftsbury prepare capital budgets to prioritize structures for replacement and develop cost estimates and preliminary designs.

7.5 Next Steps

There are many opportunities to restore the Wild Branch to a stable condition. Types of reach level and site level projects that have been identified in this plan include river corridor protection, streamside plantings, natural regeneration of buffer, retrofit and/or replacement of stream crossings, arresting active incision, and berm removal. On the watershed level, the development and implementation of fluvial erosion hazard zones is recommended to avoid conflicts regarding land use and to save money spent on flood damage and river maintenance. The towns of Wolcott, Craftsbury, and Eden could pursue the opportunity to work with the LCPC and the Vermont River Management Program to develop fluvial erosion hazard zones for the land surrounding the Wild Branch. The following are recommendations for next steps:

1. Outreach to private landowners and the public about the plan and potential restoration and protection opportunities to be completed by the State and/or LCPC.
2. Town, State, and LCPC representatives meet to discuss the various restoration and protection opportunities and set priorities for action.
3. Meetings to be held with additional partners (Lamoille County Natural Resources Conservation District, Department of Agriculture, Natural Resources Conservation Service, Vermont Agency of Transportation, etc.) to discuss implementation of priority projects.

4. Summary and prioritization of potential projects.
5. Implementation of priority projects with project partners and landowners.

For additional information about fluvial erosion hazard (FEH) zones or project development, please contact the LCPC:

Lamoille County Planning Commission
632 LaPorte Road
Morrisville, VT 05661
(802)888-4548
lcpc@lcpcvt.org

8.0 Glossary of Terms

Adapted from:
Restoration Terms, by Craig Fischenich, February, 2000, USAE Research and Development Center, Environmental Laboratory, 3909 Halls Ferry Rd., Vicksburg, MS 39180
And
Vermont Stream Geomorphic Assessment Handbook, Appendix Q, 2004, VT Agency of Natural Resources, Waterbury, VT. http://www.vtwaterquality.org/rivers/docs/assessmenthandbooks/rv_apxqglossary.pdf

Adjustment process – type of change that is underway due to natural causes or human activity that has or will result in a change to the valley, floodplain, and/or channel condition (e.g., vertical, lateral, or channel plan form adjustment processes).

Aggradation - A progressive buildup or raising of the channel bed and floodplain due to sediment deposition. The geologic process by which streambeds are raised in elevation and floodplains are formed. Aggradation indicates that the stream discharge and/or bed load characteristics are changing. Opposite of degradation.

Alluvial fan – A fan-shaped accumulation of alluvium (alluvial soils) deposited at the mouth of a ravine or at the juncture of a tributary stream with the main stem where there is an abrupt change in slope.

Alluvial soils – Soil deposits from rivers.

Alluvium – A general term for detrital deposits made by streams on riverbeds, floodplains, and alluvial fans.

Avulsion – A change in channel course that occurs when a stream suddenly breaks through its banks, typically bisecting an overextended meander arc.

Bank Stability – The ability of a streambank to counteract erosion or gravity forces.

Bankfull channel depth - The maximum depth of a channel within a riffle segment when flowing at a bankfull discharge.

Bankfull channel width - The top surface width of a stream channel when flowing at a bankfull discharge.

Bankfull discharge - The stream discharge corresponding to the water stage that overtops the natural banks. This flow occurs, on average, about once every 1 to 2 years and given its frequency and magnitude is responsible for the shaping of most stream or river channels.

Bar – An accumulation of alluvium (usually gravel or sand) caused by a decrease in sediment transport capacity on the inside of meander bends or in the center of an overwide channel.

Berms – Mounds of dirt, earth, gravel or other fill built parallel to the stream banks designed to keep flood flows from entering the adjacent floodplain.

Cascade – River bed form where the channel is very steep with narrow confinement. There are often large boulders and bedrock with waterfalls.

Channelization – The process of changing (usually straightening) the natural path of a waterway.

Culvert – A buried pipe that allows flows to pass under a road.

Degradation – (1) A progressive lowering of the channel bed due to scour. Degradation is an indicator that the stream's discharge and/or sediment load is changing. The opposite of aggradation. (2) A decrease in value for a designated use.

Delta bar – A deposit of sediment where a tributary enters the mainstem of a river.

Depositional features – Types of sediment deposition and storage areas in a channel (e.g. mid-channel bars, point bars, side bars, diagonal bars, delta bars, and islands).

Drainage Basin – The total area of land from which water drains into a specific river.

Dredging – Removing material (usually sediments) from wetlands or waterways, usually to make them deeper or wider.

Erosion – Wearing away of rock or soil by the gradual detachment of soil or rock fragments by water, wind, ice, and other mechanical, chemical, or biological forces.

Floodplain – Land built of sediment that is regularly covered with water as a result of the flooding of a nearby stream.

Gaging Station – A particular site in a stream, lake, reservoir, etc., where hydrologic data are obtained.

Grade control - A fixed feature on the streambed that controls the bed elevation at that point, effectively fixing the bed elevation from potential incision; typically bedrock, dams or culverts.

Gradient – Vertical drop per unit of horizontal distance.

Habitat – The local environment in which organisms normally grow and live.

Headwater – Referring to the source of a stream or river.

Incised River – A river that erodes its channel by the process of degradation to a lower base level than existed previously or is consistent with the current hydrology.

Islands – Mid-channel bars that are above the average water level and have established woody vegetation.

Lacustrine soils- Soil deposits from lakes.

Mass failure – When rock or easily erodible soil has been transferred by gravity downslope along a valley wall. This transfer of material can be exaggerated by various factors including: slope, soil type, climate, groundwater movement, frost action, and/or lack of stabilizing material.

Meander - The winding of a stream channel, usually in an erodible alluvial valley. A series of sine-generated curves characterized by curved flow and alternating banks and shoals.

Meander migration – The change of course or movement of a channel. The movement of a channel over time is natural in most alluvial systems. The rate of movement may be increased if the stream is out of balance with its watershed inputs.

Meander belt width – The horizontal distance between the opposite outside banks of fully developed meanders determined by extending two lines (one on each side of the channel) parallel to the valley from the lateral extent of each meander bend along both sides of the channel.

Meander wavelength - The lineal distance downvalley between two corresponding points of successive meanders of the same phase.

Meander wavelength ratio – The meander wavelength divided by the bankfull channel width.

Meander width ratio – The meander belt width divided by the bankfull channel width.

Mid-channel bar – Sediment deposits (bar) located in the channel away from the banks, generally found in areas where the channel runs straight. Mid-channel bars caused by recent channel instability are unvegetated.

Planform - The channel shape as if observed from the air. Changes in planform often involve shifts in large amount of sediment, bank erosion, or the migration of the channel.

Plane bed – Channel lacks discrete bed features (such as pools, riffles, and point bars) and may have long stretches of featureless bed.

Point bar –The convex side of a meander bend that is built up due to sediment deposition.

Pool -- A habitat feature (section of stream) that is characterized by deep, low-velocity water and a smooth surface.

Reach - Section of river with similar characteristics such as slope, confinement (valley width), and tributary influence.

Restoration – The return of an ecosystem to a close approximation of its condition prior to disturbance.

Riffle - A habitat feature (section of stream) that is characterized by shallow, fast-moving water broken by the presence of rocks and boulders.

Riffle-pool - Channel has undulating bed that defines a sequence of riffles, runs, pools, and point bars. Occurs in moderate to low gradient and moderately sinuous channels, generally in unconfined valleys with well-established floodplains.

Riparian Buffer – The width of naturally vegetated land adjacent to the stream between the top of the bank and the edge of other land uses. A buffer is largely undisturbed and consists of the trees, shrubs, groundcover plants, duff layer, and naturally uneven ground surface.

Riparian Corridor – Lands defined by the lateral extent of a stream's meanders necessary to maintain a stable stream dimension, pattern, profile and sediment regime.

Segment – A relatively homogeneous section of stream contained within a reach that has the same reference stream characteristics but is distinct from other segments in the reach.

Sensitivity – The valley, floodplain and/or channel condition's likelihood to change due to natural causes and/or anticipated human activity.

Side bar – Unvegetated sediment deposits located along the margins or the channel in locations other than the inside of channel meander bends.

Step-pool – Characterized by longitudinal steps formed by large particles (boulder/cobbles) organized into discrete channel-spanning accumulations that separate pools, which contain smaller sized materials. Often associated with steep channels in confined valleys.

Surficial sediment/geology – Sediment that lies on top of bedrock.

Tributary – A stream that flows into another stream, river, or lake.

Urban runoff – Storm water from city streets and gutters that usually carries a great deal of litter and organic and bacterial wastes into the receiving waters.

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Appendix

Phase 2 Stream Geomorphic Assessment Reports

Wild Branch

Stream: **Wild Branch** Reach # **T01** Segment: **0** Completion Date: **September 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **No**

Segment Length (ft): **3,374** Segment Location: **This segment begins at the confluence of the Lamoille River and the Wild Branch. It**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**0**	**0**
height	**0**	**0**
Roads	**285**	**557**
height	**0**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**319**	**90**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Very Steep**	**Very Steep**
Continuous w/	**Sometimes**	**Never**
W/in 1 Bankfill	**Sometimes**	**Never**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft) **850**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **78**

2.2 Max Depth (ft) **5.00**

2.3 Mean Depth (ft) **4.15**

2.4 Floodprone Width (ft) **626**

Notes:

Former rail bridge is constriction and causing deposition downstream. Some steep riffles present. Reach has been straightened in places. Large aggradational features. 1/25/08 CS indexed gravel mining in "general location" within reach based on Phase 1 data

Step 2. (Contued)

2.5 Aband. Floodpln **6.30** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **18.84**

2.7 Entrenchment Ratio **8.00**

2.8 Incision Ratio **1.26**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **380**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**0** %
Cobble	**21** %
Coarse Gravel	**59** %
Fine Gravel	**11** %
Sand	**9** %
Silt and smaller	**0** %

Silt/Clay Present? **No**

Detritus **5** %

Large Woody **14**

2.13 Average Largest Particle on

Bed **6.0** **inches**

Bar **4.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Sand**	**Sand**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Gravel**	**Gravel**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**1,103**	**380**
Erosion Height (ft)	**3.39**	**4.07**
Revetmt. Type	**Multiple**	**Multiple**
Revetmt. Length (ft)	**331**	**1,378**

Near Bank Veg. Type	Left	Right
Dominant	**Shrubs/Saplin**	**Shrubs/Saplin**
Sub-dominant	**Herbaceous**	**Herbaceous**

Bank Canopy	Left	Right
Canopy %	**1-25**	**1-25**

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**26-50**
Sub-dominant	**26-50**	**0-25**
W less than 25	**0**	**1,163**

Buffer Veg. Type	Left	Right
Dominant	**Deciduous**	**Shrubs/Saplin**
Sub-dominant	**Shrubs/Saplin**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Crop**
Sub-dominant	**Residential**	**Hay**
Mass Failures	**88**	**0**
Height	**30**	**0**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **None**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.7 StormwaterInputs

Field Ditch	**0**	Road Ditch	**1**
Other	**0**	Tile Drain	**0**
Overland Flow	**0**	Urb Strm Wtr Pipe	**0**

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
7	**5**	**3**

Diagonal	Delta	Island
2	**1**	**0**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	**0**	**1**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
2	**0**	**No**

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **452**

5.5 Dredging **Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: Wild Branch | Reach # T01 | Segment: 0 | Completion Date: September 4,

Organization: Bear Creek Environmental | Observers: CS, MA | Rain: No

Segment Length (ft): 3,374 | Segment Location: This segment begins at the confluence of the Lamoille River and the Wild Branch. It

1.6 Grade Controls

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken
Ledge	Mid-segment	4.00	3.00	Yes	

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	90.0	Yes		No	Yes
Problem	Deposition Below				
Bridge	128.	Yes		No	Yes
Problem	Deposition Below,Scour Above				
Bridge	46.5	Yes	No	Yes	Yes
Problem	Deposition Below				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type: Unconfined

	Score	STD	Historic
7.1 Channel Degradation	**14**	**None**	**Yes**
7.2 Channel Aggradation	**8**	**None**	**No**
7.3 Widening Channel	**12**		**No**
7.4 Change in Planform	**9**		**No**
Total Score	**43**		
Geomorphic Rating	**0.5375**		

Channel Evolution Model	D
Channel Evolution Stage	IId
Geomorphic Condition	Fair
Stream Sensitivity	Very High

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type: High

	Score
6.1 Epifaunal Substrate - Available Cover	9
6.2 Embeddedness	9
6.3 Velocity/Depth Patterns	15
6.4 Sediment Deposition	9
6.5 Channel Flow Status	12
6.6 Channel Alteration	13
6.7 Frequency of Riffles/Steps	13
6.8 Bank Stability	Left: 5 Right: 7
6.9 Bank Vegetation Protection	Left: 6 Right: 8
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 5
Total Score	120
Habitat Rating	0.6

Habitat Stream Condition: Fair

Narrative:

minor historic degradation, minor widening, major aggradation and planform adjustment. Channel is overwhelmed by sediment. No braiding, but numerous mid-channel bars.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T02** Segment: **0** Completion Date: **September 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **No**

Segment Length (ft): **1,833** Segment Location: **This segment continues until about 700 feet southeast of where West Hill Road meets North**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Extremely	Very Steep
Continuous w/	Never	Sometimes
W/in 1 Bankfill	Sometimes	Sometimes
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **550**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **No**

Step 2. Stream Channel

2.1 Bankfull Width **89**

2.2 Max Depth (ft) **4.60**

2.3 Mean Depth (ft) **3.30**

2.4 Floodprone Width (ft) **175**

Notes:

Valley width was wide but FPA was not due to an old terrace, also had wide bankful width at cross section location which would make entrenchment lower.

10/8/2008-CS updated reference stream type

Step 2. (Contued)

2.5 Aband. Floodpln **5.30** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **27.09**

2.7 Entrenchment Ratio **1.96**

2.8 Incision Ratio **1.15**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **340**

2.12 Substrate Composition

Bedrock	0%
Boulder	2%
Cobble	23%
Coarse Gravel	51%
Fine Gravel	12%
Sand	12%
Silt and smaller	0%

Silt/Clay Present? **No**

Detritus **3** %

Large Woody **1**

2.13 Average Largest Particle on

Bed **7.0** **inches**

Bar **6.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type

(if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	113	295
Erosion Height (ft)	3.00	5.23
Revetmt. Type	Rip-Rap	Rip-Rap
Revetmt. Length (ft)	101	213

Near Bank Veg. Type	Left	Right
Dominant	Herbaceous	Herbaceous
Sub-dominant	Deciduous	Deciduous

Bank Canopy	Left	Right
Canopy %	26-50	26-50

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	51-100	>100
Sub-dominant	0-25	51-100
W less than 25	571	0

Buffer Veg. Type	Left	Right
Dominant	Deciduous	Mixed Trees
Sub-dominant	Herbaceous	Shrubs/Saplin

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Hay	Forest
Sub-dominant	Forest	None
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
2	2	2

Diagonal	Delta	Island
2	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
2	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: Wild Branch | Reach # T02 | Segment: 0 | Completion Date: September 4,
Organization: Bear Creek Environmental | Observers: CS, MA | Rain: No
Segment Length (ft): 1,833 | Segment Location: This segment continues until about 700 feet southeast of where West Hill Road meets

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type Unconfined

	Score	STD	Historic
7.1 Channel Degradation	**15**	**None**	**No**
7.2 Channel Aggradation	**8**	**Other**	**No**
7.3 Widening Channel	**13**		**No**
7.4 Change in Planform	**12**		**No**
Total Score	**48**		
Geomorphic Rating	**0.6**		

Channel Evolution Model D
Channel Evolution Stage IId
Geomorphic Condition Fair
Stream Sensitivity Very High

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type High

	Score
6.1 Epifaunal Substrate - Available Cover	10
6.2 Embeddedness	10
6.3 Velocity/Depth Patterns	16
6.4 Sediment Deposition	8
6.5 Channel Flow Status	14
6.6 Channel Alteration	16
6.7 Frequency of Riffles/Steps	18
6.8 Bank Stability	Left: 8 Right: 7
6.9 Bank Vegetation Protection	Left: 8 Right: 8
6.10 Riparian Vegetation Zone Width	Left: 4 Right: 8
Total Score	135
Habitat Rating	0.675

Habitat Stream Condition Good

Narrative:
Minor widening and planform adjustment, major aggradation. No braiding, but several mid-channel bars within this short reach. Channel is being overwhelmed with sediment from upstream.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T03** Segment: **0** Completion Date: **September 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **No**

Segment Length (ft): **2,263** Segment Location: **This segment continues until approximately 200 feet past bridge on Gulf Road.**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	57

1.4 Adjacent Side	Left	Right
Hillside Slope	Very Steep	Extremely
Continuous w/	Never	Never
W/in 1 Bankfill	Sometimes	Sometimes
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **750**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **84**

2.2 Max Depth (ft) **4.70**

2.3 Mean Depth (ft) **3.43**

2.4 Floodprone Width (ft) **345**

Notes:

Abundant bedrock at downstream end of reach, no complete channel spanning grade controls though. Gulf Road bridge is a constriction. Cross section revised to select bankfull at a defined feature approximately 0.9 feet above that selected in the field. This

Step 2. (Contued)

2.5 Aband. Floodpln **4.70** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **24.49**

2.7 Entrenchment Ratio **4.11**

2.8 Incision Ratio **1.00**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **342**

2.12 Substrate Composition

Bedrock	2%
Boulder	2%
Cobble	28%
Coarse Gravel	48%
Fine Gravel	11%
Sand	9%
Silt and smaller	0%

Silt/Clay Present? **No**

Detritus **5** %

Large Woody **4**

2.13 Average Largest Particle on

Bed	8.0	inches
Bar	7.0	inches

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive
Bank Erosion	Left	Right
Erosion Length (ft)	247	150
Erosion Height (ft)	4.00	4.00
Revetmt. Type	Multiple	Multiple
Revetmt. Length (ft)	88	80
Near Bank Veg. Type	Left	Right
Dominant	Herbaceous	Herbaceous
Sub-dominant	Deciduous	Deciduous
Bank Canopy	Left	Right
Canopy %	26-50	26-50
Mid-Channel Canopy		Open

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	>100
Sub-dominant	51-100	26-50
W less than 25	0	0
Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Mixed Trees
Sub-dominant	Herbaceous	None

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Forest
Sub-dominant	Hay	Residential
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Abundant**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
1	3	3

Diagonal	Delta	Island
4	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
4	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **580**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: Wild Branch | Reach # T03 | Segment: 0 | Completion Date: September 4,

Organization: Bear Creek Environmental | Observers: CS, MA | Rain: No

Segment Length (ft): 2,263 | Segment Location: This segment continues until approximately 200 feet past bridge on Gulf Road.

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	43.0	Yes	No	Yes	Yes
Problem	Deposition Above,Scour Above				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type Unconfined

	Score	STD	Historic
7.1 Channel Degradation	**16**	**None**	**No**
7.2 Channel Aggradation	**7**	**None**	**No**
7.3 Widening Channel	**14**		**No**
7.4 Change in Planform	**14**		**No**
Total Score	**51**		
Geomorphic Rating	**0.6375**		

Channel Evolution Model D

Channel Evolution Stage IId

Geomorphic Condition Fair

Stream Sensitivity Very High

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type High

	Score
6.1 Epifaunal Substrate - Available Cover	10
6.2 Embeddedness	9
6.3 Velocity/Depth Patterns	15
6.4 Sediment Deposition	9
6.5 Channel Flow Status	14
6.6 Channel Alteration	10
6.7 Frequency of Riffles/Steps	17
6.8 Bank Stability	Left: 7 Right: 8
6.9 Bank Vegetation Protection	Left: 9 Right: 9
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 9
Total Score	135
Habitat Rating	0.675

Habitat Stream Condition Good

Narrative:

Minor widening and planform adjustment, major aggradation; channel is overwhelmed wirth sediment from upstream bank erosion of incised reaches. Channel is not braided, yet multiple mid-channel and diagonal bars present.

Stream: **Wild Branch** Reach # **T04** Segment: **0** Completion Date: **September 6, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **3,629** Segment Location: **This segment continues until where Wild Branch Lane crosses over the river.**

QC Status - Staff: Provisional Cons **Passed**

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**169**	**0**
height	**7**	**0**
Roads	**929**	**0**
height	**0**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**0**	**47**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Very Steep**	**Steep**
Continuous w/	**Sometimes**	**Never**
W/in 1 Bankfill	**Sometimes**	**Never**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft)	**835**
Width Determination	**Measured**
Confinement Type	**Very Broad**
Rock Gorge?	**No**
Human-caused Change?	**Yes**

Step 2. Stream Channel

2.1 Bankfull Width	**72**
2.2 Max Depth (ft)	**5.00**
2.3 Mean Depth (ft)	**3.46**
2.4 Floodprone Width (ft)	**935**

Notes:

Large depositional features in reach. Some clay on banks, one mass failure.
Cross section revised to reflect defined feature. Bankfull elevation should be field verified if restoration design work is undertaken.

Step 2. (Contued)

2.5 Aband. Floodpln	**5.00** ft.
Human Elev Floodpln	**0.00** ft.
2.6 Width/Depth Ratio	**20.66**
2.7 Entrenchment Ratio	**13.08**
2.8 Incision Ratio	**1.00**
Human Elevated Inc Rat	**0.00**
2.9 Sinuosity	**Moderate**
2.10 Riffles Type	**Sedimented**
2.11 Riffle/Step Spacing (ft)	**353**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**4** %
Cobble	**27** %
Coarse Gravel	**45** %
Fine Gravel	**8** %
Sand	**16** %
Silt and smaller	**0** %

Silt/Clay Present?	**Yes**
Detritus	**4** %
# Large Woody	**18**

2.13 Average Largest Particle on

Bed	**6.0**	**inches**
Bar	**5.0**	**inches**

2.14 Stream Type

Stream Type:	**C**
Bed Material:	**Gravel**
Subclass Slope:	**None**
Bed Form:	**Riffle-Pool**
Field Measured Slope:	

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Sand**	**Sand**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Boulder/Cobbl**	**Boulder/Cobbl**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**890**	**1,340**
Erosion Height (ft)	**5.25**	**4.83**
Revetmt. Type	**Multiple**	**Multiple**
Revetmt. Length (ft)	**124**	**338**

Near Bank Veg. Type	Left	Right
Dominant	**Deciduous**	**Deciduous**
Sub-dominant	**Herbaceous**	**Herbaceous**

Bank Canopy	Left	Right
Canopy %	**26-50**	**26-50**

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**51-100**	**26-50**
Sub-dominant	**0-25**	**0-25**
W less than 25	**796**	**1,197**

Buffer Veg. Type	Left	Right
Dominant	**Mixed Trees**	**Deciduous**
Sub-dominant	**Shrubs/Saplin**	**Shrubs/Saplin**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Residential**
Sub-dominant	**Residential**	**Hay**
Mass Failures	**0**	**41**
Height	**0**	**15**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps	**Minimal**
4.2 Adjacent Wetlands	**None**
4.3 Flow Status	**Moderate**
4.4 # of Debris Jams	**0**
4.5 Flow Regulation Type	**None**
Flow Regulation Use	
Impoundments	
Impoundmt. Location	
4.6 Up/Down strm flow reg	**None**
(old) Upstrm Flow Reg	

4.9 # of Beaver Dams	**0**
Affected Length (ft)	**0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
2	**5**	**7**

Diagonal	Delta	Island
1	**0**	**0**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	**0**	**0**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
1	**0**	**No**

5.4 Stream Ford or Animal	**No**
5.5 Straightening	**Straightening**
Straightening Length:	**301**
5.5 Dredging	**None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: Wild Branch | Reach # T04 | Segment: 0 | Completion Date: September 6,
Organization: Bear Creek Environmental | Observers: CS, MA | Rain: Yes
Segment Length (ft): 3,629 | Segment Location: This segment continues until where Wild Branch Lane crosses over the river.

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	67.0	Yes	No	No	Yes

Problem None

Step 7. Rapid Geomorphic Assessment Data

Confinement Type Unconfined

	Score	STD	Historic
7.1 Channel Degradation	**16**	**None**	**No**
7.2 Channel Aggradation	**7**	**None**	**No**
7.3 Widening Channel	**12**		**No**
7.4 Change in Planform	**9**		**No**
Total Score	**44**		
Geomorphic Rating	**0.55**		

Channel Evolution Model D
Channel Evolution Stage IId
Geomorphic Condition Fair
Stream Sensitivity Very High

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type High

	Score
6.1 Epifaunal Substrate - Available Cover	11
6.2 Embeddedness	5
6.3 Velocity/Depth Patterns	11
6.4 Sediment Deposition	7
6.5 Channel Flow Status	8
6.6 Channel Alteration	10
6.7 Frequency of Riffles/Steps	17
6.8 Bank Stability	Left: 6 Right: 3
6.9 Bank Vegetation Protection	Left: 7 Right: 7
6.10 Riparian Vegetation Zone Width	Left: 5 Right: 5
Total Score	102
Habitat Rating	0.51

Habitat Stream Condition Fair

Narrative:
Minor widening, major aggradation and planform adjustment. No braiding, yet large depositional features in reach.

Stream: **Wild Branch** Reach # **T05** Segment: **0** Completion Date: **September 6, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **2,622** Segment Location: **This segment continues until approximately 2000 feet north of where Wild Branch Lane**

QC Status - Staff: Provisional Cons **Passed**

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	2,227	0
height	8	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Very Steep	Steep
Continuous w/	Sometimes	Never
W/in 1 Bankfill	Sometimes	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **495**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **73**

2.2 Max Depth (ft) **4.30**

2.3 Mean Depth (ft) **3.36**

2.4 Floodprone Width (ft) **354**

Notes:

Large depositional features, evidence of channel migration. 1/25/08 CS indexed gravel mining in "general location" within reach based on Phase 1 data (interviews with DEC) because no specific location was known.

Step 2. (Contued)

2.5 Aband. Floodpln **4.30** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **21.76**

2.7 Entrenchment Ratio **4.84**

2.8 Incision Ratio **1.00**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **346**

2.12 Substrate Composition

Bedrock	0%
Boulder	2%
Cobble	21%
Coarse Gravel	26%
Fine Gravel	12%
Sand	39%
Silt and smaller	0%

Silt/Clay Present? **Yes**

Detritus **3** %

Large Woody **18**

2.13 Average Largest Particle on

Bed **7.0** **inches**

Bar **5.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	888	446
Erosion Height (ft)	4.69	5.20
Revetmt. Type	None	Rip-Rap
Revetmt. Length (ft)	0	274

Near Bank Veg. Type	Left	Right
Dominant	Deciduous	Deciduous
Sub-dominant	Coniferous	Herbaceous

Bank Canopy	Left	Right
Canopy %	26-50	26-50

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	26-50
Sub-dominant	None	0-25
W less than 25	0	702

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Deciduous
Sub-dominant	Invasives	Herbaceous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Residential
Sub-dominant	Other	Hay
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
3	4	0

Diagonal	Delta	Island
4	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	0	1	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
3	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **370**

5.5 Dredging **Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T05** Segment: **0** Completion Date: **September 6, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **2,622** Segment Location: **This segment continues until approximately 2000 feet north of where Wild Branch Lane**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**16**	**None**	**No**
7.2 Channel Aggradation	**8**	**None**	**No**
7.3 Widening Channel	**11**		**No**
7.4 Change in Planform	**7**		**No**
Total Score	**42**		
Geomorphic Rating	**0.525**		
Channel Evolution Model	**D**		
Channel Evolution Stage	**IId**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	11
6.2 Embeddedness	6
6.3 Velocity/Depth Patterns	15
6.4 Sediment Deposition	5
6.5 Channel Flow Status	10
6.6 Channel Alteration	11
6.7 Frequency of Riffles/Steps	16
6.8 Bank Stability	Left: 4 Right: 7
6.9 Bank Vegetation Protection	Left: 8 Right: 6
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 3
Total Score	111
Habitat Rating	0.555
Habitat Stream Condition	**Fair**

Narrative:

minor widening, major aggradation and planform adjustment. Channel overloaded with sediment from erosion associated degraded upstream reaches. Channel not braided, yet reach contains multiple mid-channel and diagonal bars.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T06** Segment: **0** Completion Date: **September 6, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **3,013** Segment Location: **This segment continues until about 1500 feet north of where Greenwood Road meets North**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	2,776	0
height	12	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	549	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Extremely	Extremely
Continuous w/	Sometimes	Never
W/in 1 Bankfill	Always	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **475**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **59**

2.2 Max Depth (ft) **4.30**

2.3 Mean Depth (ft) **3.09**

2.4 Floodprone Width (ft) **159**

Notes:

Reach runs along valley wall on left bank entire length of reach... likely straightened. 1/25/08 CS indexed gravel mining in "general location" within reach based on Phase 1 data (interviews with DEC) because no specific location was known.

Step 2. (Contued)

2.5 Aband. Floodpln **5.70** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **19.09**

2.7 Entrenchment Ratio **2.69**

2.8 Incision Ratio **1.33**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **545**

2.12 Substrate Composition

Bedrock	0%
Boulder	13%
Cobble	40%
Coarse Gravel	29%
Fine Gravel	9%
Sand	9%
Silt and smaller	0%

Silt/Clay Present? **No**

Detritus **3** %

Large Woody **5**

2.13 Average Largest Particle on

Bed **9.0** **inches**

Bar **7.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Cobble**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Boulder/Cobbl	Boulder/Cobbl
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	369	2,263
Erosion Height (ft)	4.67	4.81
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Herbaceous	Herbaceous
Sub-dominant	Coniferous	Deciduous

Bank Canopy	Left	Right
Canopy %	26-50	51-75

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	51-100
Sub-dominant	None	26-50
W less than 25	0	858

Buffer Veg. Type	Left	Right
Dominant	Coniferous	Deciduous
Sub-dominant	Deciduous	Herbaceous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Residential
Sub-dominant	None	Hay
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **None**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	2	8
Diagonal	**Delta**	**Island**
3	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
3	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **2,934**

5.5 Dredging **Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: Wild Branch | Reach # T06 | Segment: 0 | Completion Date: September 6,

Organization: Bear Creek Environmental | Observers: CS, MA | Rain: Yes

Segment Length (ft): 3,013 | Segment Location: This segment continues until about 1500 feet north of where Greenwood Road meets

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type Unconfined

	Score	STD	Historic
7.1 Channel Degradation	**13**	**None**	**Yes**
7.2 Channel Aggradation	**8**	**None**	**No**
7.3 Widening Channel	**11**		**No**
7.4 Change in Planform	**10**		**Yes**
Total Score	**42**		
Geomorphic Rating	**0.525**		

Channel Evolution Model	F
Channel Evolution Stage	III
Geomorphic Condition	Fair
Stream Sensitivity	High

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type High

	Score
6.1 Epifaunal Substrate - Available Cover	8
6.2 Embeddedness	5
6.3 Velocity/Depth Patterns	15
6.4 Sediment Deposition	10
6.5 Channel Flow Status	13
6.6 Channel Alteration	15
6.7 Frequency of Riffles/Steps	13
6.8 Bank Stability	Left: 7 Right: 1
6.9 Bank Vegetation Protection	Left: 9 Right: 5
6.10 Riparian Vegetation Zone Width	Left: 10 Right: 4
Total Score	115
Habitat Rating	0.575
Habitat Stream Condition	Fair

Narrative:

minor historic degradation, major aggradation and planform adjustment, minor widening.

Stream: **Wild Branch** Reach # **T07** Segment: **0** Completion Date: **September 11, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **3,706** Segment Location: **This segment continues until the confluence of the Tamarack Brook and the Wild Branch.**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**0**	**0**
height	**0**	**0**
Roads	**2,107**	**0**
height	**8**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**171**	**0**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Extremely**	**Extremely**
Continuous w/	**Sometimes**	**Never**
W/in 1 Bankfill	**Sometimes**	**Never**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft) **620**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **95**

2.2 Max Depth (ft) **3.45**

2.3 Mean Depth (ft) **2.87**

2.4 Floodprone Width (ft) **425**

Notes:

Large depositional features and flood chutes. Some bedrock along left bank.

Bankfull elevation on cross section revised to be at defined feature. Field verification of bankfull recommended for restoration and

Step 2. (Contued)

2.5 Aband. Floodpln **5.25** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **33.07**

2.7 Entrenchment Ratio **4.48**

2.8 Incision Ratio **1.52**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **470**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**0** %
Cobble	**24** %
Coarse Gravel	**56** %
Fine Gravel	**8** %
Sand	**12** %
Silt and smaller	**0** %

Silt/Clay Present? **No**

Detritus **2** %

Large Woody **10**

2.13 Average Largest Particle on

Bed **8.0** **inches**

Bar **6.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type

(if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Sand**	**Sand**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Gravel**	**Gravel**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**498**	**1,271**
Erosion Height (ft)	**4.43**	**4.00**
Revetmt. Type	**None**	**Rip-Rap**
Revetmt. Length (ft)	**0**	**416**

Near Bank Veg. Type	Left	Right
Dominant	**Coniferous**	**Herbaceous**
Sub-dominant	**Herbaceous**	**Coniferous**

Bank Canopy	Left	Right
Canopy %	**1-25**	**1-25**

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**0-25**
Sub-dominant	**None**	**>100**
W less than 25	**0**	**1,670**

Buffer Veg. Type	Left	Right
Dominant	**Coniferous**	**Herbaceous**
Sub-dominant	**Deciduous**	**Mixed Trees**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Residential**
Sub-dominant	**Other**	**None**
Mass Failures	**0**	**0**
Height	**0**	**0**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
2	**5**	**1**

Diagonal	Delta	Island
1	**1**	**0**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
3	**0**	**0**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
1	**0**	**No**

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **455**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: Wild Branch | Reach # T07 | Segment: 0 | Completion Date: September 11,

Organization: Bear Creek Environmental | Observers: CS, MA | Rain: Yes

Segment Length (ft): 3,706 | Segment Location: This segment continues until the confluence of the Tamarack Brook and the Wild

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type Unconfined

	Score	STD	Historic
7.1 Channel Degradation	**9**	**None**	**Yes**
7.2 Channel Aggradation	**6**	**None**	**No**
7.3 Widening Channel	**10**		**No**
7.4 Change in Planform	**8**		**No**
Total Score	**33**		
Geomorphic Rating	**0.4125**		

Channel Evolution Model	F
Channel Evolution Stage	III
Geomorphic Condition	Fair
Stream Sensitivity	Very High

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type High

	Score
6.1 Epifaunal Substrate - Available Cover	12
6.2 Embeddedness	7
6.3 Velocity/Depth Patterns	15
6.4 Sediment Deposition	6
6.5 Channel Flow Status	7
6.6 Channel Alteration	12
6.7 Frequency of Riffles/Steps	13
6.8 Bank Stability	Left: 7 Right: 5
6.9 Bank Vegetation Protection	Left: 7 Right: 5
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 3
Total Score	108
Habitat Rating	0.54
Habitat Stream Condition	Fair

Narrative:

major degradation, aggradation, widening and planform adjustment. Late stage III (possibly early stage IV), starting to build narrow juvenile floodplain.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T08** Segment: **0** Completion Date: **September 11, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **3,024** Segment Location: **This segment continues until the confluence of a tributary next to Homers Road and the**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	2,706	0
height	4	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	721	43

1.4 Adjacent Side	Left	Right
Hillside Slope	Extremely	Hilly
Continuous w/	Never	Never
W/in 1 Bankfill	Never	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **520**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **76**

2.2 Max Depth (ft) **3.30**

2.3 Mean Depth (ft) **2.52**

2.4 Floodprone Width (ft) **322**

Notes:

Evidence of minor bar scalping. Large depositional features, buffer is not great.

Multiple revetments include mainly rip rap, with some hard bank in the vicinity of the bridge.

Step 2. (Contued)

2.5 Aband. Floodpln **4.60** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **30.16**

2.7 Entrenchment Ratio **4.24**

2.8 Incision Ratio **1.39**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **462**

2.12 Substrate Composition

Bedrock	0%
Boulder	7%
Cobble	42%
Coarse Gravel	36%
Fine Gravel	10%
Sand	5%
Silt and smaller	0%

Silt/Clay Present? **No**

Detritus **2** %

Large Woody **4**

2.13 Average Largest Particle on

Bed **10.0** **inches**

Bar **7.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive
Bank Erosion	Left	Right
Erosion Length (ft)	738	330
Erosion Height (ft)	4.80	4.32
Revetmt. Type	Multiple	Multiple
Revetmt. Length (ft)	171	1,132
Near Bank Veg. Type	Left	Right
Dominant	Herbaceous	Herbaceous
Sub-dominant	Shrubs/Saplin	Shrubs/Saplin
Bank Canopy	Left	Right
Canopy %	1-25	1-25
Mid-Channel Canopy	Open	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	0-25	0-25
Sub-dominant	26-50	26-50
W less than 25	1,848	1,498
Buffer Veg. Type	Left	Right
Dominant	Herbaceous	Herbaceous
Sub-dominant	Mixed Trees	Deciduous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Hay	Residential
Sub-dominant	Pasture	Hay
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Abundant**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.7 StormwaterInputs

Field Ditch	0	Road Ditch	2
Other	0	Tile Drain	0
Overland Flow	0	Urb Strm Wtr Pipe	0

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	4	4

Diagonal	Delta	Island
4	0	1

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	0	1	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
4	0	No

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **Straightening**

Straightening Length: **891**

5.5 Dredging **Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: Wild Branch | Reach # T08 | Segment: 0 | Completion Date: September 11,

Organization: Bear Creek Environmental | Observers: CS, MA | Rain: Yes

Segment Length (ft): 3,024 | Segment Location: This segment continues until the confluence of a tributary next to Homers Road and

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	47.0	Yes	No	Yes	Yes
Problem		Deposition Above,	Deposition		

Step 7. Rapid Geomorphic Assessment Data

Confinement Type Unconfined

	Score	STD	Historic
7.1 Channel Degradation	**11**	**None**	**Yes**
7.2 Channel Aggradation	**8**	**None**	**No**
7.3 Widening Channel	**7**		**No**
7.4 Change in Planform	**10**		**No**
Total Score	**36**		
Geomorphic Rating	**0.45**		

Channel Evolution Model	F
Channel Evolution Stage	III
Geomorphic Condition	Fair
Stream Sensitivity	Very High

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type High

	Score
6.1 Epifaunal Substrate - Available Cover	10
6.2 Embeddedness	10
6.3 Velocity/Depth Patterns	16
6.4 Sediment Deposition	9
6.5 Channel Flow Status	11
6.6 Channel Alteration	9
6.7 Frequency of Riffles/Steps	12
6.8 Bank Stability	Left: 6 Right: 7
6.9 Bank Vegetation Protection	Left: 5 Right: 6
6.10 Riparian Vegetation Zone Width	Left: 5 Right: 2
Total Score	108
Habitat Rating	0.54
Habitat Stream Condition	Fair

Narrative:

major historic degradation, major aggradation, widening and planform adjustment. Reach located just downstream of reaches with extreme historic incision.

Stream: **Wild Branch** Reach # **T09** Segment: **0** Completion Date: **September 20, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **3,866** Segment Location: **This segment continues until the confluence of the tributary adjacent to Morey Hill Road**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**0**	**0**
height	**0**	**0**
Roads	**2,018**	**0**
height	**11**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**1,661**	**0**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Steep**	**Steep**
Continuous w/	**Sometimes**	**Never**
W/in 1 Bankfill	**Sometimes**	**Never**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft) **460**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **77**

2.2 Max Depth (ft) **3.20**

2.3 Mean Depth (ft) **2.43**

2.4 Floodprone Width (ft) **141**

Notes:

Spoke with landowner on right bank, mentioned that right bank floods approximately on 100 year flood. Also that there used to be a much wider bench on the right bank that has been lost to erosion. 1/25/08 CS indexed gravel mining in "general

Step 2. (Contued)

2.5 Aband. Floodpln **7.30** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **31.48**

2.7 Entrenchment Ratio **1.84**

2.8 Incision Ratio **2.28**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **442**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**1** %
Cobble	**47** %
Coarse Gravel	**35** %
Fine Gravel	**6** %
Sand	**11** %
Silt and smaller	**0** %

Silt/Clay Present? **No**

Detritus **0** %

Large Woody **6**

2.13 Average Largest Particle on

Bed **13.0** **inches**

Bar **14.0** **inches**

2.14 Stream Type

Stream Type: **B**

Bed Material: **Gravel**

Subclass Slope: **c**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Gravel**	**Gravel**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Boulder/Cobbl**	**Boulder/Cobbl**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**680**	**565**
Erosion Height (ft)	**4.90**	**5.25**
Revetmt. Type	**None**	**Rip-Rap**
Revetmt. Length (ft)	**0**	**738**

Near Bank Veg. Type	Left	Right
Dominant	**Shrubs/Saplin**	**Lawn**
Sub-dominant	**Deciduous**	**Shrubs/Saplin**

Bank Canopy	Left	Right
Canopy %	**1-25**	**1-25**

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**0-25**
Sub-dominant	**51-100**	**26-50**
W less than 25	**417**	**1,459**

Buffer Veg. Type	Left	Right
Dominant	**Mixed Trees**	**Herbaceous**
Sub-dominant	**Herbaceous**	**Deciduous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Residential**
Sub-dominant	**Hay**	**None**
Mass Failures	**138**	**0**
Height	**15**	**0**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **Minimal**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.7 StormwaterInputs

Field Ditch	**0**	Road Ditch	**1**
Other	**0**	Tile Drain	**0**
Overland Flow	**0**	Urb Strm Wtr Pipe	**0**

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
1	**3**	**8**

Diagonal	Delta	Island
2	**0**	**0**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
3	**0**	**1**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
2	**0**	**No**

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **Straightening**

Straightening Length: **792**

5.5 Dredging **Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T09** Segment: **0** Completion Date: **September 20,**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Rain: **No**

Segment Length (ft): **3,866** Segment Location: **This segment continues until the confluence of the tributary adjacent to Morey Hill Road**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**4**	**C to B**	**Yes**
7.2 Channel Aggradation	**7**	**None**	**No**
7.3 Widening Channel	**9**		**No**
7.4 Change in Planform	**10**		**No**
Total Score	**30**		
Geomorphic Rating	**0.375**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	6
6.2 Embeddedness	13
6.3 Velocity/Depth Patterns	11
6.4 Sediment Deposition	6
6.5 Channel Flow Status	6
6.6 Channel Alteration	10
6.7 Frequency of Riffles/Steps	12
6.8 Bank Stability	Left: 7 Right: 7
6.9 Bank Vegetation Protection	Left: 7 Right: 2
6.10 Riparian Vegetation Zone Width	Left: 8 Right: 2
Total Score	97
Habitat Rating	0.485
Habitat Stream Condition	**Fair**

Narrative:

Late stage 3 (start of juvenile floodplain) - extreme historic degradation, major aggradation, historic widening, and planform adjustment

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T10** Segment: **A** Completion Date: **September 20, 2007**

Organization: **Bear Creek Environmental** Observers: **MN, CS** Why Not assessed: Rain: **No**

Segment Length (ft): **611** Segment Location: **This segment continues until approximately 600 feet upstream to where the rip rap ends.**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Channel Dimensions**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	605	0
height	12	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Very Steep	Very Steep
Continuous w/	Never	Never
W/in 1 Bankfill	Never	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **516**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **51**

2.2 Max Depth (ft) **3.60**

2.3 Mean Depth (ft) **2.82**

2.4 Floodprone Width (ft) **56**

Notes:

Segment runs along North Wolcott Road. Channelized straight and plane bed due to encroachment and rip rap. No floodplain access and high incision due to road in corridor on right bank. No bankful indicators near cross section, used measurment from

Step 2. (Contued)

2.5 Aband. Floodpln **8.00** ft.

Human Elev Floodpln **16.00** ft.

2.6 Width/Depth Ratio **18.09**

2.7 Entrenchment Ratio **1.09**

2.8 Incision Ratio **2.22**

Human Elevated Inc Rat **4.44**

2.9 Sinuosity **Low**

2.10 Riffles Type **Eroded**

2.11 Riffle/Step Spacing (ft) **0**

2.12 Substrate Composition

Bedrock	0%
Boulder	11%
Cobble	49%
Coarse Gravel	29%
Fine Gravel	8%
Sand	3%
Silt and smaller	0%

Silt/Clay Present? **No**

Detritus **0** %

Large Woody **0**

2.13 Average Largest Particle on

Bed **20.0** **inches**

Bar **N/A** **inches**

2.14 Stream Type

Stream Type: **F**

Bed Material: **Cobble**

Subclass Slope: **None**

Bed Form: **Plane Bed**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Boulder/Cobbl	Boulder/Cobbl
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	218	63
Erosion Height (ft)	7.00	5.00
Revetmt. Type	None	Rip-Rap
Revetmt. Length (ft)	0	456

Near Bank Veg. Type	Left	Right
Dominant	Shrubs/Saplin	Bare
Sub-dominant	Herbaceous	None

Bank Canopy	Left	Right
Canopy %	26-50	0

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	51-100	0-25
Sub-dominant	None	None
W less than 25	0	611

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	None
Sub-dominant	Shrubs/Saplin	None

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Residential
Sub-dominant	None	None
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **None**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.7 StormwaterInputs

Field Ditch	0	Road Ditch	1
Other	0	Tile Drain	0
Overland Flow	0	Urb Strm Wtr Pipe	0

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	0	1
Diagonal	**Delta**	**Island**
0	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **598**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T10** Segment: **A** Completion Date: **September 20,**

Organization: **Bear Creek Environmental** Observers: **MN, CS** Rain: **No**

Segment Length (ft): **611** Segment Location: **This segment continues until approximately 600 feet upstream to where the rip rap ends.**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	54.0	Yes	No	No	Yes
Problem	None				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**2**	**C to F**	**Yes**
7.2 Channel Aggradation	**13**	**None**	**No**
7.3 Widening Channel	**14**		**No**
7.4 Change in Planform	**15**		**No**
Total Score	**44**		
Geomorphic Rating	**0.55**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**II**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Extreme**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	10
6.2 Embeddedness	10
6.3 Velocity/Depth Patterns	9
6.4 Sediment Deposition	13
6.5 Channel Flow Status	13
6.6 Channel Alteration	3
6.7 Frequency of Riffles/Steps	10
6.8 Bank Stability	Left: 6 Right: 8
6.9 Bank Vegetation Protection	Left: 8 Right: 0
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 0
Total Score	99
Habitat Rating	0.495
Habitat Stream Condition	**Fair**

Narrative:

Extreme historic degradation, minor aggradation, widening and planform adjustment; channel locked in place by road.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T10** Segment: **B** Completion Date: **September 20, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **2,254** Segment Location: **This segment continues until about 140 feet downstream of a bridge that is a driveway**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Channel Dimensions**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	2,242	0
height	12	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	1,169	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Very Steep	Very Steep
Continuous w/	Sometimes	Never
W/in 1 Bankfill	Sometimes	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **412**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **53**

2.2 Max Depth (ft) **3.80**

2.3 Mean Depth (ft) **2.54**

2.4 Floodprone Width (ft) **78**

Notes:

North Wolcott Road in right corridor, rip rap and straightening associated with road. No trees near mass failures.

North Wolcott Road should be considered the valley wall for Phase 2 and FEH purposes.

Step 2. (Contued)

2.5 Aband. Floodpln **6.70** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **20.98**

2.7 Entrenchment Ratio **1.46**

2.8 Incision Ratio **1.76**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **312**

2.12 Substrate Composition

Bedrock	0%
Boulder	10%
Cobble	19%
Coarse Gravel	25%
Fine Gravel	36%
Sand	10%
Silt and smaller	0%

Silt/Clay Present? **Yes**

Detritus **2** %

Large Woody **15**

2.13 Average Largest Particle on

Bed **13.0** **inches**

Bar **8.0** **inches**

2.14 Stream Type

Stream Type: **B**

Bed Material: **Gravel**

Subclass Slope: **c**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Clay	Gravel
Consistency	Cohesive	Non-cohesive
Bank Erosion	Left	Right
Erosion Length (ft)	766	88
Erosion Height (ft)	6.50	5.00
Revetmt. Type	None	Rip-Rap
Revetmt. Length (ft)	0	558
Near Bank Veg. Type	Left	Right
Dominant	Deciduous	Herbaceous
Sub-dominant	Herbaceous	Shrubs/Saplin
Bank Canopy	Left	Right
Canopy %	51-75	1-25
Mid-Channel Canopy		Open

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	26-50
Sub-dominant	None	51-100
W less than 25	0	449
Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Shrubs/Saplin
Sub-dominant	Herbaceous	Herbaceous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Residential
Sub-dominant	None	None
Mass Failures	114	0
Height	76	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
1	5	6
Diagonal	**Delta**	**Island**
2	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
2	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **473**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T10** Segment: **B** Completion Date: **September 20,**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Rain: **No**

Segment Length (ft): **2,254** Segment Location: **This segment continues until about 140 feet downstream of a bridge that is a driveway**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**5**	**C to B**	**Yes**
7.2 Channel Aggradation	**13**	**None**	**No**
7.3 Widening Channel	**12**		**No**
7.4 Change in Planform	**13**		**No**
Total Score	**43**		
Geomorphic Rating	**0.5375**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	13
6.2 Embeddedness	14
6.3 Velocity/Depth Patterns	13
6.4 Sediment Deposition	9
6.5 Channel Flow Status	10
6.6 Channel Alteration	10
6.7 Frequency of Riffles/Steps	16
6.8 Bank Stability	Left: 5 Right: 9
6.9 Bank Vegetation Protection	Left: 8 Right: 3
6.10 Riparian Vegetation Zone Width	Left: 10 Right: 4
Total Score	124
Habitat Rating	0.62
Habitat Stream Condition	**Fair**

Narrative:

major historic degradation, minor aggradation, widening and planform adjustment.

Stream: **Wild Branch** Reach # **T10** Segment: **C** Completion Date: **September 24, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **3,812** Segment Location: **This segment continues until approximately 300 feet downstream of Cote Road.**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Channel Dimensions**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**0**	**0**
height	**0**	**0**
Roads	**1,422**	**0**
height	**15**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**1,817**	**0**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Very Steep**	**Very Steep**
Continuous w/	**Sometimes**	**Never**
W/in 1 Bankfill	**Sometimes**	**Never**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft) **490**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **75**

2.2 Max Depth (ft) **2.60**

2.3 Mean Depth (ft) **2.22**

2.4 Floodprone Width (ft) **241**

Notes:

Wide channel. Road in corridor at downstream end of segment. Some rip rap and road access in upstream end of segment appears to be abutments or footers for a future bridge. Multiple stream fords in segment.

Step 2. (Contued)

2.5 Aband. Floodpln **4.50** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **33.78**

2.7 Entrenchment Ratio **3.21**

2.8 Incision Ratio **1.73**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **345**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**4** %
Cobble	**30** %
Coarse Gravel	**38** %
Fine Gravel	**23** %
Sand	**5** %
Silt and smaller	**0** %

Silt/Clay Present? **Yes**

Detritus **1** %

Large Woody **12**

2.13 Average Largest Particle on

Bed **9.0** **inches**

Bar **6.5** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Sand**	**Sand**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Gravel**	**Gravel**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**1,520**	**524**
Erosion Height (ft)	**5.71**	**4.52**
Revetmt. Type	**Rip-Rap**	**Rip-Rap**
Revetmt. Length (ft)	**216**	**1,490**

Near Bank Veg. Type	Left	Right
Dominant	**Deciduous**	**Shrubs/Saplin**
Sub-dominant	**Herbaceous**	**Herbaceous**

Bank Canopy	Left	Right
Canopy %	**51-75**	**26-50**

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**26-50**
Sub-dominant	**0-25**	**0-25**
W less than 25	**210**	**1,024**

Buffer Veg. Type	Left	Right
Dominant	**Deciduous**	**Shrubs/Saplin**
Sub-dominant	**Coniferous**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Residential**
Sub-dominant	**Residential**	**Shrubs/Saplin**
Mass Failures	**66**	**0**
Height	**25**	**0**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **Minimal**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments **None**

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg **None**

4.7 StormwaterInputs

Field Ditch	**0**	Road Ditch	**1**
Other	**0**	Tile Drain	**0**
Overland Flow	**0**	Urb Strm Wtr Pipe	**0**

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	**5**	**10**

Diagonal	Delta	Island
7	**0**	**0**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	**0**	**0**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
7	**0**	**No**

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **Straightening**

Straightening Length: **1,668**

5.5 Dredging **Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T10** Segment: **C** Completion Date: **September 24,**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Rain: **No**

Segment Length (ft): **3,812** Segment Location: **This segment continues until approximately 300 feet downstream of Cote Road.**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	52.5	Yes	No	No	Yes
Problem	Deposition Above,Deposition Below,Scour				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**8**	**None**	**Yes**
7.2 Channel Aggradation	**7**	**None**	**No**
7.3 Widening Channel	**8**		**Yes**
7.4 Change in Planform	**13**		**No**
Total Score	**36**		
Geomorphic Rating	**0.45**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	6
6.2 Embeddedness	9
6.3 Velocity/Depth Patterns	8
6.4 Sediment Deposition	5
6.5 Channel Flow Status	6
6.6 Channel Alteration	8
6.7 Frequency of Riffles/Steps	14
6.8 Bank Stability	Left: 4 Right: 7
6.9 Bank Vegetation Protection	Left: 7 Right: 4
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 3
Total Score	90
Habitat Rating	0.45
Habitat Stream Condition	**Fair**

Narrative:

major historic degradation, historic widening, juvenile floodplain just starting to develop in places, major aggradation (overwide) with deep pools infrequent.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **No Name Given** Reach # **T10.01** Segment: **0** Completion Date: **October 11, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **1,497** Segment Location: **This segment begins at the start of reach number 10 of the Wild Branch (Morey Hill Road). It**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**0**	**0**
height	**0**	**0**
Roads	**1,099**	**0**
height	**8**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**72**	**139**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Very Steep**	**Extremely**
Continuous w/	**Sometimes**	**Sometimes**
W/in 1 Bankfill	**Sometimes**	**Sometimes**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft) **155**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **25**

2.2 Max Depth (ft) **2.20**

2.3 Mean Depth (ft) **1.28**

2.4 Floodprone Width (ft) **37**

Notes:

Unnamed trib, runs along Brook Road. Perched trib enters at upstream end of segment.

Multiple revetments on right bank include rip rap and minor hard bank in the vicinity of the

Step 2. (Contued)

2.5 Aband. Floodpln **6.50** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **19.14**

2.7 Entrenchment Ratio **1.51**

2.8 Incision Ratio **2.95**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **182**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**12** %
Cobble	**49** %
Coarse Gravel	**31** %
Fine Gravel	**8** %
Sand	**0** %
Silt and smaller	**0** %

Silt/Clay Present? **Yes**

Detritus **2** %

Large Woody **23**

2.13 Average Largest Particle on

Bed **10.0** **inches**

Bar **7.0** **inches**

2.14 Stream Type

Stream Type: **B**

Bed Material: **Cobble**

Subclass Slope: **c**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Sand**	**Sand**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Boulder/Cobbl**	**Boulder/Cobbl**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**984**	**358**
Erosion Height (ft)	**5.83**	**6.69**
Revetmt. Type	**Hard Bank**	**Multiple**
Revetmt. Length (ft)	**34**	**359**

Near Bank Veg. Type	Left	Right
Dominant	**Herbaceous**	**Herbaceous**
Sub-dominant	**Deciduous**	**Deciduous**

Bank Canopy	Left	Right
Canopy %	**51-75**	**26-50**

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-dominant	**0-25**	**0-25**
W less than 25	**91**	**115**

Buffer Veg. Type	Left	Right
Dominant	**Mixed Trees**	**Mixed Trees**
Sub-dominant	**None**	**None**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Residential**	**Residential**
Mass Failures	**77**	**0**
Height	**30**	**0**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **1**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.7 StormwaterInputs

Field Ditch	**1**	Road Ditch	**2**
Other	**0**	Tile Drain	**0**
Overland Flow	**0**	Urb Strm Wtr Pipe	**0**

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
1	**3**	**6**

Diagonal	Delta	Island
0	**0**	**1**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	**0**	**0**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	**0**	**Yes**

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **547**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **No Name Given** Reach # **T10.01** Segment: **0** Completion Date: **October 11, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **1,497** Segment Location: **This segment begins at the start of reach number 10 of the Wild Branch (Morey Hill Road). It**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	29.0	Yes	No	No	Yes
Problem	Deposition Above,Deposition Below,Scour				
Culvert	7.00	Yes	No	Yes	Yes
Problem	Deposition Above,Scour Above,Scour				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**4**	**C to B**	**Yes**
7.2 Channel Aggradation	**14**	**None**	**No**
7.3 Widening Channel	**12**		**No**
7.4 Change in Planform	**11**		**No**
Total Score	**41**		
Geomorphic Rating	**0.5125**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	15
6.2 Embeddedness	16
6.3 Velocity/Depth Patterns	14
6.4 Sediment Deposition	13
6.5 Channel Flow Status	10
6.6 Channel Alteration	9
6.7 Frequency of Riffles/Steps	14
6.8 Bank Stability	Left: 2 Right: 6
6.9 Bank Vegetation Protection	Left: 7 Right: 7
6.10 Riparian Vegetation Zone Width	Left: 8 Right: 8
Total Score	129
Habitat Rating	0.645
Habitat Stream Condition	**Good**

Narrative:

extreme historic degradation, minor aggradation and widening, minor planform adjustment.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T11** Segment: **0** Completion Date: **September 24, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **4,423** Segment Location: **This segment continues until about 200 feet east of where the south end of Glenn Anderson**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**0**	**0**
height	**0**	**0**
Roads	**4,032**	**0**
height	**12**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**63**	**49**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Very Steep**	**Hilly**
Continuous w/	**Sometimes**	**Never**
W/in 1 Bankfill	**Sometimes**	**Never**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft)	**450**
Width Determination	**Measured**
Confinement Type	**Broad**
Rock Gorge?	**No**
Human-caused Change?	**yes**

Step 2. Stream Channel

2.1 Bankfull Width	**69**
2.2 Max Depth (ft)	**2.60**
2.3 Mean Depth (ft)	**1.42**
2.4 Floodprone Width (ft)	**142**

Notes:

Localized and active gravel scalping on point bar. Numerous diagonal riffles upstream of bends. Extensive planform adjustment occurring in reach. Entrenchment ratio was near cutoff between B and C channel. Weak riffle-pool bedform. Numerous diagonal

Step 2. (Contued)

2.5 Aband. Floodpln	**5.30** ft.
Human Elev Floodpln	**0.00** ft.
2.6 Width/Depth Ratio	**48.24**
2.7 Entrenchment Ratio	**2.08**
2.8 Incision Ratio	**2.04**
Human Elevated Inc Rat	**0.00**
2.9 Sinuosity	**Low**
2.10 Riffles Type	**Sedimented**
2.11 Riffle/Step Spacing (ft)	**350**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**4** %
Cobble	**30** %
Coarse Gravel	**33** %
Fine Gravel	**22** %
Sand	**10** %
Silt and smaller	**1** %

Silt/Clay Present?	**Yes**
Detritus	**2** %
# Large Woody	**30**

2.13 Average Largest Particle on

Bed	**9.0**	**inches**
Bar	**5.0**	**inches**

2.14 Stream Type

Stream Type:	**B**
Bed Material:	**Gravel**
Subclass Slope:	**c**
Bed Form:	**Riffle-Pool**
Field Measured Slope:	

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Sand**	**Sand**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Gravel**	**Gravel**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**1,440**	**1,227**
Erosion Height (ft)	**6.05**	**5.90**
Revetmt. Type	**None**	**Rip-Rap**
Revetmt. Length (ft)	**0**	**602**

Near Bank Veg. Type	Left	Right
Dominant	**Deciduous**	**Shrubs/Saplin**
Sub-dominant	**Shrubs/Saplin**	**Herbaceous**

Bank Canopy	Left	Right
Canopy %	**26-50**	**1-25**
Mid-Channel Canopy	**Open**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**0-25**
Sub-dominant	**0-25**	**>100**
W less than 25	**804**	**1,209**

Buffer Veg. Type	Left	Right
Dominant	**Mixed Trees**	**Herbaceous**
Sub-dominant	**Herbaceous**	**Shrubs/Saplin**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Residential**
Sub-dominant	**Hay**	**Shrubs/Saplin**
Mass Failures	**92**	**271**
Height	**30**	**15**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps	**Minimal**
4.2 Adjacent Wetlands	**Minimal**
4.3 Flow Status	**Low**
4.4 # of Debris Jams	**1**
4.5 Flow Regulation Type	**None**
Flow Regulation Use	
Impoundments	
Impoundmt. Location	
4.6 Up/Down strm flow reg	**None**
(old) Upstrm Flow Reg	

4.7 StormwaterInputs

Field Ditch	**0**	Road Ditch	**1**
Other	**0**	Tile Drain	**0**
Overland Flow	**0**	Urb Strm Wtr Pipe	**0**

4.9 # of Beaver Dams	**0**
Affected Length (ft)	**0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
4	**10**	**3**
Diagonal	**Delta**	**Island**
5	**0**	**0**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
6	**0**	**1**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
5	**0**	**No**

5.4 Stream Ford or Animal	**Yes**
5.5 Straightening	**Straightening**
Straightening Length:	**419**
5.5 Dredging	**Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T11** Segment: **0** Completion Date: **September 24,**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Rain: **No**

Segment Length (ft): **4,423** Segment Location: **This segment continues until about 200 feet east of where the south end of Glenn Anderson**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	51.0	Yes	No	No	Yes

Problem Deposition Above,Deposition Below

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**5**	**C to B**	**Yes**
7.2 Channel Aggradation	**5**	**None**	**No**
7.3 Widening Channel	**5**		**No**
7.4 Change in Planform	**3**		**No**

Total Score	**18**
Geomorphic Rating	**0.225**
Channel Evolution Model	**F**
Channel Evolution Stage	**III**
Geomorphic Condition	**Poor**
Stream Sensitivity	**Very High**

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	5
6.2 Embeddedness	11
6.3 Velocity/Depth Patterns	8
6.4 Sediment Deposition	5
6.5 Channel Flow Status	6
6.6 Channel Alteration	11
6.7 Frequency of Riffles/Steps	14
6.8 Bank Stability	Left: 5 Right: 6
6.9 Bank Vegetation Protection	Left: 6 Right: 4
6.10 Riparian Vegetation Zone Width	Left: 8 Right: 3
Total Score	92
Habitat Rating	0.46
Habitat Stream Condition	**Fair**

Narrative:

extreme historic degradation, extreme aggradation, widening and planform adjustment.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T12** Segment: **A** Completion Date: **September 26, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **1,267** Segment Location: **This segment continues until approximately 180 feet upstream of where Glenn Anderson**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Banks and Buffers**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	1,234	0
height	15	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	163	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Very Steep	Steep
Continuous w/	Sometimes	Never
W/in 1 Bankfill	Always	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **330**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **60**

2.2 Max Depth (ft) **3.00**

2.3 Mean Depth (ft) **2.12**

2.4 Floodprone Width (ft) **71**

Notes:

No evidence of human straightening in segment, channelized just upstream of segment. Minor bar scalping. Extremely incised, large wetland area on other side of street, likely river used to run through wetland area. Extreme incision likely due to new path

Step 2. (Contued)

2.5 Aband. Floodpln **11.20** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **28.07**

2.7 Entrenchment Ratio **1.18**

2.8 Incision Ratio **3.73**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Eroded**

2.11 Riffle/Step Spacing (ft) **385**

2.12 Substrate Composition

Bedrock	0%
Boulder	5%
Cobble	24%
Coarse Gravel	32%
Fine Gravel	27%
Sand	11%
Silt and smaller	1%

Silt/Clay Present? **Yes**

Detritus **1** %

Large Woody **10**

2.13 Average Largest Particle on

Bed **8.0** **inches**

Bar **7.0** **inches**

2.14 Stream Type

Stream Type: **F**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Plane Bed**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	598	614
Erosion Height (ft)	7.13	8.30
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Deciduous	Herbaceous
Sub-dominant	Herbaceous	Deciduous

Bank Canopy	Left	Right
Canopy %	51-75	26-50

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	26-50
Sub-dominant	None	>100
W less than 25	0	0

Buffer Veg. Type	Left	Right
Dominant	Deciduous	Deciduous
Sub-dominant	Herbaceous	Coniferous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Residential
Sub-dominant	None	None
Mass Failures	47	50
Height	25	15
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
1	2	2

Diagonal	Delta	Island
0	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	0	No

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T12** Segment: **A** Completion Date: **September 26,**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Rain: **No**

Segment Length (ft): **1,267** Segment Location: **This segment continues until approximately 180 feet upstream of where Glenn Anderson**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**3**	**C to F**	**Yes**
7.2 Channel Aggradation	**12**	**None**	**No**
7.3 Widening Channel	**7**		**No**
7.4 Change in Planform	**13**		**No**
Total Score	**35**		
Geomorphic Rating	**0.4375**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Extreme**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	9
6.2 Embeddedness	9
6.3 Velocity/Depth Patterns	8
6.4 Sediment Deposition	8
6.5 Channel Flow Status	8
6.6 Channel Alteration	13
6.7 Frequency of Riffles/Steps	14
6.8 Bank Stability	Left: 4 Right: 4
6.9 Bank Vegetation Protection	Left: 6 Right: 6
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 4
Total Score	102
Habitat Rating	0.51
Habitat Stream Condition	**Fair**

Narrative:

extreme historic degradation, minor aggradation and planform adjustment, major widening.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T12** Segment: **B** Completion Date: **September 26, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **2,745** Segment Location: **This segment continues until just west of Denton Hill Road where the river goes under Wild**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Banks and Buffers**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	600	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	1,019	42

1.4 Adjacent Side	Left	Right
Hillside Slope	Very Steep	Steep
Continuous w/	Sometimes	Never
W/in 1 Bankfill	Sometimes	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **415**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **80**

2.2 Max Depth (ft) **2.90**

2.3 Mean Depth (ft) **1.90**

2.4 Floodprone Width (ft) **96**

Notes:

Segment in poor condition. Extreme incision and widening, many mass failures along left bank. Frequently rip rapped along right bank when river abuts Wild Branch Road. Major aggradation with large bars, and major planform adjustment occurring in segment.

Step 2. (Contued)

2.5 Aband. Floodpln **4.90** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **42.00**

2.7 Entrenchment Ratio **1.20**

2.8 Incision Ratio **1.69**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **255**

2.12 Substrate Composition

Bedrock	0%
Boulder	7%
Cobble	28%
Coarse Gravel	25%
Fine Gravel	21%
Sand	19%
Silt and smaller	0%

Silt/Clay Present? **Yes**

Detritus **1** %

Large Woody **22**

2.13 Average Largest Particle on

Bed **8.0** **inches**

Bar **6.5** **inches**

2.14 Stream Type

Stream Type: **F**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type

(if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive
Bank Erosion	Left	Right
Erosion Length (ft)	740	631
Erosion Height (ft)	5.80	5.94
Revetmt. Type	Multiple	Multiple
Revetmt. Length (ft)	122	722
Near Bank Veg. Type	Left	Right
Dominant	Shrubs/Saplin	Herbaceous
Sub-dominant	Bare	Shrubs/Saplin
Bank Canopy	Left	Right
Canopy %	1-25	1-25
Mid-Channel Canopy	Open	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	26-50
Sub-dominant	0-25	0-25
W less than 25	623	123
Buffer Veg. Type	Left	Right
Dominant	Deciduous	Herbaceous
Sub-dominant	Coniferous	Shrubs/Saplin

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Residential
Sub-dominant	Hay	Hay
Mass Failures	421	0
Height	35	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.7 StormwaterInputs

Field Ditch	0	Road Ditch	1
Other	0	Tile Drain	0
Overland Flow	0	Urb Strm Wtr Pipe	0

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
1	7	4
Diagonal	**Delta**	**Island**
3	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
2	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
3	0	Yes

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **524**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T12** Segment: **B** Completion Date: **September 26,**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Rain: **No**

Segment Length (ft): **2,745** Segment Location: **This segment continues until just west of Denton Hill Road where the river goes under Wild**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	40.5	Yes	No	Yes	Yes

Problem Deposition Below,Scour Above,Alignment

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**5**	**C to F**	**Yes**
7.2 Channel Aggradation	**7**	**None**	**No**
7.3 Widening Channel	**5**		**No**
7.4 Change in Planform	**9**		**No**
Total Score	**26**		
Geomorphic Rating	**0.325**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Poor**		
Stream Sensitivity	**Extreme**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	9
6.2 Embeddedness	9
6.3 Velocity/Depth Patterns	9
6.4 Sediment Deposition	7
6.5 Channel Flow Status	6
6.6 Channel Alteration	11
6.7 Frequency of Riffles/Steps	15
6.8 Bank Stability	Left: 6 Right: 6
6.9 Bank Vegetation Protection	Left: 3 Right: 5
6.10 Riparian Vegetation Zone Width	Left: 8 Right: 3
Total Score	97
Habitat Rating	0.485
Habitat Stream Condition	**Fair**

Narrative:

extreme historic degradation, active extreme widening, major aggradation and planform adjustment.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T13** Segment: **0** Completion Date: **September 27, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **3,398** Segment Location: **This segment continues until about 1000 feet north of where Denton Hill Road meets Wild**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	788	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Hilly
Continuous w/	Sometimes	Sometimes
W/in 1 Bankfill	Sometimes	Sometimes
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **535**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **yes**

Step 2. Stream Channel

2.1 Bankfull Width **40**

2.2 Max Depth (ft) **2.60**

2.3 Mean Depth (ft) **2.20**

2.4 Floodprone Width (ft) **52**

Notes:

Entrenchment ratio was on border between F and B channel. High incision, downstream segments were also F channels. Most of reach is away from road except the most downstream 550 feet which runs along Wild Branch Road. Early stage III.

Step 2. (Contued)

2.5 Aband. Floodpln **5.40** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **17.95**

2.7 Entrenchment Ratio **1.32**

2.8 Incision Ratio **2.08**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **350**

2.12 Substrate Composition

Bedrock	0%
Boulder	3%
Cobble	17%
Coarse Gravel	33%
Fine Gravel	31%
Sand	13%
Silt and smaller	3%

Silt/Clay Present? **Yes**

Detritus **1** %

Large Woody **22**

2.13 Average Largest Particle on

Bed **7.0** **inches**

Bar **5.0** **inches**

2.14 Stream Type

Stream Type: **F**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	1,005	1,567
Erosion Height (ft)	4.45	4.54
Revetmt. Type	Rip-Rap	None
Revetmt. Length (ft)	97	0

Near Bank Veg. Type	Left	Right
Dominant	Deciduous	Deciduous
Sub-dominant	Herbaceous	Herbaceous

Bank Canopy	Left	Right
Canopy %	26-50	26-50

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	26-50	>100
Sub-dominant	51-100	26-50
W less than 25	58	178

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Mixed Trees
Sub-dominant	Herbaceous	Herbaceous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Pasture	Forest
Sub-dominant	Residential	Hay
Mass Failures	32	38
Height	30	15
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Abundant**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
2	5	10

Diagonal	Delta	Island
0	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
2	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	0	No

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **Straightening**

Straightening Length: **696**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T13** Segment: **0** Completion Date: **September 27,**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **3,398** Segment Location: **This segment continues until about 1000 feet north of where Denton Hill Road meets Wild**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**5**	**C to F**	**Yes**
7.2 Channel Aggradation	**10**	**None**	**No**
7.3 Widening Channel	**13**		**No**
7.4 Change in Planform	**11**		**No**
Total Score	**39**		
Geomorphic Rating	**0.4875**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Extreme**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	8
6.2 Embeddedness	6
6.3 Velocity/Depth Patterns	12
6.4 Sediment Deposition	10
6.5 Channel Flow Status	13
6.6 Channel Alteration	14
6.7 Frequency of Riffles/Steps	15
6.8 Bank Stability	Left: 6 Right: 4
6.9 Bank Vegetation Protection	Left: 7 Right: 7
6.10 Riparian Vegetation Zone Width	Left: 8 Right: 5
Total Score	115
Habitat Rating	0.575
Habitat Stream Condition	**Fair**

Narrative:

extreme historic degradation, minor planform adjustment and widening, major aggradation.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T14** Segment: **A** Completion Date: **October 2, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **1,050** Segment Location: **This segment continues for approximately 1000 feet upstream and ends where beaver dams**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Channel Dimensions**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Hilly
Continuous w/	Never	Never
W/in 1 Bankfill	Sometimes	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **717**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **No**

Step 2. Stream Channel

2.1 Bankfull Width **39**

2.2 Max Depth (ft) **3.30**

2.3 Mean Depth (ft) **2.49**

2.4 Floodprone Width (ft) **100**

Notes:

Upstream of segment seriously impacted by beaver dams. One remnant beaver dam at upstream end of segment, no longer impacting segment. Cow pasture beyond valley wall on left bank.

Step 2. (Contued)

2.5 Aband. Floodpln **4.60** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **15.46**

2.7 Entrenchment Ratio **2.60**

2.8 Incision Ratio **1.39**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **315**

2.12 Substrate Composition

Bedrock	0%
Boulder	4%
Cobble	16%
Coarse Gravel	27%
Fine Gravel	25%
Sand	28%
Silt and smaller	0%

Silt/Clay Present? **No**

Detritus **3** %

Large Woody **8**

2.13 Average Largest Particle on

Bed **7.0** **inches**

Bar **3.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type

(if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	377	336
Erosion Height (ft)	4.06	4.66
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Deciduous	Deciduous
Sub-dominant	Coniferous	Herbaceous

Bank Canopy	Left	Right
Canopy %	51-75	26-50

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	26-50
Sub-dominant	26-50	51-100
W less than 25	0	0

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Deciduous
Sub-dominant	None	Herbaceous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Hay
Sub-dominant	Pasture	None
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	10	3

Diagonal	Delta	Island
0	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
2	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T14** Segment: **A** Completion Date: **October 2, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **1,050** Segment Location: **This segment continues for approximately 1000 feet upstream and ends where beaver dams**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**12**	**None**	**Yes**
7.2 Channel Aggradation	**13**	**None**	**No**
7.3 Widening Channel	**13**		**No**
7.4 Change in Planform	**11**		**No**
Total Score	**49**		
Geomorphic Rating	**0.6125**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	14
6.2 Embeddedness	8
6.3 Velocity/Depth Patterns	12
6.4 Sediment Deposition	9
6.5 Channel Flow Status	12
6.6 Channel Alteration	14
6.7 Frequency of Riffles/Steps	14
6.8 Bank Stability	Left: 5 Right: 5
6.9 Bank Vegetation Protection	Left: 9 Right: 6
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 4
Total Score	121
Habitat Rating	0.605
Habitat Stream Condition	**Fair**

Narrative:

Minor historic degradation, minor aggradation, widening and planform adjustment.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T14** Segment: **B** Completion Date: **October 1, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: **beaver dam** Rain: **Yes**

Segment Length (ft): **885** Segment Location: **This segment continues for approximately 900 feet upstream where beaver dams have**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Other Reason**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Hilly
Continuous w/	Never	Never
W/in 1 Bankfill	Never	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **790**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **No**

Step 2. Stream Channel

2.1 Bankfull Width **0**

2.2 Max Depth (ft) **0.00**

2.3 Mean Depth (ft) **0.00**

2.4 Floodprone Width (ft) **0**

Notes:

Segment not assessed due to influence by beaver dam. Too deep to walk in river, water backed up for length of segment. Farm land on both sides of segment, farm bridge crosses river in segment. Evidence of more extensive past beaver dam influence

Step 2. (Contued)

2.5 Aband. Floodpln **0.00** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **0.00**

2.7 Entrenchment Ratio **0.00**

2.8 Incision Ratio **0.00**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Not Applicable**

2.11 Riffle/Step Spacing (ft) **0**

2.12 Substrate Composition

Silt/Clay Present? **No**

Detritus **0** %

Large Woody **0**

2.13 Average Largest Particle on

Bed **0.0**

Bar **0.0**

Not Evaluated

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Plane Bed**

Field Measured Slope:

2.15 Reference Stream Type

(if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	0	182
Erosion Height (ft)	0.00	5.00
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Herbaceous	Herbaceous
Sub-dominant	Deciduous	Deciduous

Bank Canopy	Left	Right
Canopy %	1-25	1-25

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	26-50	26-50
Sub-dominant	>100	None
W less than 25	0	0

Buffer Veg. Type	Left	Right
Dominant	Deciduous	Deciduous
Sub-dominant	Herbaceous	Herbaceous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Hay	Hay
Sub-dominant	Residential	None
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **Minimal**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **1**

Affected Length (ft) **800**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	10	2

Diagonal	Delta	Island
0	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T14** Segment: **B** Completion Date: **October 1, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **885** Segment Location: **This segment continues for approximately 900 feet upstream where beaver dams have**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	25.0	Yes	No	Yes	Yes

Problem: Scour Above,Scour Below

Step 7. Rapid Geomorphic Assessment Data

Confinement Type

Channel Evolution Model

Channel Evolution Stage

Geomorphic Condition **Fair**

Stream Sensitivity

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type

Habitat Stream Condition

Narrative:

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T14** Segment: **C** Completion Date: **October 1, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **3,502** Segment Location: **This segment continues until the bridge on Hatch Brook Road.**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Banks and Buffers**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	176	50

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Hilly
Continuous w/	Sometimes	Never
W/in 1 Bankfill	Sometimes	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **790**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **No**

Step 2. Stream Channel

2.1 Bankfull Width **42**

2.2 Max Depth (ft) **3.00**

2.3 Mean Depth (ft) **2.28**

2.4 Floodprone Width (ft) **86**

Notes:

Evidence of remnant beaver dam in reach, also downstream segment significantly influenced by beaver dams. Christmas tree farm located on right bank. Moderately entrenched. Lots of planform adjustment occurring in reach and large depositional

Step 2. (Contued)

2.5 Aband. Floodpln **4.40** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **18.42**

2.7 Entrenchment Ratio **2.04**

2.8 Incision Ratio **1.47**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **440**

2.12 Substrate Composition

Bedrock	0%
Boulder	4%
Cobble	23%
Coarse Gravel	53%
Fine Gravel	13%
Sand	7%
Silt and smaller	0%

Silt/Clay Present? **Yes**

Detritus **2** %

Large Woody **20**

2.13 Average Largest Particle on

Bed **9.0** **inches**

Bar **4.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive
Bank Erosion	Left	Right
Erosion Length (ft)	1,743	1,010
Erosion Height (ft)	5.12	5.20
Revetmt. Type	Multiple	Multiple
Revetmt. Length (ft)	106	173
Near Bank Veg. Type	Left	Right
Dominant	Shrubs/Saplin	Shrubs/Saplin
Sub-dominant	Herbaceous	Herbaceous
Bank Canopy	Left	Right
Canopy %	26-50	26-50
Mid-Channel Canopy		Open

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	51-100
Sub-dominant	26-50	>100
W less than 25	0	99
Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Mixed Trees
Sub-dominant	Herbaceous	Herbaceous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Forest
Sub-dominant	Hay	Hay
Mass Failures	143	0
Height	20	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	7	7

Diagonal	Delta	Island
0	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
6	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T14** Segment: **C** Completion Date: **October 1, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **3,502** Segment Location: **This segment continues until the bridge on Hatch Brook Road.**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	20.0	Yes	No	Yes	Yes
Problem	None				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**9**	**None**	**Yes**
7.2 Channel Aggradation	**10**	**None**	**No**
7.3 Widening Channel	**10**		**No**
7.4 Change in Planform	**6**		**No**
Total Score	**35**		
Geomorphic Rating	**0.4375**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	13
6.2 Embeddedness	8
6.3 Velocity/Depth Patterns	13
6.4 Sediment Deposition	8
6.5 Channel Flow Status	11
6.6 Channel Alteration	15
6.7 Frequency of Riffles/Steps	12
6.8 Bank Stability	Left: 4 Right: 6
6.9 Bank Vegetation Protection	Left: 8 Right: 8
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 7
Total Score	122
Habitat Rating	0.61
Habitat Stream Condition	**Fair**

Narrative:

Major historic degradation, major aggradation, widening and planform adjustment.

Stream: **Wild Branch** Reach # **T15** Segment: **A** Completion Date: **October 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **No**

Segment Length (ft): **2,898** Segment Location: **This segment continues for approximately 2812 feet upstream where the depositional**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Depositional Features**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Steep
Continuous w/	Never	Sometimes
W/in 1 Bankfill	Never	Sometimes
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft)	1,250
Width Determination	Measured
Confinement Type	Very Broad
Rock Gorge?	No
Human-caused Change?	No

Step 2. Stream Channel

2.1 Bankfull Width	41
2.2 Max Depth (ft)	3.10
2.3 Mean Depth (ft)	2.33
2.4 Floodprone Width (ft)	223

Notes:

Segment has large depositional features and wide valley width. Early Stage III.

Step 2. (Contued)

2.5 Aband. Floodpln	5.50 ft.
Human Elev Floodpln	0.00 ft.
2.6 Width/Depth Ratio	17.60
2.7 Entrenchment Ratio	5.44
2.8 Incision Ratio	1.77
Human Elevated Inc Rat	0.00
2.9 Sinuosity	Low
2.10 Riffles Type	Sedimented
2.11 Riffle/Step Spacing (ft)	270

2.12 Substrate Composition

Bedrock	0%
Boulder	5%
Cobble	34%
Coarse Gravel	45%
Fine Gravel	12%
Sand	4%
Silt and smaller	0%

Silt/Clay Present?	Yes
Detritus	5 %
# Large Woody	12

2.13 Average Largest Particle on

Bed	5.0	inches
Bar	4.0	inches

2.14 Stream Type

Stream Type:	C
Bed Material:	Gravel
Subclass Slope:	None
Bed Form:	Riffle-Pool
Field Measured Slope:	

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	696	903
Erosion Height (ft)	4.35	4.74
Revetmt. Type	Rip-Rap	None
Revetmt. Length (ft)	138	0

Near Bank Veg. Type	Left	Right
Dominant	Deciduous	Deciduous
Sub-dominant	Herbaceous	Herbaceous

Bank Canopy	Left	Right
Canopy %	51-75	51-75
Mid-Channel Canopy		Open

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	26-50	>100
Sub-dominant	>100	None
W less than 25	72	0

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Mixed Trees
Sub-dominant	Herbaceous	None

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Pasture	Forest
Sub-dominant	Forest	None
Mass Failures	0	51
Height	0	20
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps	Minimal
4.2 Adjacent Wetlands	Minimal
4.3 Flow Status	Low
4.4 # of Debris Jams	0
4.5 Flow Regulation Type	None
Flow Regulation Use	
Impoundments	
Impoundmt. Location	
4.6 Up/Down strm flow reg	None
(old) Upstrm Flow Reg	

4.9 # of Beaver Dams	0
Affected Length (ft)	0

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
1	8	5
Diagonal	Delta	Island
5	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
2	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
5	0	No

5.4 Stream Ford or Animal	No
5.5 Straightening	Straightening
Straightening Length:	136
5.5 Dredging	None

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T15** Segment: **A** Completion Date: **October 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **No**

Segment Length (ft): **2,898** Segment Location: **This segment continues for approximately 2812 feet upstream where the depositional**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**8**	**None**	**Yes**
7.2 Channel Aggradation	**6**	**None**	**No**
7.3 Widening Channel	**13**		**No**
7.4 Change in Planform	**12**		**No**
Total Score	**39**		
Geomorphic Rating	**0.4875**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	11
6.2 Embeddedness	9
6.3 Velocity/Depth Patterns	13
6.4 Sediment Deposition	7
6.5 Channel Flow Status	7
6.6 Channel Alteration	14
6.7 Frequency of Riffles/Steps	16
6.8 Bank Stability	Left: 6 Right: 5
6.9 Bank Vegetation Protection	Left: 7 Right: 6
6.10 Riparian Vegetation Zone Width	Left: 6 Right: 9
Total Score	116
Habitat Rating	0.58
Habitat Stream Condition	**Fair**

Narrative:

major historic degradation, minor widening and planform adjustment, major aggradation. Early stage III.

Stream: **Wild Branch** Reach # **T15** Segment: **B** Completion Date: **October 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **No**

Segment Length (ft): **1,152** Segment Location: **This segment continues for approximately 1150 feet upstream where the valley width**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Valley Width**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Steep
Continuous w/	Never	Sometimes
W/in 1 Bankfill	Never	Sometimes
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **880**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **No**

Step 2. Stream Channel

2.1 Bankfull Width **41**

2.2 Max Depth (ft) **3.00**

2.3 Mean Depth (ft) **2.21**

2.4 Floodprone Width (ft) **205**

Notes:

Segment naturally straight, road not within corridor, valley is wider than upstream segment. Old dam used to exist in upstream segment. Early Stage III.

Riffles are sedimented, not many deep pools,

Step 2. (Contued)

2.5 Aband. Floodpln **4.40** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **18.55**

2.7 Entrenchment Ratio **5.00**

2.8 Incision Ratio **1.47**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **342**

2.12 Substrate Composition

Bedrock	0%
Boulder	7%
Cobble	36%
Coarse Gravel	33%
Fine Gravel	19%
Sand	5%
Silt and smaller	0%

Silt/Clay Present? **No**

Detritus **5** %

Large Woody **5**

2.13 Average Largest Particle on

Bed **9.0** **inches**

Bar **8.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	101	230
Erosion Height (ft)	3.00	4.00
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Shrubs/Saplin	Deciduous
Sub-dominant	Herbaceous	Herbaceous

Bank Canopy	Left	Right
Canopy %	26-50	51-75

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	>100
Sub-dominant	51-100	None
W less than 25	0	0

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Mixed Trees
Sub-dominant	None	None

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Forest
Sub-dominant	Hay	None
Mass Failures	0	44
Height	0	15
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **None**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	0	1

Diagonal	Delta	Island
1	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
1	0	No

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T15** Segment: **B** Completion Date: **October 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **No**

Segment Length (ft): **1,152** Segment Location: **This segment continues for approximately 1150 feet upstream where the valley width**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**9**	**None**	**Yes**
7.2 Channel Aggradation	**10**	**None**	**No**
7.3 Widening Channel	**14**		**No**
7.4 Change in Planform	**17**		**No**
Total Score	**50**		
Geomorphic Rating	**0.625**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	15
6.2 Embeddedness	11
6.3 Velocity/Depth Patterns	15
6.4 Sediment Deposition	14
6.5 Channel Flow Status	12
6.6 Channel Alteration	13
6.7 Frequency of Riffles/Steps	12
6.8 Bank Stability	Left: 8 Right: 7
6.9 Bank Vegetation Protection	Left: 9 Right: 9
6.10 Riparian Vegetation Zone Width	Left: 8 Right: 10
Total Score	143
Habitat Rating	0.715
Habitat Stream Condition	**Good**

Narrative:

major historic degradation, major aggradation and minor widening.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T15** Segment: **C** Completion Date: **October 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **No**

Segment Length (ft): **1,312** Segment Location: **This segment continues for about one half mile until about 400 feet downstream of a small**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Valley Width**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Steep
Continuous w/	Sometimes	Sometimes
W/in 1 Bankfill	Sometimes	Sometimes
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft)	165
Width Determination	Measured
Confinement Type	Narrow
Rock Gorge?	No
Human-caused Change?	No

Step 2. Stream Channel

2.1 Bankfull Width	53
2.2 Max Depth (ft)	2.50
2.3 Mean Depth (ft)	1.96
2.4 Floodprone Width (ft)	120

Notes:

Evidence of possibly 2 old dam abutments in segment near grade controls. Upper most part of segment runs through pasture. Early Stage III.

Step 2. (Contued)

2.5 Aband. Floodpln	4.10 ft.
Human Elev Floodpln	0.00 ft.
2.6 Width/Depth Ratio	26.79
2.7 Entrenchment Ratio	2.29
2.8 Incision Ratio	1.64
Human Elevated Inc Rat	0.00
2.9 Sinuosity	Low
2.10 Riffles Type	Complete
2.11 Riffle/Step Spacing (ft)	350

2.12 Substrate Composition

Bedrock	0%
Boulder	12%
Cobble	29%
Coarse Gravel	41%
Fine Gravel	17%
Sand	1%
Silt and smaller	0%

Silt/Clay Present?	No
Detritus	3 %
# Large Woody	6

2.13 Average Largest Particle on

Bed	10.0	inches
Bar	9.0	inches

2.14 Stream Type

Stream Type:	C
Bed Material:	Gravel
Subclass Slope:	None
Bed Form:	Riffle-Pool
Field Measured Slope:	

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Boulder/Cobbl	Boulder/Cobbl
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	52	397
Erosion Height (ft)	5.00	6.20
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Herbaceous	Deciduous
Sub-dominant	Deciduous	Herbaceous

Bank Canopy	Left	Right
Canopy %	26-50	26-50
Mid-Channel Canopy		Open

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	51-100	>100
Sub-dominant	0-25	0-25
W less than 25	309	0

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Mixed Trees
Sub-dominant	Herbaceous	None

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Pasture	Forest
Sub-dominant	Forest	Pasture
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps	Minimal
4.2 Adjacent Wetlands	Minimal
4.3 Flow Status	Low
4.4 # of Debris Jams	0
4.5 Flow Regulation Type	None
Flow Regulation Use	
Impoundments	
Impoundmt. Location	
4.6 Up/Down strm flow reg	None
(old) Upstrm Flow Reg	

4.9 # of Beaver Dams	0
Affected Length (ft)	0

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	1	5

Diagonal	Delta	Island
0	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	0	No

5.4 Stream Ford or Animal	Yes
5.5 Straightening	None
Straightening Length:	0
5.5 Dredging	None

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T15** Segment: **C** Completion Date: **October 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **No**

Segment Length (ft): **1,312** Segment Location: **This segment continues for about one half mile until about 400 feet downstream of a small**

1.6 Grade Controls

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken
Ledge	Mid-segment	4.00	1.00	Yes	
Ledge	Mid-segment	4.00	2.00	Yes	

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**9**	**None**	**Yes**
7.2 Channel Aggradation	**12**	**None**	**No**
7.3 Widening Channel	**13**		**No**
7.4 Change in Planform	**14**		**No**
Total Score	**48**		
Geomorphic Rating	**0.6**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	14
6.2 Embeddedness	13
6.3 Velocity/Depth Patterns	16
6.4 Sediment Deposition	13
6.5 Channel Flow Status	13
6.6 Channel Alteration	16
6.7 Frequency of Riffles/Steps	14
6.8 Bank Stability	Left: 9 Right: 5
6.9 Bank Vegetation Protection	Left: 6 Right: 6
6.10 Riparian Vegetation Zone Width	Left: 7 Right: 9
Total Score	141
Habitat Rating	0.705
Habitat Stream Condition	**Good**

Narrative:

major historic degradation, minor aggradation, widening and planform adjustment. Early stage III.

Stream: **Wild Branch** Reach # **T16** Segment: **0** Completion Date: **October 5, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **6,043** Segment Location: **This segment continues until a tributary entering from the north, approximately 600 feet**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**0**	**0**
height	**0**	**0**
Roads	**1,099**	**0**
height	**5**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**451**	**87**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Very Steep**	**Steep**
Continuous w/	**Sometimes**	**Sometimes**
W/in 1 Bankfill	**Sometimes**	**Sometimes**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft) **430**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **47**

2.2 Max Depth (ft) **2.70**

2.3 Mean Depth (ft) **1.57**

2.4 Floodprone Width (ft) **115**

Notes:

Problems with alignment in upper Collinsville Road bridge during floods. Steep riffle and MCB above bridge. Evidence of minor bar scalping on many large point bars.

Multiple revetments include rip rap and some

Step 2. (Contued)

2.5 Aband. Floodpln **4.10** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **30.06**

2.7 Entrenchment Ratio **2.43**

2.8 Incision Ratio **1.52**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **272**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**1** %
Cobble	**28** %
Coarse Gravel	**40** %
Fine Gravel	**26** %
Sand	**5** %
Silt and smaller	**0** %

Silt/Clay Present? **Yes**

Detritus **1** %

Large Woody **18**

2.13 Average Largest Particle on

Bed **9.0** **inches**

Bar **6.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Sand**	**Sand**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Gravel**	**Gravel**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**1,377**	**1,853**
Erosion Height (ft)	**4.12**	**3.97**
Revetmt. Type	**Multiple**	**Multiple**
Revetmt. Length (ft)	**393**	**238**

Near Bank Veg. Type	Left	Right
Dominant	**Deciduous**	**Herbaceous**
Sub-dominant	**Herbaceous**	**Deciduous**

Bank Canopy	Left	Right
Canopy %	**51-75**	**26-50**

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**26-50**
Sub-dominant	**51-100**	**>100**
W less than 25	**249**	**938**

Buffer Veg. Type	Left	Right
Dominant	**Mixed Trees**	**Deciduous**
Sub-dominant	**Herbaceous**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Residential**
Sub-dominant	**Pasture**	**Hay**
Mass Failures	**104**	**37**
Height	**25**	**15**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
4	**11**	**16**

Diagonal	Delta	Island
6	**0**	**0**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	**0**	**0**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
6	**0**	**No**

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **Straightening**

Straightening Length: **1,959**

5.5 Dredging **Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T16** Segment: **0** Completion Date: **October 5, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA, MN** Rain: **No**

Segment Length (ft): **6,043** Segment Location: **This segment continues until a tributary entering from the north, approximately 600 feet**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	18.0	Yes	No	Yes	Yes
Problem	Deposition Above,Scour Below				
Bridge	28.0	Yes	No	Yes	Yes
Problem	Deposition Below				
Bridge	28.0	Yes	No	Yes	Yes
Problem	Deposition Above,Deposition Below,Scour				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**9**	**None**	**Yes**
7.2 Channel Aggradation	**8**	**None**	**No**
7.3 Widening Channel	**10**		**No**
7.4 Change in Planform	**12**		**No**
Total Score	**39**		
Geomorphic Rating	**0.4875**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	10
6.2 Embeddedness	15
6.3 Velocity/Depth Patterns	12
6.4 Sediment Deposition	7
6.5 Channel Flow Status	8
6.6 Channel Alteration	9
6.7 Frequency of Riffles/Steps	15
6.8 Bank Stability	Left: 6 Right: 5
6.9 Bank Vegetation Protection	Left: 7 Right: 7
6.10 Riparian Vegetation Zone Width	Left: 4 Right: 8
Total Score	113
Habitat Rating	0.565
Habitat Stream Condition	**Fair**

Narrative:

major historic degradation, aggradation and widening, minor planform adjustment.

Stream: **Wild Branch** Reach # **T17** Segment: **A** Completion Date: **October 5, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **1,285** Segment Location: **This segment continues for approximately 1245 feet upstream where the corridor becomes**

QC Status - Staff: Provisional Cons **Passed**

Step 1. Valley and Floodplain

1.1 Segmentation **Channel Dimensions**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Hilly
Continuous w/	Never	Sometimes
W/in 1 Bankfill	Never	Sometimes
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **1,000**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **No**

Step 2. Stream Channel

2.1 Bankfull Width **46**

2.2 Max Depth (ft) **2.30**

2.3 Mean Depth (ft) **1.78**

2.4 Floodprone Width (ft) **202**

Notes:

Late Stage III. Weak riffle-pool bedform.

Step 2. (Contued)

2.5 Aband. Floodpln **4.30** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **25.84**

2.7 Entrenchment Ratio **4.39**

2.8 Incision Ratio **1.87**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **225**

2.12 Substrate Composition

Bedrock	0%
Boulder	6%
Cobble	26%
Coarse Gravel	40%
Fine Gravel	22%
Sand	6%
Silt and smaller	0%

Silt/Clay Present? **Yes**

Detritus **1** %

Large Woody **22**

2.13 Average Largest Particle on

Bed **7.5** **inches**

Bar **6.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Moderate**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	317	402
Erosion Height (ft)	4.14	4.43
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Shrubs/Saplin	Shrubs/Saplin
Sub-dominant	Deciduous	Herbaceous

Bank Canopy	Left	Right
Canopy %	1-25	1-25
Mid-Channel Canopy		Open

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	>100
Sub-dominant	51-100	0-25
W less than 25	71	217

Buffer Veg. Type	Left	Right
Dominant	Shrubs/Saplin	Shrubs/Saplin
Sub-dominant	Herbaceous	Mixed Trees

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Forest
Sub-dominant	Hay	Pasture
Mass Failures	0	87
Height	0	30
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **Minimal**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	4	2
Diagonal	**Delta**	**Island**
3	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
3	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
3	0	No

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T17** Segment: **A** Completion Date: **October 5, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Rain: **No**

Segment Length (ft): **1,285** Segment Location: **This segment continues for approximately 1245 feet upstream where the corridor becomes**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**7**	**None**	**Yes**
7.2 Channel Aggradation	**9**	**None**	**No**
7.3 Widening Channel	**11**		**No**
7.4 Change in Planform	**10**		**No**
Total Score	**37**		
Geomorphic Rating	**0.4625**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	6
6.2 Embeddedness	12
6.3 Velocity/Depth Patterns	9
6.4 Sediment Deposition	12
6.5 Channel Flow Status	9
6.6 Channel Alteration	18
6.7 Frequency of Riffles/Steps	15
6.8 Bank Stability	Left: 6 Right: 5
6.9 Bank Vegetation Protection	Left: 7 Right: 7
6.10 Riparian Vegetation Zone Width	Left: 8 Right: 7
Total Score	121
Habitat Rating	0.605
Habitat Stream Condition	**Fair**

Narrative:

major historic degradation, major aggradation, and planform adjustment, minor widening.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T17** Segment: **B** Completion Date: **October 5, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **1,460** Segment Location: **This segment continues until approximately 1500 feet upstream.**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Channel Dimensions**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Hilly
Continuous w/	Never	Sometimes
W/in 1 Bankfill	Sometimes	Sometimes
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **350**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **No**

Step 2. Stream Channel

2.1 Bankfull Width **32**

2.2 Max Depth (ft) **2.60**

2.3 Mean Depth (ft) **1.91**

2.4 Floodprone Width (ft) **61**

Notes:

Some areas of segment are more depositional than where the cross section was done and have higher w/d ratios, but better flood plain access. Weak riffle-pool bedform.

Step 2. (Contued)

2.5 Aband. Floodpln **4.80** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **16.65**

2.7 Entrenchment Ratio **1.93**

2.8 Incision Ratio **1.85**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **158**

2.12 Substrate Composition

Bedrock	0%
Boulder	9%
Cobble	16%
Coarse Gravel	30%
Fine Gravel	32%
Sand	13%
Silt and smaller	0%

Silt/Clay Present? **Yes**

Detritus **1** %

Large Woody **18**

2.13 Average Largest Particle on

Bed **8.0** **inches**

Bar **6.5** **inches**

2.14 Stream Type

Stream Type: **B**

Bed Material: **Gravel**

Subclass Slope: **c**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	547	461
Erosion Height (ft)	5.60	3.58
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Coniferous	Coniferous
Sub-dominant	Herbaceous	Herbaceous

Bank Canopy	Left	Right
Canopy %	51-75	51-75

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	>100
Sub-dominant	None	None
W less than 25	0	0

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Mixed Trees
Sub-dominant	None	None

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Forest
Sub-dominant	None	None
Mass Failures	0	34
Height	0	40
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **1**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	1	3

Diagonal	Delta	Island
1	0	1

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
1	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T17** Segment: **B** Completion Date: **October 5, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Rain: **No**

Segment Length (ft): **1,460** Segment Location: **This segment continues until approximately 1500 feet upstream.**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**5**	**C to B**	**Yes**
7.2 Channel Aggradation	**12**	**None**	**No**
7.3 Widening Channel	**12**		**No**
7.4 Change in Planform	**11**		**No**
Total Score	**40**		
Geomorphic Rating	**0.5**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	13
6.2 Embeddedness	14
6.3 Velocity/Depth Patterns	13
6.4 Sediment Deposition	9
6.5 Channel Flow Status	11
6.6 Channel Alteration	18
6.7 Frequency of Riffles/Steps	17
6.8 Bank Stability	Left: 6 Right: 5
6.9 Bank Vegetation Protection	Left: 10 Right: 8
6.10 Riparian Vegetation Zone Width	Left: 10 Right: 10
Total Score	144
Habitat Rating	0.72
Habitat Stream Condition	**Good**

Narrative:

(early stage III in most locations) extreme historic degradation, minor aggradation, widening and planform adjustment.

Stream: **Wild Branch** Reach # **T18** Segment: **0** Completion Date: **October 9, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **4,489** Segment Location: **This segment continues until approximately one half mile upstream, where Collinsville Road**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**0**	**0**
height	**0**	**0**
Roads	**138**	**0**
height	**7**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**0**	**0**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Steep**	**Steep**
Continuous w/	**Always**	**Sometimes**
W/in 1 Bankfill	**Sometimes**	**Sometimes**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft) **250**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **No**

Step 2. Stream Channel

2.1 Bankfull Width **34**

2.2 Max Depth (ft) **2.90**

2.3 Mean Depth (ft) **2.21**

2.4 Floodprone Width (ft) **77**

Notes:

reach was far from roads and development. Still had some major planform adjustment. Late Stage III. Bankfull elevation was increased by 0.6 feet from that selected in the field to reflect a more defined feature (bench) on the left side of the channel.

Step 2. (Contued)

2.5 Aband. Floodpln **4.40** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **15.52**

2.7 Entrenchment Ratio **2.24**

2.8 Incision Ratio **1.52**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **372**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**8** %
Cobble	**41** %
Coarse Gravel	**37** %
Fine Gravel	**7** %
Sand	**7** %
Silt and smaller	**0** %

Silt/Clay Present? **Yes**

Detritus **2** %

Large Woody **35**

2.13 Average Largest Particle on

Bed **9.0** **inches**

Bar **7.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Sand**	**Sand**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Gravel**	**Gravel**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**468**	**1,192**
Erosion Height (ft)	**4.00**	**3.37**
Revetmt. Type	**None**	**None**
Revetmt. Length (ft)	**0**	**0**

Near Bank Veg. Type	Left	Right
Dominant	**Shrubs/Saplin**	**Shrubs/Saplin**
Sub-dominant	**Herbaceous**	**Herbaceous**

Bank Canopy	Left	Right
Canopy %	**51-75**	**51-75**

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-dominant	**None**	**None**
W less than 25	**0**	**0**

Buffer Veg. Type	Left	Right
Dominant	**Coniferous**	**Coniferous**
Sub-dominant	**Deciduous**	**Deciduous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**None**	**None**
Mass Failures	**28**	**41**
Height	**10**	**12**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Abundant**

4.2 Adjacent Wetlands **Minimal**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
6	**4**	**9**

Diagonal	Delta	Island
2	**1**	**1**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	**0**	**1**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
2	**0**	**No**

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T18** Segment: **0** Completion Date: **October 9, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **4,489** Segment Location: **This segment continues until approximately one half mile upstream, where Collinsville Road**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**11**	**None**	**Yes**
7.2 Channel Aggradation	**12**	**None**	**No**
7.3 Widening Channel	**15**		**No**
7.4 Change in Planform	**9**		**No**
Total Score	**47**		
Geomorphic Rating	**0.5875**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	13
6.2 Embeddedness	13
6.3 Velocity/Depth Patterns	16
6.4 Sediment Deposition	10
6.5 Channel Flow Status	10
6.6 Channel Alteration	18
6.7 Frequency of Riffles/Steps	13
6.8 Bank Stability	Left: 7 Right: 6
6.9 Bank Vegetation Protection	Left: 8 Right: 8
6.10 Riparian Vegetation Zone Width	Left: 10 Right: 10
Total Score	142
Habitat Rating	0.71
Habitat Stream Condition	**Good**

Narrative:

minor historic degradation, aggradation, widening, major planform adjustment.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T19** Segment: **A** Completion Date: **October 9, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **1,428** Segment Location: **This segment continues until approximately 1325 feet upstream of the Square Road Bridge.**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Channel Dimensions**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	670	0
height	7	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Hilly
Continuous w/	Sometimes	Never
W/in 1 Bankfill	Sometimes	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **466**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **39**

2.2 Max Depth (ft) **1.80**

2.3 Mean Depth (ft) **1.14**

2.4 Floodprone Width (ft) **52**

Notes:

Segmented because upstream segment has multiple channels and is significantly impacted by beaver dams.

Multiple revetments include minor rip rap and hard bank in the vicinity of the bridge.

Step 2. (Contued)

2.5 Aband. Floodpln **5.20** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **34.21**

2.7 Entrenchment Ratio **1.32**

2.8 Incision Ratio **2.89**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **245**

2.12 Substrate Composition

Bedrock	0%
Boulder	8%
Cobble	37%
Coarse Gravel	36%
Fine Gravel	17%
Sand	2%
Silt and smaller	0%

Silt/Clay Present? **No**

Detritus **3** %

Large Woody **13**

2.13 Average Largest Particle on

Bed **9.0** **inches**

Bar **6.0** **inches**

2.14 Stream Type

Stream Type: **B**

Bed Material: **Gravel**

Subclass Slope: **c**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive
Bank Erosion	Left	Right
Erosion Length (ft)	443	462
Erosion Height (ft)	3.66	3.23
Revetmt. Type	Multiple	Multiple
Revetmt. Length (ft)	60	77
Near Bank Veg. Type	Left	Right
Dominant	Coniferous	Shrubs/Saplin
Sub-dominant	Deciduous	Deciduous
Bank Canopy	Left	Right
Canopy %	51-75	26-50
Mid-Channel Canopy	Open	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	>100
Sub-dominant	None	0-25
W less than 25	0	134
Buffer Veg. Type	Left	Right
Dominant	Coniferous	Mixed Trees
Sub-dominant	Deciduous	Shrubs/Saplin

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Forest
Sub-dominant	None	Residential
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Abundant**

4.2 Adjacent Wetlands **Minimal**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	1	8

Diagonal	Delta	Island
1	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
1	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T19** Segment: **A** Completion Date: **October 9, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **1,428** Segment Location: **This segment continues until approximately 1325 feet upstream of the Square Road Bridge.**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	24.0	Yes	No	Yes	Yes
Problem	Deposition Above,Deposition Below,Scour				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**5**	**C to B**	**Yes**
7.2 Channel Aggradation	**13**	**None**	**No**
7.3 Widening Channel	**10**		**No**
7.4 Change in Planform	**13**		**No**
Total Score	**41**		
Geomorphic Rating	**0.5125**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	15
6.2 Embeddedness	15
6.3 Velocity/Depth Patterns	14
6.4 Sediment Deposition	15
6.5 Channel Flow Status	12
6.6 Channel Alteration	15
6.7 Frequency of Riffles/Steps	13
6.8 Bank Stability	Left: 5 Right: 5
6.9 Bank Vegetation Protection	Left: 9 Right: 9
6.10 Riparian Vegetation Zone Width	Left: 10 Right: 9
Total Score	146
Habitat Rating	0.73
Habitat Stream Condition	**Good**

Narrative:

extreme historic degradation, minor aggradation, planform adjustment, major widening.

Stream: **Wild Branch** Reach # **T19** Segment: **B** Completion Date: **October 9, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: **beaver dam** Rain: **Yes**

Segment Length (ft): **2,430** Segment Location: **This segment continues approximately 2430 feet upstream and is heavily impacted by**

QC Status - Staff: Provisional Consultant: Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Channel Dimensions**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Hilly
Continuous w/	Sometimes	Never
W/in 1 Bankfill	Sometimes	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft): **625**

Width Determination: **Estimated**

Confinement Type: **Very Broad**

Rock Gorge?: **No**

Human-caused Change?: **No**

Step 2. Stream Channel

2.1 Bankfull Width: **0**

2.2 Max Depth (ft): **0.00**

2.3 Mean Depth (ft): **0.00**

2.4 Floodprone Width (ft): **0**

Notes:

One channel avulsion, two flood chutes, numerous islands and two beaver dams are in this segment. The segment also had a number of beaver ponds. Huge depositional features and multiple channels made it

Step 2. (Contued)

2.5 Aband. Floodpln: **0.00** ft.

Human Elev Floodpln: **0.00** ft.

2.6 Width/Depth Ratio: **0.00**

2.7 Entrenchment Ratio: **0.00**

2.8 Incision Ratio: **0.00**

Human Elevated Inc Rat: **0.00**

2.9 Sinuosity

2.10 Riffles Type

2.11 Riffle/Step Spacing (ft): **0**

2.12 Substrate Composition

Silt/Clay Present?

Detritus: **0** %

Large Woody: **0**

2.13 Average Largest Particle on

Bed: **0.0**

Bar: **0.0**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type

(if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Moderate**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	191	102
Erosion Height (ft)	2.47	3.00
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Deciduous	Deciduous
Sub-dominant	Coniferous	Coniferous

Bank Canopy	Left	Right
Canopy %	26-50	26-50

Mid-Channel Canopy: **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	>100
Sub-dominant	None	None
W less than 25	0	0

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Mixed Trees
Sub-dominant	None	None

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Forest
Sub-dominant	None	None
Mass Failures	0	0
Height	0	0
Gullies		0
Length		0
Height		0.00

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps

4.2 Adjacent Wetlands

4.3 Flow Status

4.4 # of Debris Jams: **1**

4.5 Flow Regulation Type: **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg: **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams: **2**

Affected Length (ft): **2,600**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
1	0	2

Diagonal	Delta	Island
0	0	4

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
2	0	1	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	0	

5.4 Stream Ford or Animal: **No**

5.5 Straightening: **None**

Straightening Length: **0**

5.5 Dredging: **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T19** Segment: **B** Completion Date: **October 9, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **2,430** Segment Location: **This segment continues approximately 2430 feet upstream and is heavily impacted by**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type

Channel Evolution Model

Channel Evolution Stage

Geomorphic Condition **Fair**

Stream Sensitivity

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type

Habitat Stream Condition

Narrative:

Stream Geometry Data

Wild Branch

		Phase 2 Stream Type					Phase 1 Data			Phase 2 Channel Data											
Reach	Seg-ment	Stream Type	Bed Material	Bedform	Subcl. Slope	Sub Rch?	Channel Slope	Channel width	Bankfull width	Max. depth	Mean depth	Floodpr. width	Abandn FldPln	W/D Ratio	Entrench-ment	Incision Ratio	Stage Evol.	Evol. Model	RGA Cond.	RHA Cond.	QC Stf	QC Aut
T01	0	C	Gravel	Riffle-Pool	None	No	0.44	65.91	78.2	5.0	4.15	625.5	6.3	18.84	8.00	1.26	IId	D	Fair	Fair	P	P
T02	0	C	Gravel	Riffle-Pool	None	No	0.38	65.60	89.4	4.6	3.3	175.0	5.3	27.09	1.96	1.15	IId	D	Fair	Good	P	P
T03	0	C	Gravel	Riffle-Pool	None	No	0.53	65.51	84.0	4.7	3.43	345.0	4.7	24.49	4.11	1.00	IId	D	Fair	Good	P	P
T04	0	C	Gravel	Riffle-Pool	None	No	0.63	64.84	71.5	5.0	3.46	935.0	5.0	20.66	13.08	1.00	IId	D	Fair	Fair	P	P
T05	0	C	Gravel	Riffle-Pool	None	No	0.46	64.05	73.1	4.3	3.36	353.8	4.3	21.76	4.84	1.00	IId	D	Fair	Fair	P	P
T06	0	C	Cobble	Riffle-Pool	None	No	0.63	63.60	59.0	4.3	3.09	158.5	5.7	19.09	2.69	1.33	III	F	Fair	Fair	P	P
T07	0	C	Gravel	Riffle-Pool	None	No	0.67	63.08	94.9	3.45	2.87	425.0	5.25	33.07	4.48	1.52	III	F	Fair	Fair	P	P
T08	0	C	Gravel	Riffle-Pool	None	No	0.73	56.55	76.0	3.3	2.52	322.0	4.6	30.16	4.24	1.39	III	F	Fair	Fair	P	P
T09	0	B	Gravel	Riffle-Pool	c	No	0.85	53.63	76.5	3.2	2.43	141.0	7.3	31.48	1.84	2.28	III	F	Fair	Fair	P	P
T10	A	F	Cobble	Plane Bed	None	No	1.08	49.56	51.0	3.6	2.82	55.5	8.0	18.09	1.09	2.22	II	F	Fair	Fair	P	P
T10	B	B	Gravel	Riffle-Pool	c	No	1.08	49.56	53.3	3.8	2.54	78.0	6.7	20.98	1.46	1.76	III	F	Fair	Fair	P	P
T10	C	C	Gravel	Riffle-Pool	None	No	1.08	49.56	75.0	2.6	2.22	241.0	4.5	33.78	3.21	1.73	III	F	Fair	Fair	P	P
T10.01	0	B	Cobble	Riffle-Pool	c	No	0.33	22.90	24.5	2.2	1.28	37.0	6.5	19.14	1.51	2.95	III	F	Fair	Good	P	P
T11	0	B	Gravel	Riffle-Pool	c	No	1.24	48.50	68.5	2.6	1.42	142.2	5.3	48.24	2.08	2.04	III	F	Poor	Fair	P	P
T12	A	F	Gravel	Plane Bed	None	No	1.05	47.15	59.5	3.0	2.12	70.5	11.2	28.07	1.18	3.73	III	F	Fair	Fair	P	P
T12	B	F	Gravel	Riffle-Pool	None	No	1.05	47.15	79.8	2.9	1.9	95.8	4.9	42.00	1.20	1.69	III	F	Poor	Fair	P	P
T13	0	F	Gravel	Riffle-Pool	None	No	0.38	46.01	39.5	2.6	2.2	52.0	5.4	17.95	1.32	2.08	III	F	Fair	Fair	P	P
T14	A	C	Gravel	Riffle-Pool	None	No	0.33	42.07	38.5	3.3	2.49	100.0	4.6	15.46	2.60	1.39	III	F	Fair	Fair	P	P
T14	B	C	Gravel	Plane Bed	None	No	0.33	42.07											Fair		P	F
T14	C	C	Gravel	Riffle-Pool	None	No	0.33	42.07	42.0	3.0	2.28	85.5	4.4	18.42	2.04	1.47	III	F	Fair	Fair	P	P
T15	A	C	Gravel	Riffle-Pool	None	No	0.63	41.05	41.0	3.1	2.33	223.0	5.5	17.60	5.44	1.77	III	F	Fair	Fair	P	P
T15	B	C	Gravel	Riffle-Pool	None	No	0.63	41.05	41.0	3.0	2.21	205.0	4.4	18.55	5.00	1.47	III	F	Fair	Good	P	P
T15	C	C	Gravel	Riffle-Pool	None	No	0.63	41.05	52.5	2.5	1.96	120.0	4.1	26.79	2.29	1.64	III	F	Fair	Good	P	P
T16	0	C	Gravel	Riffle-Pool	None	No	0.65	36.46	47.2	2.7	1.57	114.5	4.1	30.06	2.43	1.52	III	F	Fair	Fair	P	P
T17	A	C	Gravel	Riffle-Pool	None	No	1.31	30.79	46.0	2.3	1.78	202.0	4.3	25.84	4.39	1.87	III	F	Fair	Fair	P	P
T17	B	B	Gravel	Riffle-Pool	c	No	1.31	30.79	31.8	2.6	1.91	61.3	4.8	16.65	1.93	1.85	III	F	Fair	Good	P	P
T18	0	C	Gravel	Riffle-Pool	None	No	1.49	30.26	34.3	2.9	2.21	77.0	4.4	15.52	2.24	1.52	III	F	Fair	Good	P	P
T19	A	B	Gravel	Riffle-Pool	c	No	1.39	24.95	39.0	1.8	1.14	51.5	5.2	34.21	1.32	2.89	III	F	Fair	Good	P	P
T19	B	C	Gravel	Riffle-Pool	None	No	1.39	24.95											Fair		P	F

Rapid Geomorphic Assessment

Wild Branch

Reach	Segment	Sub-Rch?	Degradation			Aggradation			Widening		Planform		Geo. Score	Geo. Condition	Evol. Stage	Confinement Type	Sensitivity	QC Stf	QC Aut
			Score	STD	Historic	Score	STD	Historic	Score	Historic	Score	Historic							
T01	0	No	14	None	Yes	8	None	No	12	No	9	No	0.54	Fair	IId	VB	Very	P	P
T02	0	No	15	None	No	8	Other	No	13	No	12	No	0.60	Fair	IId	BD	Very	P	P
T03	0	No	16	None	No	7	None	No	14	No	14	No	0.64	Fair	IId	VB	Very	P	P
T04	0	No	16	None	No	7	None	No	12	No	9	No	0.55	Fair	IId	VB	Very	P	P
T05	0	No	16	None	No	8	None	No	11	No	7	No	0.53	Fair	IId	BD	Very	P	P
T06	0	No	13	None	Yes	8	None	No	11	No	10	Yes	0.53	Fair	III	BD	High	P	P
T07	0	No	9	None	Yes	6	None	No	10	No	8	No	0.41	Fair	III	BD	Very	P	P
T08	0	No	11	None	Yes	8	None	No	7	No	10	No	0.45	Fair	III	BD	Very	P	P
T09	0	No	4	C to B	Yes	7	None	No	9	No	10	No	0.38	Fair	III	BD	Very	P	P
T10	A	No	2	C to F	Yes	13	None	No	14	No	15	No	0.55	Fair	II	VB	Extreme	P	P
T10	B	No	5	C to B	Yes	13	None	No	12	No	13	No	0.54	Fair	III	BD	Very	P	P
T10	C	No	8	None	Yes	7	None	No	8	Yes	13	No	0.45	Fair	III	BD	Very	P	P
T10.01	0	No	4	C to B	Yes	14	None	No	12	No	11	No	0.51	Fair	III	BD	Very	P	P
T11	0	No	5	C to B	Yes	5	None	No	5	No	3	No	0.23	Poor	III	BD	Very	P	P
T12	A	No	3	C to F	Yes	12	None	No	7	No	13	No	0.44	Fair	III	BD	Extreme	P	P
T12	B	No	5	C to F	Yes	7	None	No	5	No	9	No	0.33	Poor	III	BD	Extreme	P	P
T13	0	No	5	C to F	Yes	10	None	No	13	No	11	No	0.49	Fair	III	VB	Extreme	P	P
T14	A	No	12	None	Yes	13	None	No	13	No	11	No	0.61	Fair	III	VB	Very	P	P
T14	B	No											0.00	Fair		VB		P	F
T14	C	No	9	None	Yes	10	None	No	10	No	6	No	0.44	Fair	III	VB	Very	P	P
T15	A	No	8	None	Yes	6	None	No	13	No	12	No	0.49	Fair	III	VB	Very	P	P
T15	B	No	9	None	Yes	10	None	No	14	No	17	No	0.63	Fair	III	VB	Very	P	P
T15	C	No	9	None	Yes	12	None	No	13	No	14	No	0.60	Fair	III	NW	Very	P	P
T16	0	No	9	None	Yes	8	None	No	10	No	12	No	0.49	Fair	III	VB	Very	P	P
T17	A	No	7	None	Yes	9	None	No	11	No	10	No	0.46	Fair	III	VB	Very	P	P
T17	B	No	5	C to B	Yes	12	None	No	12	No	11	No	0.50	Fair	III	VB	Very	P	P
T18	0	No	11	None	Yes	12	None	No	15	No	9	No	0.59	Fair	III	BD	Very	P	P
T19	A	No	5	C to B	Yes	13	None	No	10	No	13	No	0.51	Fair	III	VB	Very	P	P
T19	B	No											0.00	Fair		VB		P	F

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Stream Geomorphic Assessment

Agency of Natural Resources

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Aquatic Organism Passage, Geomorphic Compatibility, Retrofit Potential

Explanation of codes used in table header -- Explanation of data acquisition

AOP Coarse Screen		AOP Geomorphic Compatibility		AOP Retrofit Potential	
Green	Full AOP for all aquatic organisms	**Green**	Structure is fully compatable geomorphically 20 < GC < 25	**H**	High probablity the existing culvert can be retrofited
Gray	Reduced AOP for all aquatic organisms	**Light Green**	Structure is mostly compatable geomorphically 15 < GC < 20	**M**	Medium probablity the existing culvert can be retrofited
Orange	No AOP for all aquatic organisms except adult salmonids	**Yellow**	Structure is partially compatable geomorphically 10 < GC < 15	**L**	Low probablity the existing culvert can be retrofited
Red	No AOP for all aquatic organisms including adult salmonids	**Orange**	Structure is mostly incompatable geomorphically 5 < GC < 10	**Pos 1 (left)**	For strong swimmers
		Red	Structure is fully incompatable geomorphically 0 < GC < 5	**Pos 2 (center)**	For moderate swimmers
				Pos 3 (right)	For weak swimmers

Wild Branch - AOP Results

Town	Road	Stream Name	Structure: SgaID / struct_num	AOP Coarse Screen	AOP Geomorphic Compatibility	AOP Retrofit Potential	Percent Bankfull Width
Wolcott	BROOK RD	Wild Branch trib	70000809111500X 700008014508103	Reduced AOP	Partially Compatable	LLL	0 %
Wolcott	BROOK RD	Wild Branch trib	70000809121500X 700008014108103	Reduced AOP	Partially Compatable	MLL	36 %
Wolcott	CORLEY RD	Lamoille River trib	70003804791500X	Reduced AOP	Mostly Compatable	Missing Data	--- %
Wolcott	CORLEY RD	Lamoille River trib	70003804841500X	Reduced AOP	Partially Compatable	LLL	0 %
Wolcott	E HILL RD	Tamarack Brook	70001407411500X 700014020708103	Reduced AOP	Mostly Compatable	Missing Data	0 %
Wolcott	E HILL RD	Tamarack Brook	70001407441500X	Reduced AOP	Partially Compatable	LLL	0 %
Wolcott	E HILL RD	Tamarack Brook trib	70001407651500X	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	E HILL RD	Wolcott Pond Brook	70001407311500X	Unknown	Mostly Compatable	LLL	0 %
Wolcott	E HILL RD	Wolcott Pond Brook	70001407321500X	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	ELMORE POND RD	Wild Branch trib	70000403801500X 700004008608103	Reduced AOP	Partially Compatable	LLL	0 %
Wolcott	FORT HILL RD	Wild Branch trib	70000208991500X	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	GULF RD	Wild Branch trib	70001504931500X	No AOP Including Adult Salmonids	Partially Compatable	LLL	0 %
Wolcott	HINES RD	Wild Branch trib	70001607131500X	Reduced AOP	Partially Compatable	LLL	0 %
Wolcott	KEELER RD	Wild Branch trib	70002108731500X	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	KEELER RD	Wolcott Pond Brook	70002108711500X	Reduced AOP	Mostly Compatable	Missing Data	--- %
Wolcott	MARSH RD	Lamoille River trib	70002508041500X 700025030708103	Reduced AOP	Mostly Compatable	Missing Data	0 %
Wolcott	MOREY HILL RD	Wild Branch trib	70004109031500X	Reduced AOP	Partially Compatable	LLL	0 %
Wolcott	MOREY HILL RD	Wild Branch trib	70004109041500X	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	N WOLCOTT RD	Wild Branch trib	70000103931500X	Reduced AOP	Partially Compatable	LLL	0 %
Wolcott	N WOLCOTT RD	Wild Branch trib	70000103961500X	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	N WOLCOTT RD	Wild Branch trib	70000104211500X	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	N WOLCOTT RD	Wild Branch trib	70000104231500X	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	TOWN HILL RD	Tamarack Brook	70000606931500X 700006011208103	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	TOWN HILL RD	Tamarack Brook trib	70000606941500X 700006011108103	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	W HILL RD	Wild Branch trib	70001806511500X	Reduced AOP	Partially Compatable	LLL	0 %
Wolcott	YOUNG RD	Lamoille River trib	70002708411500X	Reduced AOP	Mostly Compatable	LLL	0 %

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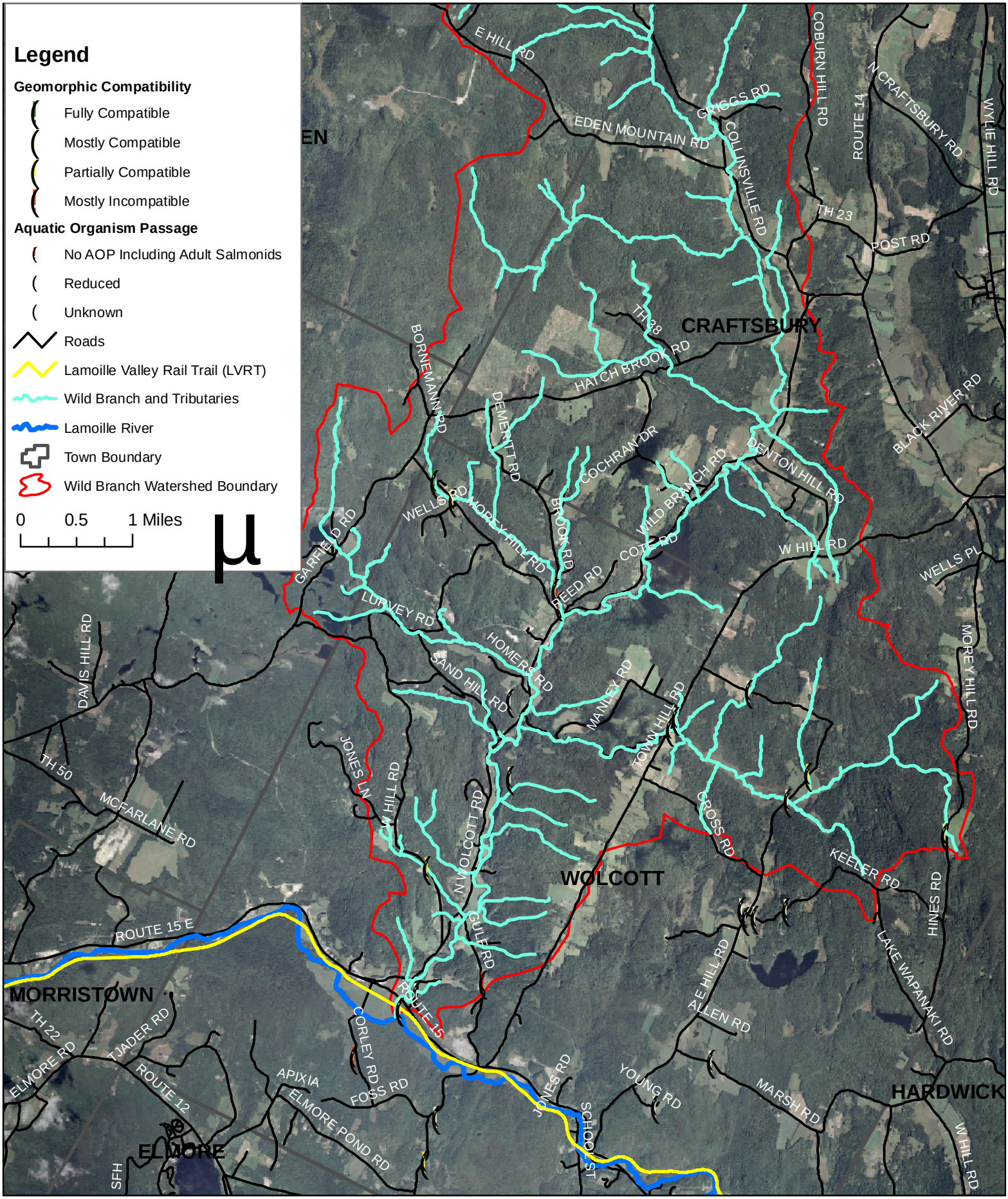
Wild Branch Watershed and Small Tributaries to the Lamoille River
Culvert Evaluation
Geomorphic Compatibility and Aquatic Organism Passage



Appendix

Phase 2 Stream Geomorphic Assessment Reports

Wild Branch

Stream: **Wild Branch** Reach # **T01** Segment: **0** Completion Date: **September 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **No**

Segment Length (ft): **3,374** Segment Location: **This segment begins at the confluence of the Lamoille River and the Wild Branch. It**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**0**	**0**
height	**0**	**0**
Roads	**285**	**557**
height	**0**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**319**	**90**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Very Steep**	**Very Steep**
Continuous w/	**Sometimes**	**Never**
W/in 1 Bankfill	**Sometimes**	**Never**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft) **850**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **78**

2.2 Max Depth (ft) **5.00**

2.3 Mean Depth (ft) **4.15**

2.4 Floodprone Width (ft) **626**

Notes:

Former rail bridge is constriction and causing deposition downstream. Some steep riffles present. Reach has been straightened in places. Large aggradational features. 1/25/08 CS indexed gravel mining in "general location" within reach based on Phase 1 data

Step 2. (Contued)

2.5 Aband. Floodpln **6.30** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **18.84**

2.7 Entrenchment Ratio **8.00**

2.8 Incision Ratio **1.26**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **380**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**0** %
Cobble	**21** %
Coarse Gravel	**59** %
Fine Gravel	**11** %
Sand	**9** %
Silt and smaller	**0** %

Silt/Clay Present? **No**

Detritus **5** %

Large Woody **14**

2.13 Average Largest Particle on

Bed **6.0** **inches**

Bar **4.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Sand**	**Sand**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Gravel**	**Gravel**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**1,103**	**380**
Erosion Height (ft)	**3.39**	**4.07**
Revetmt. Type	**Multiple**	**Multiple**
Revetmt. Length (ft)	**331**	**1,378**

Near Bank Veg. Type	Left	Right
Dominant	**Shrubs/Saplin**	**Shrubs/Saplin**
Sub-dominant	**Herbaceous**	**Herbaceous**

Bank Canopy	Left	Right
Canopy %	**1-25**	**1-25**

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**26-50**
Sub-dominant	**26-50**	**0-25**
W less than 25	**0**	**1,163**

Buffer Veg. Type	Left	Right
Dominant	**Deciduous**	**Shrubs/Saplin**
Sub-dominant	**Shrubs/Saplin**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Crop**
Sub-dominant	**Residential**	**Hay**
Mass Failures	**88**	**0**
Height	**30**	**0**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **None**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.7 StormwaterInputs

Field Ditch	**0**	Road Ditch	**1**
Other	**0**	Tile Drain	**0**
Overland Flow	**0**	Urb Strm Wtr Pipe	**0**

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
7	**5**	**3**

Diagonal	Delta	Island
2	**1**	**0**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	**0**	**1**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
2	**0**	**No**

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **452**

5.5 Dredging **Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: Wild Branch | Reach # T01 | Segment: 0 | Completion Date: September 4,

Organization: Bear Creek Environmental | Observers: CS, MA | Rain: No

Segment Length (ft): 3,374 | Segment Location: This segment begins at the confluence of the Lamoille River and the Wild Branch. It

1.6 Grade Controls

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken
Ledge	Mid-segment	4.00	3.00	Yes	

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	90.0	Yes		No	Yes
Problem	Deposition Below				
Bridge	128.	Yes		No	Yes
Problem	Deposition Below,Scour Above				
Bridge	46.5	Yes	No	Yes	Yes
Problem	Deposition Below				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type: Unconfined

	Score	STD	Historic
7.1 Channel Degradation	**14**	**None**	**Yes**
7.2 Channel Aggradation	**8**	**None**	**No**
7.3 Widening Channel	**12**		**No**
7.4 Change in Planform	**9**		**No**
Total Score	**43**		
Geomorphic Rating	**0.5375**		

Channel Evolution Model	D
Channel Evolution Stage	IId
Geomorphic Condition	Fair
Stream Sensitivity	Very High

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type: High

	Score
6.1 Epifaunal Substrate - Available Cover	9
6.2 Embeddedness	9
6.3 Velocity/Depth Patterns	15
6.4 Sediment Deposition	9
6.5 Channel Flow Status	12
6.6 Channel Alteration	13
6.7 Frequency of Riffles/Steps	13
6.8 Bank Stability	Left: 5 Right: 7
6.9 Bank Vegetation Protection	Left: 6 Right: 8
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 5
Total Score	120
Habitat Rating	0.6

Habitat Stream Condition: Fair

Narrative:

minor historic degradation, minor widening, major aggradation and planform adjustment. Channel is overwhelmed by sediment. No braiding, but numerous mid-channel bars.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T02** Segment: **0** Completion Date: **September 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **No**

Segment Length (ft): **1,833** Segment Location: **This segment continues until about 700 feet southeast of where West Hill Road meets North**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Extremely	Very Steep
Continuous w/	Never	Sometimes
W/in 1 Bankfill	Sometimes	Sometimes
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **550**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **No**

Step 2. Stream Channel

2.1 Bankfull Width **89**

2.2 Max Depth (ft) **4.60**

2.3 Mean Depth (ft) **3.30**

2.4 Floodprone Width (ft) **175**

Notes:

Valley width was wide but FPA was not due to an old terrace, also had wide bankful width at cross section location which would make entrenchment lower.

10/8/2008-CS updated reference stream type

Step 2. (Contued)

2.5 Aband. Floodpln **5.30** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **27.09**

2.7 Entrenchment Ratio **1.96**

2.8 Incision Ratio **1.15**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **340**

2.12 Substrate Composition

Bedrock	0%
Boulder	2%
Cobble	23%
Coarse Gravel	51%
Fine Gravel	12%
Sand	12%
Silt and smaller	0%

Silt/Clay Present? **No**

Detritus **3** %

Large Woody **1**

2.13 Average Largest Particle on

Bed **7.0** **inches**

Bar **6.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type

(if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	113	295
Erosion Height (ft)	3.00	5.23
Revetmt. Type	Rip-Rap	Rip-Rap
Revetmt. Length (ft)	101	213

Near Bank Veg. Type	Left	Right
Dominant	Herbaceous	Herbaceous
Sub-dominant	Deciduous	Deciduous

Bank Canopy	Left	Right
Canopy %	26-50	26-50

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	51-100	>100
Sub-dominant	0-25	51-100
W less than 25	571	0

Buffer Veg. Type	Left	Right
Dominant	Deciduous	Mixed Trees
Sub-dominant	Herbaceous	Shrubs/Saplin

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Hay	Forest
Sub-dominant	Forest	None
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
2	2	2

Diagonal	Delta	Island
2	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
2	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: Wild Branch | Reach # T02 | Segment: 0 | Completion Date: September 4,
Organization: Bear Creek Environmental | Observers: CS, MA | Rain: No
Segment Length (ft): 1,833 | Segment Location: This segment continues until about 700 feet southeast of where West Hill Road meets

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type Unconfined

	Score	STD	Historic
7.1 Channel Degradation	**15**	**None**	**No**
7.2 Channel Aggradation	**8**	**Other**	**No**
7.3 Widening Channel	**13**		**No**
7.4 Change in Planform	**12**		**No**
Total Score	**48**		
Geomorphic Rating	**0.6**		

Channel Evolution Model D
Channel Evolution Stage IId
Geomorphic Condition Fair
Stream Sensitivity Very High

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type High

	Score
6.1 Epifaunal Substrate - Available Cover	10
6.2 Embeddedness	10
6.3 Velocity/Depth Patterns	16
6.4 Sediment Deposition	8
6.5 Channel Flow Status	14
6.6 Channel Alteration	16
6.7 Frequency of Riffles/Steps	18
6.8 Bank Stability	Left: 8 Right: 7
6.9 Bank Vegetation Protection	Left: 8 Right: 8
6.10 Riparian Vegetation Zone Width	Left: 4 Right: 8
Total Score	135
Habitat Rating	0.675

Habitat Stream Condition Good

Narrative:
Minor widening and planform adjustment, major aggradation. No braiding, but several mid-channel bars within this short reach. Channel is being overwhelmed with sediment from upstream.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T03** Segment: **0** Completion Date: **September 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **No**

Segment Length (ft): **2,263** Segment Location: **This segment continues until approximately 200 feet past bridge on Gulf Road.**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	57

1.4 Adjacent Side	Left	Right
Hillside Slope	Very Steep	Extremely
Continuous w/	Never	Never
W/in 1 Bankfill	Sometimes	Sometimes
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **750**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **84**

2.2 Max Depth (ft) **4.70**

2.3 Mean Depth (ft) **3.43**

2.4 Floodprone Width (ft) **345**

Notes:

Abundant bedrock at downstream end of reach, no complete channel spanning grade controls though. Gulf Road bridge is a constriction. Cross section revised to select bankfull at a defined feature approximately 0.9 feet above that selected in the field. This

Step 2. (Contued)

2.5 Aband. Floodpln **4.70** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **24.49**

2.7 Entrenchment Ratio **4.11**

2.8 Incision Ratio **1.00**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **342**

2.12 Substrate Composition

Bedrock	2%
Boulder	2%
Cobble	28%
Coarse Gravel	48%
Fine Gravel	11%
Sand	9%
Silt and smaller	0%

Silt/Clay Present? **No**

Detritus **5** %

Large Woody **4**

2.13 Average Largest Particle on

Bed	8.0	inches
Bar	7.0	inches

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive
Bank Erosion	Left	Right
Erosion Length (ft)	247	150
Erosion Height (ft)	4.00	4.00
Revetmt. Type	Multiple	Multiple
Revetmt. Length (ft)	88	80
Near Bank Veg. Type	Left	Right
Dominant	Herbaceous	Herbaceous
Sub-dominant	Deciduous	Deciduous
Bank Canopy	Left	Right
Canopy %	26-50	26-50
Mid-Channel Canopy		Open

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	>100
Sub-dominant	51-100	26-50
W less than 25	0	0
Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Mixed Trees
Sub-dominant	Herbaceous	None

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Forest
Sub-dominant	Hay	Residential
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Abundant**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
1	3	3

Diagonal	Delta	Island
4	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
4	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **580**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: Wild Branch | Reach # T03 | Segment: 0 | Completion Date: September 4,

Organization: Bear Creek Environmental | Observers: CS, MA | Rain: No

Segment Length (ft): 2,263 | Segment Location: This segment continues until approximately 200 feet past bridge on Gulf Road.

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	43.0	Yes	No	Yes	Yes
Problem	Deposition Above,Scour Above				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type Unconfined

	Score	STD	Historic
7.1 Channel Degradation	**16**	**None**	**No**
7.2 Channel Aggradation	**7**	**None**	**No**
7.3 Widening Channel	**14**		**No**
7.4 Change in Planform	**14**		**No**
Total Score	**51**		
Geomorphic Rating	**0.6375**		

Channel Evolution Model D

Channel Evolution Stage IId

Geomorphic Condition Fair

Stream Sensitivity Very High

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type High

	Score
6.1 Epifaunal Substrate - Available Cover	10
6.2 Embeddedness	9
6.3 Velocity/Depth Patterns	15
6.4 Sediment Deposition	9
6.5 Channel Flow Status	14
6.6 Channel Alteration	10
6.7 Frequency of Riffles/Steps	17
6.8 Bank Stability	Left: 7 Right: 8
6.9 Bank Vegetation Protection	Left: 9 Right: 9
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 9
Total Score	135
Habitat Rating	0.675

Habitat Stream Condition Good

Narrative:

Minor widening and planform adjustment, major aggradation; channel is overwhelmed wirth sediment from upstream bank erosion of incised reaches. Channel is not braided, yet multiple mid-channel and diagonal bars present.

Stream: **Wild Branch** Reach # **T04** Segment: **0** Completion Date: **September 6, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **3,629** Segment Location: **This segment continues until where Wild Branch Lane crosses over the river.**

QC Status - Staff: Provisional Cons **Passed**

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**169**	**0**
height	**7**	**0**
Roads	**929**	**0**
height	**0**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**0**	**47**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Very Steep**	**Steep**
Continuous w/	**Sometimes**	**Never**
W/in 1 Bankfill	**Sometimes**	**Never**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft)	**835**
Width Determination	**Measured**
Confinement Type	**Very Broad**
Rock Gorge?	**No**
Human-caused Change?	**Yes**

Step 2. Stream Channel

2.1 Bankfull Width	**72**
2.2 Max Depth (ft)	**5.00**
2.3 Mean Depth (ft)	**3.46**
2.4 Floodprone Width (ft)	**935**

Notes:

Large depositional features in reach. Some clay on banks, one mass failure.
Cross section revised to reflect defined feature. Bankfull elevation should be field verified if restoration design work is undertaken.

Step 2. (Contued)

2.5 Aband. Floodpln	**5.00** ft.
Human Elev Floodpln	**0.00** ft.
2.6 Width/Depth Ratio	**20.66**
2.7 Entrenchment Ratio	**13.08**
2.8 Incision Ratio	**1.00**
Human Elevated Inc Rat	**0.00**
2.9 Sinuosity	**Moderate**
2.10 Riffles Type	**Sedimented**
2.11 Riffle/Step Spacing (ft)	**353**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**4** %
Cobble	**27** %
Coarse Gravel	**45** %
Fine Gravel	**8** %
Sand	**16** %
Silt and smaller	**0** %

Silt/Clay Present?	**Yes**
Detritus	**4** %
# Large Woody	**18**

2.13 Average Largest Particle on

Bed	**6.0**	**inches**
Bar	**5.0**	**inches**

2.14 Stream Type

Stream Type:	**C**
Bed Material:	**Gravel**
Subclass Slope:	**None**
Bed Form:	**Riffle-Pool**
Field Measured Slope:	

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Sand**	**Sand**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Boulder/Cobbl**	**Boulder/Cobbl**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**890**	**1,340**
Erosion Height (ft)	**5.25**	**4.83**
Revetmt. Type	**Multiple**	**Multiple**
Revetmt. Length (ft)	**124**	**338**

Near Bank Veg. Type	Left	Right
Dominant	**Deciduous**	**Deciduous**
Sub-dominant	**Herbaceous**	**Herbaceous**

Bank Canopy	Left	Right
Canopy %	**26-50**	**26-50**

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**51-100**	**26-50**
Sub-dominant	**0-25**	**0-25**
W less than 25	**796**	**1,197**

Buffer Veg. Type	Left	Right
Dominant	**Mixed Trees**	**Deciduous**
Sub-dominant	**Shrubs/Saplin**	**Shrubs/Saplin**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Residential**
Sub-dominant	**Residential**	**Hay**
Mass Failures	**0**	**41**
Height	**0**	**15**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps	**Minimal**
4.2 Adjacent Wetlands	**None**
4.3 Flow Status	**Moderate**
4.4 # of Debris Jams	**0**
4.5 Flow Regulation Type	**None**
Flow Regulation Use	
Impoundments	
Impoundmt. Location	
4.6 Up/Down strm flow reg	**None**
(old) Upstrm Flow Reg	

4.9 # of Beaver Dams	**0**
Affected Length (ft)	**0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
2	**5**	**7**

Diagonal	Delta	Island
1	**0**	**0**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	**0**	**0**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
1	**0**	**No**

5.4 Stream Ford or Animal	**No**
5.5 Straightening	**Straightening**
Straightening Length:	**301**
5.5 Dredging	**None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: Wild Branch | Reach # T04 | Segment: 0 | Completion Date: September 6,
Organization: Bear Creek Environmental | Observers: CS, MA | Rain: Yes
Segment Length (ft): 3,629 | Segment Location: This segment continues until where Wild Branch Lane crosses over the river.

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	67.0	Yes	No	No	Yes

Problem None

Step 7. Rapid Geomorphic Assessment Data

Confinement Type Unconfined

	Score	STD	Historic
7.1 Channel Degradation	**16**	**None**	**No**
7.2 Channel Aggradation	**7**	**None**	**No**
7.3 Widening Channel	**12**		**No**
7.4 Change in Planform	**9**		**No**
Total Score	**44**		
Geomorphic Rating	**0.55**		

Channel Evolution Model D
Channel Evolution Stage IId
Geomorphic Condition Fair
Stream Sensitivity Very High

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type High

	Score
6.1 Epifaunal Substrate - Available Cover	11
6.2 Embeddedness	5
6.3 Velocity/Depth Patterns	11
6.4 Sediment Deposition	7
6.5 Channel Flow Status	8
6.6 Channel Alteration	10
6.7 Frequency of Riffles/Steps	17
6.8 Bank Stability	Left: 6 Right: 3
6.9 Bank Vegetation Protection	Left: 7 Right: 7
6.10 Riparian Vegetation Zone Width	Left: 5 Right: 5
Total Score	102
Habitat Rating	0.51

Habitat Stream Condition Fair

Narrative:
Minor widening, major aggradation and planform adjustment. No braiding, yet large depositional features in reach.

Stream: **Wild Branch** Reach # **T05** Segment: **0** Completion Date: **September 6, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **2,622** Segment Location: **This segment continues until approximately 2000 feet north of where Wild Branch Lane**

QC Status - Staff: Provisional Cons **Passed**

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	2,227	0
height	8	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Very Steep	Steep
Continuous w/	Sometimes	Never
W/in 1 Bankfill	Sometimes	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **495**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **73**

2.2 Max Depth (ft) **4.30**

2.3 Mean Depth (ft) **3.36**

2.4 Floodprone Width (ft) **354**

Notes:

Large depositional features, evidence of channel migration. 1/25/08 CS indexed gravel mining in "general location" within reach based on Phase 1 data (interviews with DEC) because no specific location was known.

Step 2. (Contued)

2.5 Aband. Floodpln **4.30** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **21.76**

2.7 Entrenchment Ratio **4.84**

2.8 Incision Ratio **1.00**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **346**

2.12 Substrate Composition

Bedrock	0%
Boulder	2%
Cobble	21%
Coarse Gravel	26%
Fine Gravel	12%
Sand	39%
Silt and smaller	0%

Silt/Clay Present? **Yes**

Detritus **3** %

Large Woody **18**

2.13 Average Largest Particle on

Bed **7.0** **inches**

Bar **5.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	888	446
Erosion Height (ft)	4.69	5.20
Revetmt. Type	None	Rip-Rap
Revetmt. Length (ft)	0	274

Near Bank Veg. Type	Left	Right
Dominant	Deciduous	Deciduous
Sub-dominant	Coniferous	Herbaceous

Bank Canopy	Left	Right
Canopy %	26-50	26-50

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	26-50
Sub-dominant	None	0-25
W less than 25	0	702

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Deciduous
Sub-dominant	Invasives	Herbaceous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Residential
Sub-dominant	Other	Hay
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
3	4	0

Diagonal	Delta	Island
4	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	0	1	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
3	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **370**

5.5 Dredging **Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T05** Segment: **0** Completion Date: **September 6, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **2,622** Segment Location: **This segment continues until approximately 2000 feet north of where Wild Branch Lane**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**16**	**None**	**No**
7.2 Channel Aggradation	**8**	**None**	**No**
7.3 Widening Channel	**11**		**No**
7.4 Change in Planform	**7**		**No**
Total Score	**42**		
Geomorphic Rating	**0.525**		
Channel Evolution Model	**D**		
Channel Evolution Stage	**IId**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	11
6.2 Embeddedness	6
6.3 Velocity/Depth Patterns	15
6.4 Sediment Deposition	5
6.5 Channel Flow Status	10
6.6 Channel Alteration	11
6.7 Frequency of Riffles/Steps	16
6.8 Bank Stability	Left: 4 Right: 7
6.9 Bank Vegetation Protection	Left: 8 Right: 6
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 3
Total Score	111
Habitat Rating	0.555
Habitat Stream Condition	**Fair**

Narrative:

minor widening, major aggradation and planform adjustment. Channel overloaded with sediment from erosion associated degraded upstream reaches. Channel not braided, yet reach contains multiple mid-channel and diagonal bars.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T06** Segment: **0** Completion Date: **September 6, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **3,013** Segment Location: **This segment continues until about 1500 feet north of where Greenwood Road meets North**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	2,776	0
height	12	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	549	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Extremely	Extremely
Continuous w/	Sometimes	Never
W/in 1 Bankfill	Always	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **475**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **59**

2.2 Max Depth (ft) **4.30**

2.3 Mean Depth (ft) **3.09**

2.4 Floodprone Width (ft) **159**

Notes:

Reach runs along valley wall on left bank entire length of reach... likely straightened. 1/25/08 CS indexed gravel mining in "general location" within reach based on Phase 1 data (interviews with DEC) because no specific location was known.

Step 2. (Contued)

2.5 Aband. Floodpln **5.70** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **19.09**

2.7 Entrenchment Ratio **2.69**

2.8 Incision Ratio **1.33**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **545**

2.12 Substrate Composition

Bedrock	0%
Boulder	13%
Cobble	40%
Coarse Gravel	29%
Fine Gravel	9%
Sand	9%
Silt and smaller	0%

Silt/Clay Present? **No**

Detritus **3** %

Large Woody **5**

2.13 Average Largest Particle on

Bed **9.0** **inches**

Bar **7.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Cobble**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Boulder/Cobbl	Boulder/Cobbl
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	369	2,263
Erosion Height (ft)	4.67	4.81
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Herbaceous	Herbaceous
Sub-dominant	Coniferous	Deciduous

Bank Canopy	Left	Right
Canopy %	26-50	51-75

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	51-100
Sub-dominant	None	26-50
W less than 25	0	858

Buffer Veg. Type	Left	Right
Dominant	Coniferous	Deciduous
Sub-dominant	Deciduous	Herbaceous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Residential
Sub-dominant	None	Hay
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **None**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	2	8
Diagonal	**Delta**	**Island**
3	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
3	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **2,934**

5.5 Dredging **Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: Wild Branch | Reach # T06 | Segment: 0 | Completion Date: September 6,

Organization: Bear Creek Environmental | Observers: CS, MA | Rain: Yes

Segment Length (ft): 3,013 | Segment Location: This segment continues until about 1500 feet north of where Greenwood Road meets

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type Unconfined

	Score	STD	Historic
7.1 Channel Degradation	**13**	**None**	**Yes**
7.2 Channel Aggradation	**8**	**None**	**No**
7.3 Widening Channel	**11**		**No**
7.4 Change in Planform	**10**		**Yes**
Total Score	**42**		
Geomorphic Rating	**0.525**		

Channel Evolution Model	F
Channel Evolution Stage	III
Geomorphic Condition	Fair
Stream Sensitivity	High

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type High

	Score
6.1 Epifaunal Substrate - Available Cover	8
6.2 Embeddedness	5
6.3 Velocity/Depth Patterns	15
6.4 Sediment Deposition	10
6.5 Channel Flow Status	13
6.6 Channel Alteration	15
6.7 Frequency of Riffles/Steps	13
6.8 Bank Stability	Left: 7 Right: 1
6.9 Bank Vegetation Protection	Left: 9 Right: 5
6.10 Riparian Vegetation Zone Width	Left: 10 Right: 4
Total Score	115
Habitat Rating	0.575
Habitat Stream Condition	Fair

Narrative:

minor historic degradation, major aggradation and planform adjustment, minor widening.

Stream: **Wild Branch** Reach # **T07** Segment: **0** Completion Date: **September 11, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **3,706** Segment Location: **This segment continues until the confluence of the Tamarack Brook and the Wild Branch.**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**0**	**0**
height	**0**	**0**
Roads	**2,107**	**0**
height	**8**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**171**	**0**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Extremely**	**Extremely**
Continuous w/	**Sometimes**	**Never**
W/in 1 Bankfill	**Sometimes**	**Never**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft) **620**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **95**

2.2 Max Depth (ft) **3.45**

2.3 Mean Depth (ft) **2.87**

2.4 Floodprone Width (ft) **425**

Notes:

Large depositional features and flood chutes. Some bedrock along left bank.

Bankfull elevation on cross section revised to be at defined feature. Field verification of bankfull recommended for restoration and

Step 2. (Contued)

2.5 Aband. Floodpln **5.25** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **33.07**

2.7 Entrenchment Ratio **4.48**

2.8 Incision Ratio **1.52**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **470**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**0** %
Cobble	**24** %
Coarse Gravel	**56** %
Fine Gravel	**8** %
Sand	**12** %
Silt and smaller	**0** %

Silt/Clay Present? **No**

Detritus **2** %

Large Woody **10**

2.13 Average Largest Particle on

Bed **8.0** **inches**

Bar **6.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type

(if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Sand**	**Sand**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Gravel**	**Gravel**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**498**	**1,271**
Erosion Height (ft)	**4.43**	**4.00**
Revetmt. Type	**None**	**Rip-Rap**
Revetmt. Length (ft)	**0**	**416**

Near Bank Veg. Type	Left	Right
Dominant	**Coniferous**	**Herbaceous**
Sub-dominant	**Herbaceous**	**Coniferous**

Bank Canopy	Left	Right
Canopy %	**1-25**	**1-25**

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**0-25**
Sub-dominant	**None**	**>100**
W less than 25	**0**	**1,670**

Buffer Veg. Type	Left	Right
Dominant	**Coniferous**	**Herbaceous**
Sub-dominant	**Deciduous**	**Mixed Trees**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Residential**
Sub-dominant	**Other**	**None**
Mass Failures	**0**	**0**
Height	**0**	**0**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
2	**5**	**1**

Diagonal	Delta	Island
1	**1**	**0**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
3	**0**	**0**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
1	**0**	**No**

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **455**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: Wild Branch | Reach # T07 | Segment: 0 | Completion Date: September 11,

Organization: Bear Creek Environmental | Observers: CS, MA | Rain: Yes

Segment Length (ft): 3,706 | Segment Location: This segment continues until the confluence of the Tamarack Brook and the Wild

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type Unconfined

	Score	STD	Historic
7.1 Channel Degradation	**9**	**None**	**Yes**
7.2 Channel Aggradation	**6**	**None**	**No**
7.3 Widening Channel	**10**		**No**
7.4 Change in Planform	**8**		**No**
Total Score	**33**		
Geomorphic Rating	**0.4125**		

Channel Evolution Model	F
Channel Evolution Stage	III
Geomorphic Condition	Fair
Stream Sensitivity	Very High

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type High

	Score
6.1 Epifaunal Substrate - Available Cover	12
6.2 Embeddedness	7
6.3 Velocity/Depth Patterns	15
6.4 Sediment Deposition	6
6.5 Channel Flow Status	7
6.6 Channel Alteration	12
6.7 Frequency of Riffles/Steps	13
6.8 Bank Stability	Left: 7 Right: 5
6.9 Bank Vegetation Protection	Left: 7 Right: 5
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 3
Total Score	108
Habitat Rating	0.54
Habitat Stream Condition	Fair

Narrative:

major degradation, aggradation, widening and planform adjustment. Late stage III (possibly early stage IV), starting to build narrow juvenile floodplain.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T08** Segment: **0** Completion Date: **September 11, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **3,024** Segment Location: **This segment continues until the confluence of a tributary next to Homers Road and the**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	2,706	0
height	4	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	721	43

1.4 Adjacent Side	Left	Right
Hillside Slope	Extremely	Hilly
Continuous w/	Never	Never
W/in 1 Bankfill	Never	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **520**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **76**

2.2 Max Depth (ft) **3.30**

2.3 Mean Depth (ft) **2.52**

2.4 Floodprone Width (ft) **322**

Notes:

Evidence of minor bar scalping. Large depositional features, buffer is not great.

Multiple revetments include mainly rip rap, with some hard bank in the vicinity of the bridge.

Step 2. (Contued)

2.5 Aband. Floodpln **4.60** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **30.16**

2.7 Entrenchment Ratio **4.24**

2.8 Incision Ratio **1.39**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **462**

2.12 Substrate Composition

Bedrock	0%
Boulder	7%
Cobble	42%
Coarse Gravel	36%
Fine Gravel	10%
Sand	5%
Silt and smaller	0%

Silt/Clay Present? **No**

Detritus **2** %

Large Woody **4**

2.13 Average Largest Particle on

Bed **10.0** **inches**

Bar **7.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive
Bank Erosion	Left	Right
Erosion Length (ft)	738	330
Erosion Height (ft)	4.80	4.32
Revetmt. Type	Multiple	Multiple
Revetmt. Length (ft)	171	1,132
Near Bank Veg. Type	Left	Right
Dominant	Herbaceous	Herbaceous
Sub-dominant	Shrubs/Saplin	Shrubs/Saplin
Bank Canopy	Left	Right
Canopy %	1-25	1-25
Mid-Channel Canopy	Open	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	0-25	0-25
Sub-dominant	26-50	26-50
W less than 25	1,848	1,498
Buffer Veg. Type	Left	Right
Dominant	Herbaceous	Herbaceous
Sub-dominant	Mixed Trees	Deciduous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Hay	Residential
Sub-dominant	Pasture	Hay
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Abundant**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.7 StormwaterInputs

Field Ditch	0	Road Ditch	2
Other	0	Tile Drain	0
Overland Flow	0	Urb Strm Wtr Pipe	0

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	4	4

Diagonal	Delta	Island
4	0	1

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	0	1	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
4	0	No

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **Straightening**

Straightening Length: **891**

5.5 Dredging **Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: Wild Branch | Reach # T08 | Segment: 0 | Completion Date: September 11,

Organization: Bear Creek Environmental | Observers: CS, MA | Rain: Yes

Segment Length (ft): 3,024 | Segment Location: This segment continues until the confluence of a tributary next to Homers Road and

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	47.0	Yes	No	Yes	Yes
Problem		Deposition Above,	Deposition		

Step 7. Rapid Geomorphic Assessment Data

Confinement Type Unconfined

	Score	STD	Historic
7.1 Channel Degradation	**11**	**None**	**Yes**
7.2 Channel Aggradation	**8**	**None**	**No**
7.3 Widening Channel	**7**		**No**
7.4 Change in Planform	**10**		**No**
Total Score	**36**		
Geomorphic Rating	**0.45**		

Channel Evolution Model	F
Channel Evolution Stage	III
Geomorphic Condition	Fair
Stream Sensitivity	Very High

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type High

	Score
6.1 Epifaunal Substrate - Available Cover	10
6.2 Embeddedness	10
6.3 Velocity/Depth Patterns	16
6.4 Sediment Deposition	9
6.5 Channel Flow Status	11
6.6 Channel Alteration	9
6.7 Frequency of Riffles/Steps	12
6.8 Bank Stability	Left: 6 Right: 7
6.9 Bank Vegetation Protection	Left: 5 Right: 6
6.10 Riparian Vegetation Zone Width	Left: 5 Right: 2
Total Score	108
Habitat Rating	0.54
Habitat Stream Condition	Fair

Narrative:

major historic degradation, major aggradation, widening and planform adjustment. Reach located just downstream of reaches with extreme historic incision.

Stream: **Wild Branch** Reach # **T09** Segment: **0** Completion Date: **September 20, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **3,866** Segment Location: **This segment continues until the confluence of the tributary adjacent to Morey Hill Road**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**0**	**0**
height	**0**	**0**
Roads	**2,018**	**0**
height	**11**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**1,661**	**0**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Steep**	**Steep**
Continuous w/	**Sometimes**	**Never**
W/in 1 Bankfill	**Sometimes**	**Never**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft) **460**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **77**

2.2 Max Depth (ft) **3.20**

2.3 Mean Depth (ft) **2.43**

2.4 Floodprone Width (ft) **141**

Notes:

Spoke with landowner on right bank, mentioned that right bank floods approximately on 100 year flood. Also that there used to be a much wider bench on the right bank that has been lost to erosion. 1/25/08 CS indexed gravel mining in "general

Step 2. (Contued)

2.5 Aband. Floodpln **7.30** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **31.48**

2.7 Entrenchment Ratio **1.84**

2.8 Incision Ratio **2.28**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **442**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**1** %
Cobble	**47** %
Coarse Gravel	**35** %
Fine Gravel	**6** %
Sand	**11** %
Silt and smaller	**0** %

Silt/Clay Present? **No**

Detritus **0** %

Large Woody **6**

2.13 Average Largest Particle on

Bed **13.0** **inches**

Bar **14.0** **inches**

2.14 Stream Type

Stream Type: **B**

Bed Material: **Gravel**

Subclass Slope: **c**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Gravel**	**Gravel**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Boulder/Cobbl**	**Boulder/Cobbl**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**680**	**565**
Erosion Height (ft)	**4.90**	**5.25**
Revetmt. Type	**None**	**Rip-Rap**
Revetmt. Length (ft)	**0**	**738**

Near Bank Veg. Type	Left	Right
Dominant	**Shrubs/Saplin**	**Lawn**
Sub-dominant	**Deciduous**	**Shrubs/Saplin**

Bank Canopy	Left	Right
Canopy %	**1-25**	**1-25**

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**0-25**
Sub-dominant	**51-100**	**26-50**
W less than 25	**417**	**1,459**

Buffer Veg. Type	Left	Right
Dominant	**Mixed Trees**	**Herbaceous**
Sub-dominant	**Herbaceous**	**Deciduous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Residential**
Sub-dominant	**Hay**	**None**
Mass Failures	**138**	**0**
Height	**15**	**0**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **Minimal**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.7 StormwaterInputs

Field Ditch	**0**	Road Ditch	**1**
Other	**0**	Tile Drain	**0**
Overland Flow	**0**	Urb Strm Wtr Pipe	**0**

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
1	**3**	**8**

Diagonal	Delta	Island
2	**0**	**0**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
3	**0**	**1**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
2	**0**	**No**

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **Straightening**

Straightening Length: **792**

5.5 Dredging **Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T09** Segment: **0** Completion Date: **September 20,**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Rain: **No**

Segment Length (ft): **3,866** Segment Location: **This segment continues until the confluence of the tributary adjacent to Morey Hill Road**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**4**	**C to B**	**Yes**
7.2 Channel Aggradation	**7**	**None**	**No**
7.3 Widening Channel	**9**		**No**
7.4 Change in Planform	**10**		**No**
Total Score	**30**		
Geomorphic Rating	**0.375**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	6
6.2 Embeddedness	13
6.3 Velocity/Depth Patterns	11
6.4 Sediment Deposition	6
6.5 Channel Flow Status	6
6.6 Channel Alteration	10
6.7 Frequency of Riffles/Steps	12
6.8 Bank Stability	Left: 7 Right: 7
6.9 Bank Vegetation Protection	Left: 7 Right: 2
6.10 Riparian Vegetation Zone Width	Left: 8 Right: 2
Total Score	97
Habitat Rating	0.485
Habitat Stream Condition	**Fair**

Narrative:

Late stage 3 (start of juvenile floodplain) - extreme historic degradation, major aggradation, historic widening, and planform adjustment

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T10** Segment: **A** Completion Date: **September 20, 2007**

Organization: **Bear Creek Environmental** Observers: **MN, CS** Why Not assessed: Rain: **No**

Segment Length (ft): **611** Segment Location: **This segment continues until approximately 600 feet upstream to where the rip rap ends.**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Channel Dimensions**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	605	0
height	12	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Very Steep	Very Steep
Continuous w/	Never	Never
W/in 1 Bankfill	Never	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **516**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **51**

2.2 Max Depth (ft) **3.60**

2.3 Mean Depth (ft) **2.82**

2.4 Floodprone Width (ft) **56**

Notes:

Segment runs along North Wolcott Road. Channelized straight and plane bed due to encroachment and rip rap. No floodplain access and high incision due to road in corridor on right bank. No bankful indicators near cross section, used measurment from

Step 2. (Contued)

2.5 Aband. Floodpln **8.00** ft.

Human Elev Floodpln **16.00** ft.

2.6 Width/Depth Ratio **18.09**

2.7 Entrenchment Ratio **1.09**

2.8 Incision Ratio **2.22**

Human Elevated Inc Rat **4.44**

2.9 Sinuosity **Low**

2.10 Riffles Type **Eroded**

2.11 Riffle/Step Spacing (ft) **0**

2.12 Substrate Composition

Bedrock	0%
Boulder	11%
Cobble	49%
Coarse Gravel	29%
Fine Gravel	8%
Sand	3%
Silt and smaller	0%

Silt/Clay Present? **No**

Detritus **0** %

Large Woody **0**

2.13 Average Largest Particle on

Bed **20.0** **inches**

Bar **N/A** **inches**

2.14 Stream Type

Stream Type: **F**

Bed Material: **Cobble**

Subclass Slope: **None**

Bed Form: **Plane Bed**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Boulder/Cobbl	Boulder/Cobbl
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	218	63
Erosion Height (ft)	7.00	5.00
Revetmt. Type	None	Rip-Rap
Revetmt. Length (ft)	0	456

Near Bank Veg. Type	Left	Right
Dominant	Shrubs/Saplin	Bare
Sub-dominant	Herbaceous	None

Bank Canopy	Left	Right
Canopy %	26-50	0

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	51-100	0-25
Sub-dominant	None	None
W less than 25	0	611

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	None
Sub-dominant	Shrubs/Saplin	None

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Residential
Sub-dominant	None	None
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **None**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.7 StormwaterInputs

Field Ditch	0	Road Ditch	1
Other	0	Tile Drain	0
Overland Flow	0	Urb Strm Wtr Pipe	0

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	0	1
Diagonal	**Delta**	**Island**
0	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **598**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T10** Segment: **A** Completion Date: **September 20,**

Organization: **Bear Creek Environmental** Observers: **MN, CS** Rain: **No**

Segment Length (ft): **611** Segment Location: **This segment continues until approximately 600 feet upstream to where the rip rap ends.**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	54.0	Yes	No	No	Yes
Problem	None				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**2**	**C to F**	**Yes**
7.2 Channel Aggradation	**13**	**None**	**No**
7.3 Widening Channel	**14**		**No**
7.4 Change in Planform	**15**		**No**
Total Score	**44**		
Geomorphic Rating	**0.55**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**II**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Extreme**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	10
6.2 Embeddedness	10
6.3 Velocity/Depth Patterns	9
6.4 Sediment Deposition	13
6.5 Channel Flow Status	13
6.6 Channel Alteration	3
6.7 Frequency of Riffles/Steps	10
6.8 Bank Stability	Left: 6 Right: 8
6.9 Bank Vegetation Protection	Left: 8 Right: 0
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 0
Total Score	99
Habitat Rating	0.495
Habitat Stream Condition	**Fair**

Narrative:

Extreme historic degradation, minor aggradation, widening and planform adjustment; channel locked in place by road.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T10** Segment: **B** Completion Date: **September 20, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **2,254** Segment Location: **This segment continues until about 140 feet downstream of a bridge that is a driveway**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Channel Dimensions**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	2,242	0
height	12	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	1,169	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Very Steep	Very Steep
Continuous w/	Sometimes	Never
W/in 1 Bankfill	Sometimes	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **412**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **53**

2.2 Max Depth (ft) **3.80**

2.3 Mean Depth (ft) **2.54**

2.4 Floodprone Width (ft) **78**

Notes:

North Wolcott Road in right corridor, rip rap and straightening associated with road. No trees near mass failures.

North Wolcott Road should be considered the valley wall for Phase 2 and FEH purposes.

Step 2. (Contued)

2.5 Aband. Floodpln **6.70** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **20.98**

2.7 Entrenchment Ratio **1.46**

2.8 Incision Ratio **1.76**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **312**

2.12 Substrate Composition

Bedrock	0%
Boulder	10%
Cobble	19%
Coarse Gravel	25%
Fine Gravel	36%
Sand	10%
Silt and smaller	0%

Silt/Clay Present? **Yes**

Detritus **2** %

Large Woody **15**

2.13 Average Largest Particle on

Bed **13.0** **inches**

Bar **8.0** **inches**

2.14 Stream Type

Stream Type: **B**

Bed Material: **Gravel**

Subclass Slope: **c**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Clay	Gravel
Consistency	Cohesive	Non-cohesive
Bank Erosion	Left	Right
Erosion Length (ft)	766	88
Erosion Height (ft)	6.50	5.00
Revetmt. Type	None	Rip-Rap
Revetmt. Length (ft)	0	558
Near Bank Veg. Type	Left	Right
Dominant	Deciduous	Herbaceous
Sub-dominant	Herbaceous	Shrubs/Saplin
Bank Canopy	Left	Right
Canopy %	51-75	1-25
Mid-Channel Canopy		Open

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	26-50
Sub-dominant	None	51-100
W less than 25	0	449
Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Shrubs/Saplin
Sub-dominant	Herbaceous	Herbaceous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Residential
Sub-dominant	None	None
Mass Failures	114	0
Height	76	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
1	5	6
Diagonal	**Delta**	**Island**
2	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
2	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **473**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T10** Segment: **B** Completion Date: **September 20,**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Rain: **No**

Segment Length (ft): **2,254** Segment Location: **This segment continues until about 140 feet downstream of a bridge that is a driveway**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**5**	**C to B**	**Yes**
7.2 Channel Aggradation	**13**	**None**	**No**
7.3 Widening Channel	**12**		**No**
7.4 Change in Planform	**13**		**No**
Total Score	**43**		
Geomorphic Rating	**0.5375**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	13
6.2 Embeddedness	14
6.3 Velocity/Depth Patterns	13
6.4 Sediment Deposition	9
6.5 Channel Flow Status	10
6.6 Channel Alteration	10
6.7 Frequency of Riffles/Steps	16
6.8 Bank Stability	Left: 5 Right: 9
6.9 Bank Vegetation Protection	Left: 8 Right: 3
6.10 Riparian Vegetation Zone Width	Left: 10 Right: 4
Total Score	124
Habitat Rating	0.62
Habitat Stream Condition	**Fair**

Narrative:

major historic degradation, minor aggradation, widening and planform adjustment.

Stream: **Wild Branch** Reach # **T10** Segment: **C** Completion Date: **September 24, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **3,812** Segment Location: **This segment continues until approximately 300 feet downstream of Cote Road.**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Channel Dimensions**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**0**	**0**
height	**0**	**0**
Roads	**1,422**	**0**
height	**15**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**1,817**	**0**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Very Steep**	**Very Steep**
Continuous w/	**Sometimes**	**Never**
W/in 1 Bankfill	**Sometimes**	**Never**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft) **490**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **75**

2.2 Max Depth (ft) **2.60**

2.3 Mean Depth (ft) **2.22**

2.4 Floodprone Width (ft) **241**

Notes:

Wide channel. Road in corridor at downstream end of segment. Some rip rap and road access in upstream end of segment appears to be abutments or footers for a future bridge. Multiple stream fords in segment.

Step 2. (Contued)

2.5 Aband. Floodpln **4.50** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **33.78**

2.7 Entrenchment Ratio **3.21**

2.8 Incision Ratio **1.73**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **345**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**4** %
Cobble	**30** %
Coarse Gravel	**38** %
Fine Gravel	**23** %
Sand	**5** %
Silt and smaller	**0** %

Silt/Clay Present? **Yes**

Detritus **1** %

Large Woody **12**

2.13 Average Largest Particle on

Bed **9.0** **inches**

Bar **6.5** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Sand**	**Sand**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Gravel**	**Gravel**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**1,520**	**524**
Erosion Height (ft)	**5.71**	**4.52**
Revetmt. Type	**Rip-Rap**	**Rip-Rap**
Revetmt. Length (ft)	**216**	**1,490**

Near Bank Veg. Type	Left	Right
Dominant	**Deciduous**	**Shrubs/Saplin**
Sub-dominant	**Herbaceous**	**Herbaceous**

Bank Canopy	Left	Right
Canopy %	**51-75**	**26-50**

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**26-50**
Sub-dominant	**0-25**	**0-25**
W less than 25	**210**	**1,024**

Buffer Veg. Type	Left	Right
Dominant	**Deciduous**	**Shrubs/Saplin**
Sub-dominant	**Coniferous**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Residential**
Sub-dominant	**Residential**	**Shrubs/Saplin**
Mass Failures	**66**	**0**
Height	**25**	**0**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **Minimal**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments **None**

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg **None**

4.7 StormwaterInputs

Field Ditch	**0**	Road Ditch	**1**
Other	**0**	Tile Drain	**0**
Overland Flow	**0**	Urb Strm Wtr Pipe	**0**

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	**5**	**10**

Diagonal	Delta	Island
7	**0**	**0**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	**0**	**0**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
7	**0**	**No**

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **Straightening**

Straightening Length: **1,668**

5.5 Dredging **Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T10** Segment: **C** Completion Date: **September 24,**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Rain: **No**

Segment Length (ft): **3,812** Segment Location: **This segment continues until approximately 300 feet downstream of Cote Road.**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	52.5	Yes	No	No	Yes
Problem	Deposition Above,Deposition Below,Scour				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**8**	**None**	**Yes**
7.2 Channel Aggradation	**7**	**None**	**No**
7.3 Widening Channel	**8**		**Yes**
7.4 Change in Planform	**13**		**No**
Total Score	**36**		
Geomorphic Rating	**0.45**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	6
6.2 Embeddedness	9
6.3 Velocity/Depth Patterns	8
6.4 Sediment Deposition	5
6.5 Channel Flow Status	6
6.6 Channel Alteration	8
6.7 Frequency of Riffles/Steps	14
6.8 Bank Stability	Left: 4 Right: 7
6.9 Bank Vegetation Protection	Left: 7 Right: 4
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 3
Total Score	90
Habitat Rating	0.45
Habitat Stream Condition	**Fair**

Narrative:

major historic degradation, historic widening, juvenile floodplain just starting to develop in places, major aggradation (overwide) with deep pools infrequent.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **No Name Given** Reach # **T10.01** Segment: **0** Completion Date: **October 11, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **1,497** Segment Location: **This segment begins at the start of reach number 10 of the Wild Branch (Morey Hill Road). It**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**0**	**0**
height	**0**	**0**
Roads	**1,099**	**0**
height	**8**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**72**	**139**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Very Steep**	**Extremely**
Continuous w/	**Sometimes**	**Sometimes**
W/in 1 Bankfill	**Sometimes**	**Sometimes**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft) **155**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **25**

2.2 Max Depth (ft) **2.20**

2.3 Mean Depth (ft) **1.28**

2.4 Floodprone Width (ft) **37**

Notes:

Unnamed trib, runs along Brook Road. Perched trib enters at upstream end of segment.

Multiple revetments on right bank include rip rap and minor hard bank in the vicinity of the

Step 2. (Contued)

2.5 Aband. Floodpln **6.50** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **19.14**

2.7 Entrenchment Ratio **1.51**

2.8 Incision Ratio **2.95**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **182**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**12** %
Cobble	**49** %
Coarse Gravel	**31** %
Fine Gravel	**8** %
Sand	**0** %
Silt and smaller	**0** %

Silt/Clay Present? **Yes**

Detritus **2** %

Large Woody **23**

2.13 Average Largest Particle on

Bed **10.0** **inches**

Bar **7.0** **inches**

2.14 Stream Type

Stream Type: **B**

Bed Material: **Cobble**

Subclass Slope: **c**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Sand**	**Sand**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Boulder/Cobbl**	**Boulder/Cobbl**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**984**	**358**
Erosion Height (ft)	**5.83**	**6.69**
Revetmt. Type	**Hard Bank**	**Multiple**
Revetmt. Length (ft)	**34**	**359**

Near Bank Veg. Type	Left	Right
Dominant	**Herbaceous**	**Herbaceous**
Sub-dominant	**Deciduous**	**Deciduous**

Bank Canopy	Left	Right
Canopy %	**51-75**	**26-50**

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-dominant	**0-25**	**0-25**
W less than 25	**91**	**115**

Buffer Veg. Type	Left	Right
Dominant	**Mixed Trees**	**Mixed Trees**
Sub-dominant	**None**	**None**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Residential**	**Residential**
Mass Failures	**77**	**0**
Height	**30**	**0**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **1**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.7 StormwaterInputs

Field Ditch	**1**	Road Ditch	**2**
Other	**0**	Tile Drain	**0**
Overland Flow	**0**	Urb Strm Wtr Pipe	**0**

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
1	**3**	**6**

Diagonal	Delta	Island
0	**0**	**1**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	**0**	**0**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	**0**	**Yes**

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **547**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **No Name Given** Reach # **T10.01** Segment: **0** Completion Date: **October 11, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **1,497** Segment Location: **This segment begins at the start of reach number 10 of the Wild Branch (Morey Hill Road). It**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	29.0	Yes	No	No	Yes
Problem	Deposition Above,Deposition Below,Scour				
Culvert	7.00	Yes	No	Yes	Yes
Problem	Deposition Above,Scour Above,Scour				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**4**	**C to B**	**Yes**
7.2 Channel Aggradation	**14**	**None**	**No**
7.3 Widening Channel	**12**		**No**
7.4 Change in Planform	**11**		**No**
Total Score	**41**		
Geomorphic Rating	**0.5125**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	15
6.2 Embeddedness	16
6.3 Velocity/Depth Patterns	14
6.4 Sediment Deposition	13
6.5 Channel Flow Status	10
6.6 Channel Alteration	9
6.7 Frequency of Riffles/Steps	14
6.8 Bank Stability	Left: 2 Right: 6
6.9 Bank Vegetation Protection	Left: 7 Right: 7
6.10 Riparian Vegetation Zone Width	Left: 8 Right: 8
Total Score	129
Habitat Rating	0.645
Habitat Stream Condition	**Good**

Narrative:

extreme historic degradation, minor aggradation and widening, minor planform adjustment.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T11** Segment: **0** Completion Date: **September 24, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **4,423** Segment Location: **This segment continues until about 200 feet east of where the south end of Glenn Anderson**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**0**	**0**
height	**0**	**0**
Roads	**4,032**	**0**
height	**12**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**63**	**49**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Very Steep**	**Hilly**
Continuous w/	**Sometimes**	**Never**
W/in 1 Bankfill	**Sometimes**	**Never**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft)	**450**
Width Determination	**Measured**
Confinement Type	**Broad**
Rock Gorge?	**No**
Human-caused Change?	**yes**

Step 2. Stream Channel

2.1 Bankfull Width	**69**
2.2 Max Depth (ft)	**2.60**
2.3 Mean Depth (ft)	**1.42**
2.4 Floodprone Width (ft)	**142**

Notes:

Localized and active gravel scalping on point bar. Numerous diagonal riffles upstream of bends. Extensive planform adjustment occurring in reach. Entrenchment ratio was near cutoff between B and C channel. Weak riffle-pool bedform. Numerous diagonal

Step 2. (Contued)

2.5 Aband. Floodpln	**5.30** ft.
Human Elev Floodpln	**0.00** ft.
2.6 Width/Depth Ratio	**48.24**
2.7 Entrenchment Ratio	**2.08**
2.8 Incision Ratio	**2.04**
Human Elevated Inc Rat	**0.00**
2.9 Sinuosity	**Low**
2.10 Riffles Type	**Sedimented**
2.11 Riffle/Step Spacing (ft)	**350**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**4** %
Cobble	**30** %
Coarse Gravel	**33** %
Fine Gravel	**22** %
Sand	**10** %
Silt and smaller	**1** %

Silt/Clay Present?	**Yes**
Detritus	**2** %
# Large Woody	**30**

2.13 Average Largest Particle on

Bed	**9.0**	**inches**
Bar	**5.0**	**inches**

2.14 Stream Type

Stream Type:	**B**
Bed Material:	**Gravel**
Subclass Slope:	**c**
Bed Form:	**Riffle-Pool**
Field Measured Slope:	

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Sand**	**Sand**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Gravel**	**Gravel**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**1,440**	**1,227**
Erosion Height (ft)	**6.05**	**5.90**
Revetmt. Type	**None**	**Rip-Rap**
Revetmt. Length (ft)	**0**	**602**

Near Bank Veg. Type	Left	Right
Dominant	**Deciduous**	**Shrubs/Saplin**
Sub-dominant	**Shrubs/Saplin**	**Herbaceous**

Bank Canopy	Left	Right
Canopy %	**26-50**	**1-25**
Mid-Channel Canopy	**Open**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**0-25**
Sub-dominant	**0-25**	**>100**
W less than 25	**804**	**1,209**

Buffer Veg. Type	Left	Right
Dominant	**Mixed Trees**	**Herbaceous**
Sub-dominant	**Herbaceous**	**Shrubs/Saplin**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Residential**
Sub-dominant	**Hay**	**Shrubs/Saplin**
Mass Failures	**92**	**271**
Height	**30**	**15**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps	**Minimal**
4.2 Adjacent Wetlands	**Minimal**
4.3 Flow Status	**Low**
4.4 # of Debris Jams	**1**
4.5 Flow Regulation Type	**None**
Flow Regulation Use	
Impoundments	
Impoundmt. Location	
4.6 Up/Down strm flow reg	**None**
(old) Upstrm Flow Reg	

4.7 StormwaterInputs

Field Ditch	**0**	Road Ditch	**1**
Other	**0**	Tile Drain	**0**
Overland Flow	**0**	Urb Strm Wtr Pipe	**0**

4.9 # of Beaver Dams	**0**
Affected Length (ft)	**0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
4	**10**	**3**
Diagonal	**Delta**	**Island**
5	**0**	**0**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
6	**0**	**1**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
5	**0**	**No**

5.4 Stream Ford or Animal	**Yes**
5.5 Straightening	**Straightening**
Straightening Length:	**419**
5.5 Dredging	**Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T11** Segment: **0** Completion Date: **September 24,**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Rain: **No**

Segment Length (ft): **4,423** Segment Location: **This segment continues until about 200 feet east of where the south end of Glenn Anderson**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	51.0	Yes	No	No	Yes

Problem Deposition Above,Deposition Below

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**5**	**C to B**	**Yes**
7.2 Channel Aggradation	**5**	**None**	**No**
7.3 Widening Channel	**5**		**No**
7.4 Change in Planform	**3**		**No**

Total Score	**18**
Geomorphic Rating	**0.225**
Channel Evolution Model	**F**
Channel Evolution Stage	**III**
Geomorphic Condition	**Poor**
Stream Sensitivity	**Very High**

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	5
6.2 Embeddedness	11
6.3 Velocity/Depth Patterns	8
6.4 Sediment Deposition	5
6.5 Channel Flow Status	6
6.6 Channel Alteration	11
6.7 Frequency of Riffles/Steps	14
6.8 Bank Stability	Left: 5 Right: 6
6.9 Bank Vegetation Protection	Left: 6 Right: 4
6.10 Riparian Vegetation Zone Width	Left: 8 Right: 3
Total Score	92
Habitat Rating	0.46
Habitat Stream Condition	**Fair**

Narrative:

extreme historic degradation, extreme aggradation, widening and planform adjustment.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T12** Segment: **A** Completion Date: **September 26, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **1,267** Segment Location: **This segment continues until approximately 180 feet upstream of where Glenn Anderson**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Banks and Buffers**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	1,234	0
height	15	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	163	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Very Steep	Steep
Continuous w/	Sometimes	Never
W/in 1 Bankfill	Always	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **330**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **60**

2.2 Max Depth (ft) **3.00**

2.3 Mean Depth (ft) **2.12**

2.4 Floodprone Width (ft) **71**

Notes:

No evidence of human straightening in segment, channelized just upstream of segment. Minor bar scalping. Extremely incised, large wetland area on other side of street, likely river used to run through wetland area. Extreme incision likely due to new path

Step 2. (Contued)

2.5 Aband. Floodpln **11.20** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **28.07**

2.7 Entrenchment Ratio **1.18**

2.8 Incision Ratio **3.73**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Eroded**

2.11 Riffle/Step Spacing (ft) **385**

2.12 Substrate Composition

Bedrock	0%
Boulder	5%
Cobble	24%
Coarse Gravel	32%
Fine Gravel	27%
Sand	11%
Silt and smaller	1%

Silt/Clay Present? **Yes**

Detritus **1** %

Large Woody **10**

2.13 Average Largest Particle on

Bed **8.0** **inches**

Bar **7.0** **inches**

2.14 Stream Type

Stream Type: **F**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Plane Bed**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	598	614
Erosion Height (ft)	7.13	8.30
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Deciduous	Herbaceous
Sub-dominant	Herbaceous	Deciduous

Bank Canopy	Left	Right
Canopy %	51-75	26-50

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	26-50
Sub-dominant	None	>100
W less than 25	0	0

Buffer Veg. Type	Left	Right
Dominant	Deciduous	Deciduous
Sub-dominant	Herbaceous	Coniferous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Residential
Sub-dominant	None	None
Mass Failures	47	50
Height	25	15
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
1	2	2

Diagonal	Delta	Island
0	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	0	No

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T12** Segment: **A** Completion Date: **September 26,**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Rain: **No**

Segment Length (ft): **1,267** Segment Location: **This segment continues until approximately 180 feet upstream of where Glenn Anderson**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**3**	**C to F**	**Yes**
7.2 Channel Aggradation	**12**	**None**	**No**
7.3 Widening Channel	**7**		**No**
7.4 Change in Planform	**13**		**No**
Total Score	**35**		
Geomorphic Rating	**0.4375**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Extreme**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	9
6.2 Embeddedness	9
6.3 Velocity/Depth Patterns	8
6.4 Sediment Deposition	8
6.5 Channel Flow Status	8
6.6 Channel Alteration	13
6.7 Frequency of Riffles/Steps	14
6.8 Bank Stability	Left: 4 Right: 4
6.9 Bank Vegetation Protection	Left: 6 Right: 6
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 4
Total Score	102
Habitat Rating	0.51
Habitat Stream Condition	**Fair**

Narrative:

extreme historic degradation, minor aggradation and planform adjustment, major widening.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T12** Segment: **B** Completion Date: **September 26, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **2,745** Segment Location: **This segment continues until just west of Denton Hill Road where the river goes under Wild**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Banks and Buffers**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	600	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	1,019	42

1.4 Adjacent Side	Left	Right
Hillside Slope	Very Steep	Steep
Continuous w/	Sometimes	Never
W/in 1 Bankfill	Sometimes	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **415**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **80**

2.2 Max Depth (ft) **2.90**

2.3 Mean Depth (ft) **1.90**

2.4 Floodprone Width (ft) **96**

Notes:

Segment in poor condition. Extreme incision and widening, many mass failures along left bank. Frequently rip rapped along right bank when river abuts Wild Branch Road. Major aggradation with large bars, and major planform adjustment occurring in segment.

Step 2. (Contued)

2.5 Aband. Floodpln **4.90** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **42.00**

2.7 Entrenchment Ratio **1.20**

2.8 Incision Ratio **1.69**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **255**

2.12 Substrate Composition

Bedrock	0%
Boulder	7%
Cobble	28%
Coarse Gravel	25%
Fine Gravel	21%
Sand	19%
Silt and smaller	0%

Silt/Clay Present? **Yes**

Detritus **1** %

Large Woody **22**

2.13 Average Largest Particle on

Bed **8.0** **inches**

Bar **6.5** **inches**

2.14 Stream Type

Stream Type: **F**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type

(if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive
Bank Erosion	Left	Right
Erosion Length (ft)	740	631
Erosion Height (ft)	5.80	5.94
Revetmt. Type	Multiple	Multiple
Revetmt. Length (ft)	122	722
Near Bank Veg. Type	Left	Right
Dominant	Shrubs/Saplin	Herbaceous
Sub-dominant	Bare	Shrubs/Saplin
Bank Canopy	Left	Right
Canopy %	1-25	1-25
Mid-Channel Canopy	Open	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	26-50
Sub-dominant	0-25	0-25
W less than 25	623	123
Buffer Veg. Type	Left	Right
Dominant	Deciduous	Herbaceous
Sub-dominant	Coniferous	Shrubs/Saplin

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Residential
Sub-dominant	Hay	Hay
Mass Failures	421	0
Height	35	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.7 StormwaterInputs

Field Ditch	0	Road Ditch	1
Other	0	Tile Drain	0
Overland Flow	0	Urb Strm Wtr Pipe	0

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
1	7	4
Diagonal	**Delta**	**Island**
3	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
2	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
3	0	Yes

5.4 Stream Ford or Animal **No**

5.5 Straightening **Straightening**

Straightening Length: **524**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T12** Segment: **B** Completion Date: **September 26,**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Rain: **No**

Segment Length (ft): **2,745** Segment Location: **This segment continues until just west of Denton Hill Road where the river goes under Wild**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	40.5	Yes	No	Yes	Yes

Problem Deposition Below,Scour Above,Alignment

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**5**	**C to F**	**Yes**
7.2 Channel Aggradation	**7**	**None**	**No**
7.3 Widening Channel	**5**		**No**
7.4 Change in Planform	**9**		**No**
Total Score	**26**		
Geomorphic Rating	**0.325**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Poor**		
Stream Sensitivity	**Extreme**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	9
6.2 Embeddedness	9
6.3 Velocity/Depth Patterns	9
6.4 Sediment Deposition	7
6.5 Channel Flow Status	6
6.6 Channel Alteration	11
6.7 Frequency of Riffles/Steps	15
6.8 Bank Stability	Left: 6 Right: 6
6.9 Bank Vegetation Protection	Left: 3 Right: 5
6.10 Riparian Vegetation Zone Width	Left: 8 Right: 3
Total Score	97
Habitat Rating	0.485
Habitat Stream Condition	**Fair**

Narrative:

extreme historic degradation, active extreme widening, major aggradation and planform adjustment.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T13** Segment: **0** Completion Date: **September 27, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **3,398** Segment Location: **This segment continues until about 1000 feet north of where Denton Hill Road meets Wild**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	788	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Hilly
Continuous w/	Sometimes	Sometimes
W/in 1 Bankfill	Sometimes	Sometimes
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **535**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **yes**

Step 2. Stream Channel

2.1 Bankfull Width **40**

2.2 Max Depth (ft) **2.60**

2.3 Mean Depth (ft) **2.20**

2.4 Floodprone Width (ft) **52**

Notes:

Entrenchment ratio was on border between F and B channel. High incision, downstream segments were also F channels. Most of reach is away from road except the most downstream 550 feet which runs along Wild Branch Road. Early stage III.

Step 2. (Contued)

2.5 Aband. Floodpln **5.40** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **17.95**

2.7 Entrenchment Ratio **1.32**

2.8 Incision Ratio **2.08**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **350**

2.12 Substrate Composition

Bedrock	0%
Boulder	3%
Cobble	17%
Coarse Gravel	33%
Fine Gravel	31%
Sand	13%
Silt and smaller	3%

Silt/Clay Present? **Yes**

Detritus **1** %

Large Woody **22**

2.13 Average Largest Particle on

Bed **7.0** **inches**

Bar **5.0** **inches**

2.14 Stream Type

Stream Type: **F**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	1,005	1,567
Erosion Height (ft)	4.45	4.54
Revetmt. Type	Rip-Rap	None
Revetmt. Length (ft)	97	0

Near Bank Veg. Type	Left	Right
Dominant	Deciduous	Deciduous
Sub-dominant	Herbaceous	Herbaceous

Bank Canopy	Left	Right
Canopy %	26-50	26-50

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	26-50	>100
Sub-dominant	51-100	26-50
W less than 25	58	178

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Mixed Trees
Sub-dominant	Herbaceous	Herbaceous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Pasture	Forest
Sub-dominant	Residential	Hay
Mass Failures	32	38
Height	30	15
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Abundant**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
2	5	10

Diagonal	Delta	Island
0	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
2	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	0	No

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **Straightening**

Straightening Length: **696**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T13** Segment: **0** Completion Date: **September 27,**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **3,398** Segment Location: **This segment continues until about 1000 feet north of where Denton Hill Road meets Wild**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**5**	**C to F**	**Yes**
7.2 Channel Aggradation	**10**	**None**	**No**
7.3 Widening Channel	**13**		**No**
7.4 Change in Planform	**11**		**No**
Total Score	**39**		
Geomorphic Rating	**0.4875**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Extreme**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	8
6.2 Embeddedness	6
6.3 Velocity/Depth Patterns	12
6.4 Sediment Deposition	10
6.5 Channel Flow Status	13
6.6 Channel Alteration	14
6.7 Frequency of Riffles/Steps	15
6.8 Bank Stability	Left: 6 Right: 4
6.9 Bank Vegetation Protection	Left: 7 Right: 7
6.10 Riparian Vegetation Zone Width	Left: 8 Right: 5
Total Score	115
Habitat Rating	0.575
Habitat Stream Condition	**Fair**

Narrative:

extreme historic degradation, minor planform adjustment and widening, major aggradation.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T14** Segment: **A** Completion Date: **October 2, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **1,050** Segment Location: **This segment continues for approximately 1000 feet upstream and ends where beaver dams**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Channel Dimensions**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Hilly
Continuous w/	Never	Never
W/in 1 Bankfill	Sometimes	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **717**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **No**

Step 2. Stream Channel

2.1 Bankfull Width **39**

2.2 Max Depth (ft) **3.30**

2.3 Mean Depth (ft) **2.49**

2.4 Floodprone Width (ft) **100**

Notes:

Upstream of segment seriously impacted by beaver dams. One remnant beaver dam at upstream end of segment, no longer impacting segment. Cow pasture beyond valley wall on left bank.

Step 2. (Contued)

2.5 Aband. Floodpln **4.60** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **15.46**

2.7 Entrenchment Ratio **2.60**

2.8 Incision Ratio **1.39**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **315**

2.12 Substrate Composition

Bedrock	0%
Boulder	4%
Cobble	16%
Coarse Gravel	27%
Fine Gravel	25%
Sand	28%
Silt and smaller	0%

Silt/Clay Present? **No**

Detritus **3** %

Large Woody **8**

2.13 Average Largest Particle on

Bed **7.0** **inches**

Bar **3.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type

(if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	377	336
Erosion Height (ft)	4.06	4.66
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Deciduous	Deciduous
Sub-dominant	Coniferous	Herbaceous

Bank Canopy	Left	Right
Canopy %	51-75	26-50

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	26-50
Sub-dominant	26-50	51-100
W less than 25	0	0

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Deciduous
Sub-dominant	None	Herbaceous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Hay
Sub-dominant	Pasture	None
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	10	3

Diagonal	Delta	Island
0	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
2	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T14** Segment: **A** Completion Date: **October 2, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **1,050** Segment Location: **This segment continues for approximately 1000 feet upstream and ends where beaver dams**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**12**	**None**	**Yes**
7.2 Channel Aggradation	**13**	**None**	**No**
7.3 Widening Channel	**13**		**No**
7.4 Change in Planform	**11**		**No**
Total Score	**49**		
Geomorphic Rating	**0.6125**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	14
6.2 Embeddedness	8
6.3 Velocity/Depth Patterns	12
6.4 Sediment Deposition	9
6.5 Channel Flow Status	12
6.6 Channel Alteration	14
6.7 Frequency of Riffles/Steps	14
6.8 Bank Stability	Left: 5 Right: 5
6.9 Bank Vegetation Protection	Left: 9 Right: 6
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 4
Total Score	121
Habitat Rating	0.605
Habitat Stream Condition	**Fair**

Narrative:

Minor historic degradation, minor aggradation, widening and planform adjustment.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T14** Segment: **B** Completion Date: **October 1, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: **beaver dam** Rain: **Yes**

Segment Length (ft): **885** Segment Location: **This segment continues for approximately 900 feet upstream where beaver dams have**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Other Reason**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Hilly
Continuous w/	Never	Never
W/in 1 Bankfill	Never	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **790**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **No**

Step 2. Stream Channel

2.1 Bankfull Width **0**

2.2 Max Depth (ft) **0.00**

2.3 Mean Depth (ft) **0.00**

2.4 Floodprone Width (ft) **0**

Notes:

Segment not assessed due to influence by beaver dam. Too deep to walk in river, water backed up for length of segment. Farm land on both sides of segment, farm bridge crosses river in segment. Evidence of more extensive past beaver dam influence

Step 2. (Contued)

2.5 Aband. Floodpln **0.00** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **0.00**

2.7 Entrenchment Ratio **0.00**

2.8 Incision Ratio **0.00**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Not Applicable**

2.11 Riffle/Step Spacing (ft) **0**

2.12 Substrate Composition

Silt/Clay Present? **No**

Detritus **0** %

Large Woody **0**

2.13 Average Largest Particle on

Bed **0.0**

Bar **0.0**

Not Evaluated

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Plane Bed**

Field Measured Slope:

2.15 Reference Stream Type

(if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	0	182
Erosion Height (ft)	0.00	5.00
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Herbaceous	Herbaceous
Sub-dominant	Deciduous	Deciduous

Bank Canopy	Left	Right
Canopy %	1-25	1-25

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	26-50	26-50
Sub-dominant	>100	None
W less than 25	0	0

Buffer Veg. Type	Left	Right
Dominant	Deciduous	Deciduous
Sub-dominant	Herbaceous	Herbaceous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Hay	Hay
Sub-dominant	Residential	None
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **Minimal**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **1**

Affected Length (ft) **800**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	10	2

Diagonal	Delta	Island
0	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T14** Segment: **B** Completion Date: **October 1, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **885** Segment Location: **This segment continues for approximately 900 feet upstream where beaver dams have**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	25.0	Yes	No	Yes	Yes

Problem: Scour Above,Scour Below

Step 7. Rapid Geomorphic Assessment Data

Confinement Type

Channel Evolution Model

Channel Evolution Stage

Geomorphic Condition **Fair**

Stream Sensitivity

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type

Habitat Stream Condition

Narrative:

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T14** Segment: **C** Completion Date: **October 1, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **3,502** Segment Location: **This segment continues until the bridge on Hatch Brook Road.**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Banks and Buffers**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	176	50

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Hilly
Continuous w/	Sometimes	Never
W/in 1 Bankfill	Sometimes	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **790**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **No**

Step 2. Stream Channel

2.1 Bankfull Width **42**

2.2 Max Depth (ft) **3.00**

2.3 Mean Depth (ft) **2.28**

2.4 Floodprone Width (ft) **86**

Notes:

Evidence of remnant beaver dam in reach, also downstream segment significantly influenced by beaver dams. Christmas tree farm located on right bank. Moderately entrenched. Lots of planform adjustment occurring in reach and large depositional

Step 2. (Contued)

2.5 Aband. Floodpln **4.40** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **18.42**

2.7 Entrenchment Ratio **2.04**

2.8 Incision Ratio **1.47**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Moderate**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **440**

2.12 Substrate Composition

Bedrock	0%
Boulder	4%
Cobble	23%
Coarse Gravel	53%
Fine Gravel	13%
Sand	7%
Silt and smaller	0%

Silt/Clay Present? **Yes**

Detritus **2** %

Large Woody **20**

2.13 Average Largest Particle on

Bed **9.0** **inches**

Bar **4.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive
Bank Erosion	Left	Right
Erosion Length (ft)	1,743	1,010
Erosion Height (ft)	5.12	5.20
Revetmt. Type	Multiple	Multiple
Revetmt. Length (ft)	106	173
Near Bank Veg. Type	Left	Right
Dominant	Shrubs/Saplin	Shrubs/Saplin
Sub-dominant	Herbaceous	Herbaceous
Bank Canopy	Left	Right
Canopy %	26-50	26-50
Mid-Channel Canopy		Open

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	51-100
Sub-dominant	26-50	>100
W less than 25	0	99
Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Mixed Trees
Sub-dominant	Herbaceous	Herbaceous

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Forest
Sub-dominant	Hay	Hay
Mass Failures	143	0
Height	20	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	7	7

Diagonal	Delta	Island
0	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
6	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T14** Segment: **C** Completion Date: **October 1, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **3,502** Segment Location: **This segment continues until the bridge on Hatch Brook Road.**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	20.0	Yes	No	Yes	Yes
Problem	None				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**9**	**None**	**Yes**
7.2 Channel Aggradation	**10**	**None**	**No**
7.3 Widening Channel	**10**		**No**
7.4 Change in Planform	**6**		**No**
Total Score	**35**		
Geomorphic Rating	**0.4375**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	13
6.2 Embeddedness	8
6.3 Velocity/Depth Patterns	13
6.4 Sediment Deposition	8
6.5 Channel Flow Status	11
6.6 Channel Alteration	15
6.7 Frequency of Riffles/Steps	12
6.8 Bank Stability	Left: 4 Right: 6
6.9 Bank Vegetation Protection	Left: 8 Right: 8
6.10 Riparian Vegetation Zone Width	Left: 9 Right: 7
Total Score	122
Habitat Rating	0.61
Habitat Stream Condition	**Fair**

Narrative:

Major historic degradation, major aggradation, widening and planform adjustment.

Stream: **Wild Branch** Reach # **T15** Segment: **A** Completion Date: **October 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **No**

Segment Length (ft): **2,898** Segment Location: **This segment continues for approximately 2812 feet upstream where the depositional**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Depositional Features**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Steep
Continuous w/	Never	Sometimes
W/in 1 Bankfill	Never	Sometimes
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft)	1,250
Width Determination	Measured
Confinement Type	Very Broad
Rock Gorge?	No
Human-caused Change?	No

Step 2. Stream Channel

2.1 Bankfull Width	41
2.2 Max Depth (ft)	3.10
2.3 Mean Depth (ft)	2.33
2.4 Floodprone Width (ft)	223

Notes:

Segment has large depositional features and wide valley width. Early Stage III.

Step 2. (Contued)

2.5 Aband. Floodpln	5.50 ft.
Human Elev Floodpln	0.00 ft.
2.6 Width/Depth Ratio	17.60
2.7 Entrenchment Ratio	5.44
2.8 Incision Ratio	1.77
Human Elevated Inc Rat	0.00
2.9 Sinuosity	Low
2.10 Riffles Type	Sedimented
2.11 Riffle/Step Spacing (ft)	270

2.12 Substrate Composition

Bedrock	0%
Boulder	5%
Cobble	34%
Coarse Gravel	45%
Fine Gravel	12%
Sand	4%
Silt and smaller	0%

Silt/Clay Present?	Yes
Detritus	5 %
# Large Woody	12

2.13 Average Largest Particle on

Bed	5.0	inches
Bar	4.0	inches

2.14 Stream Type

Stream Type:	C
Bed Material:	Gravel
Subclass Slope:	None
Bed Form:	Riffle-Pool
Field Measured Slope:	

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	696	903
Erosion Height (ft)	4.35	4.74
Revetmt. Type	Rip-Rap	None
Revetmt. Length (ft)	138	0

Near Bank Veg. Type	Left	Right
Dominant	Deciduous	Deciduous
Sub-dominant	Herbaceous	Herbaceous

Bank Canopy	Left	Right
Canopy %	51-75	51-75
Mid-Channel Canopy		Open

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	26-50	>100
Sub-dominant	>100	None
W less than 25	72	0

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Mixed Trees
Sub-dominant	Herbaceous	None

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Pasture	Forest
Sub-dominant	Forest	None
Mass Failures	0	51
Height	0	20
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps	Minimal
4.2 Adjacent Wetlands	Minimal
4.3 Flow Status	Low
4.4 # of Debris Jams	0
4.5 Flow Regulation Type	None
Flow Regulation Use	
Impoundments	
Impoundmt. Location	
4.6 Up/Down strm flow reg	None
(old) Upstrm Flow Reg	

4.9 # of Beaver Dams	0
Affected Length (ft)	0

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
1	8	5
Diagonal	Delta	Island
5	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
2	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
5	0	No

5.4 Stream Ford or Animal	No
5.5 Straightening	Straightening
Straightening Length:	136
5.5 Dredging	None

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T15** Segment: **A** Completion Date: **October 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **No**

Segment Length (ft): **2,898** Segment Location: **This segment continues for approximately 2812 feet upstream where the depositional**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**8**	**None**	**Yes**
7.2 Channel Aggradation	**6**	**None**	**No**
7.3 Widening Channel	**13**		**No**
7.4 Change in Planform	**12**		**No**
Total Score	**39**		
Geomorphic Rating	**0.4875**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	11
6.2 Embeddedness	9
6.3 Velocity/Depth Patterns	13
6.4 Sediment Deposition	7
6.5 Channel Flow Status	7
6.6 Channel Alteration	14
6.7 Frequency of Riffles/Steps	16
6.8 Bank Stability	Left: 6 Right: 5
6.9 Bank Vegetation Protection	Left: 7 Right: 6
6.10 Riparian Vegetation Zone Width	Left: 6 Right: 9
Total Score	116
Habitat Rating	0.58
Habitat Stream Condition	**Fair**

Narrative:

major historic degradation, minor widening and planform adjustment, major aggradation. Early stage III.

Stream: **Wild Branch** Reach # **T15** Segment: **B** Completion Date: **October 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **No**

Segment Length (ft): **1,152** Segment Location: **This segment continues for approximately 1150 feet upstream where the valley width**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Valley Width**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Steep
Continuous w/	Never	Sometimes
W/in 1 Bankfill	Never	Sometimes
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **880**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **No**

Step 2. Stream Channel

2.1 Bankfull Width **41**

2.2 Max Depth (ft) **3.00**

2.3 Mean Depth (ft) **2.21**

2.4 Floodprone Width (ft) **205**

Notes:

Segment naturally straight, road not within corridor, valley is wider than upstream segment. Old dam used to exist in upstream segment. Early Stage III.

Riffles are sedimented, not many deep pools,

Step 2. (Contued)

2.5 Aband. Floodpln **4.40** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **18.55**

2.7 Entrenchment Ratio **5.00**

2.8 Incision Ratio **1.47**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **342**

2.12 Substrate Composition

Bedrock	0%
Boulder	7%
Cobble	36%
Coarse Gravel	33%
Fine Gravel	19%
Sand	5%
Silt and smaller	0%

Silt/Clay Present? **No**

Detritus **5** %

Large Woody **5**

2.13 Average Largest Particle on

Bed **9.0** **inches**

Bar **8.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	101	230
Erosion Height (ft)	3.00	4.00
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Shrubs/Saplin	Deciduous
Sub-dominant	Herbaceous	Herbaceous

Bank Canopy	Left	Right
Canopy %	26-50	51-75

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	>100
Sub-dominant	51-100	None
W less than 25	0	0

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Mixed Trees
Sub-dominant	None	None

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Forest
Sub-dominant	Hay	None
Mass Failures	0	44
Height	0	15
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **None**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	0	1

Diagonal	Delta	Island
1	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
1	0	No

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T15** Segment: **B** Completion Date: **October 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **No**

Segment Length (ft): **1,152** Segment Location: **This segment continues for approximately 1150 feet upstream where the valley width**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**9**	**None**	**Yes**
7.2 Channel Aggradation	**10**	**None**	**No**
7.3 Widening Channel	**14**		**No**
7.4 Change in Planform	**17**		**No**
Total Score	**50**		
Geomorphic Rating	**0.625**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	15
6.2 Embeddedness	11
6.3 Velocity/Depth Patterns	15
6.4 Sediment Deposition	14
6.5 Channel Flow Status	12
6.6 Channel Alteration	13
6.7 Frequency of Riffles/Steps	12
6.8 Bank Stability	Left: 8 Right: 7
6.9 Bank Vegetation Protection	Left: 9 Right: 9
6.10 Riparian Vegetation Zone Width	Left: 8 Right: 10
Total Score	143
Habitat Rating	0.715
Habitat Stream Condition	**Good**

Narrative:

major historic degradation, major aggradation and minor widening.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T15** Segment: **C** Completion Date: **October 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **No**

Segment Length (ft): **1,312** Segment Location: **This segment continues for about one half mile until about 400 feet downstream of a small**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Valley Width**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Steep
Continuous w/	Sometimes	Sometimes
W/in 1 Bankfill	Sometimes	Sometimes
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft)	165
Width Determination	Measured
Confinement Type	Narrow
Rock Gorge?	No
Human-caused Change?	No

Step 2. Stream Channel

2.1 Bankfull Width	53
2.2 Max Depth (ft)	2.50
2.3 Mean Depth (ft)	1.96
2.4 Floodprone Width (ft)	120

Notes:

Evidence of possibly 2 old dam abutments in segment near grade controls. Upper most part of segment runs through pasture. Early Stage III.

Step 2. (Contued)

2.5 Aband. Floodpln	4.10 ft.
Human Elev Floodpln	0.00 ft.
2.6 Width/Depth Ratio	26.79
2.7 Entrenchment Ratio	2.29
2.8 Incision Ratio	1.64
Human Elevated Inc Rat	0.00
2.9 Sinuosity	Low
2.10 Riffles Type	Complete
2.11 Riffle/Step Spacing (ft)	350

2.12 Substrate Composition

Bedrock	0%
Boulder	12%
Cobble	29%
Coarse Gravel	41%
Fine Gravel	17%
Sand	1%
Silt and smaller	0%

Silt/Clay Present?	No
Detritus	3 %
# Large Woody	6

2.13 Average Largest Particle on

Bed	10.0	inches
Bar	9.0	inches

2.14 Stream Type

Stream Type:	C
Bed Material:	Gravel
Subclass Slope:	None
Bed Form:	Riffle-Pool
Field Measured Slope:	

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Boulder/Cobbl	Boulder/Cobbl
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	52	397
Erosion Height (ft)	5.00	6.20
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Herbaceous	Deciduous
Sub-dominant	Deciduous	Herbaceous

Bank Canopy	Left	Right
Canopy %	26-50	26-50
Mid-Channel Canopy		Open

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	51-100	>100
Sub-dominant	0-25	0-25
W less than 25	309	0

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Mixed Trees
Sub-dominant	Herbaceous	None

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Pasture	Forest
Sub-dominant	Forest	Pasture
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps	Minimal
4.2 Adjacent Wetlands	Minimal
4.3 Flow Status	Low
4.4 # of Debris Jams	0
4.5 Flow Regulation Type	None
Flow Regulation Use	
Impoundments	
Impoundmt. Location	
4.6 Up/Down strm flow reg	None
(old) Upstrm Flow Reg	

4.9 # of Beaver Dams	0
Affected Length (ft)	0

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	1	5

Diagonal	Delta	Island
0	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	0	No

5.4 Stream Ford or Animal	Yes
5.5 Straightening	None
Straightening Length:	0
5.5 Dredging	None

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T15** Segment: **C** Completion Date: **October 4, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **No**

Segment Length (ft): **1,312** Segment Location: **This segment continues for about one half mile until about 400 feet downstream of a small**

1.6 Grade Controls

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken
Ledge	Mid-segment	4.00	1.00	Yes	
Ledge	Mid-segment	4.00	2.00	Yes	

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**9**	**None**	**Yes**
7.2 Channel Aggradation	**12**	**None**	**No**
7.3 Widening Channel	**13**		**No**
7.4 Change in Planform	**14**		**No**
Total Score	**48**		
Geomorphic Rating	**0.6**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	14
6.2 Embeddedness	13
6.3 Velocity/Depth Patterns	16
6.4 Sediment Deposition	13
6.5 Channel Flow Status	13
6.6 Channel Alteration	16
6.7 Frequency of Riffles/Steps	14
6.8 Bank Stability	Left: 9 Right: 5
6.9 Bank Vegetation Protection	Left: 6 Right: 6
6.10 Riparian Vegetation Zone Width	Left: 7 Right: 9
Total Score	141
Habitat Rating	0.705
Habitat Stream Condition	**Good**

Narrative:

major historic degradation, minor aggradation, widening and planform adjustment. Early stage III.

Stream: **Wild Branch** Reach # **T16** Segment: **0** Completion Date: **October 5, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **6,043** Segment Location: **This segment continues until a tributary entering from the north, approximately 600 feet**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**0**	**0**
height	**0**	**0**
Roads	**1,099**	**0**
height	**5**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**451**	**87**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Very Steep**	**Steep**
Continuous w/	**Sometimes**	**Sometimes**
W/in 1 Bankfill	**Sometimes**	**Sometimes**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft) **430**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **47**

2.2 Max Depth (ft) **2.70**

2.3 Mean Depth (ft) **1.57**

2.4 Floodprone Width (ft) **115**

Notes:

Problems with alignment in upper Collinsville Road bridge during floods. Steep riffle and MCB above bridge. Evidence of minor bar scalping on many large point bars.

Multiple revetments include rip rap and some

Step 2. (Contued)

2.5 Aband. Floodpln **4.10** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **30.06**

2.7 Entrenchment Ratio **2.43**

2.8 Incision Ratio **1.52**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **272**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**1** %
Cobble	**28** %
Coarse Gravel	**40** %
Fine Gravel	**26** %
Sand	**5** %
Silt and smaller	**0** %

Silt/Clay Present? **Yes**

Detritus **1** %

Large Woody **18**

2.13 Average Largest Particle on

Bed **9.0** **inches**

Bar **6.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Sand**	**Sand**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Gravel**	**Gravel**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**1,377**	**1,853**
Erosion Height (ft)	**4.12**	**3.97**
Revetmt. Type	**Multiple**	**Multiple**
Revetmt. Length (ft)	**393**	**238**

Near Bank Veg. Type	Left	Right
Dominant	**Deciduous**	**Herbaceous**
Sub-dominant	**Herbaceous**	**Deciduous**

Bank Canopy	Left	Right
Canopy %	**51-75**	**26-50**

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**26-50**
Sub-dominant	**51-100**	**>100**
W less than 25	**249**	**938**

Buffer Veg. Type	Left	Right
Dominant	**Mixed Trees**	**Deciduous**
Sub-dominant	**Herbaceous**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Residential**
Sub-dominant	**Pasture**	**Hay**
Mass Failures	**104**	**37**
Height	**25**	**15**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
4	**11**	**16**

Diagonal	Delta	Island
6	**0**	**0**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	**0**	**0**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
6	**0**	**No**

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **Straightening**

Straightening Length: **1,959**

5.5 Dredging **Gravel Mining**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T16** Segment: **0** Completion Date: **October 5, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA, MN** Rain: **No**

Segment Length (ft): **6,043** Segment Location: **This segment continues until a tributary entering from the north, approximately 600 feet**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	18.0	Yes	No	Yes	Yes
Problem	Deposition Above,Scour Below				
Bridge	28.0	Yes	No	Yes	Yes
Problem	Deposition Below				
Bridge	28.0	Yes	No	Yes	Yes
Problem	Deposition Above,Deposition Below,Scour				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**9**	**None**	**Yes**
7.2 Channel Aggradation	**8**	**None**	**No**
7.3 Widening Channel	**10**		**No**
7.4 Change in Planform	**12**		**No**
Total Score	**39**		
Geomorphic Rating	**0.4875**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	10
6.2 Embeddedness	15
6.3 Velocity/Depth Patterns	12
6.4 Sediment Deposition	7
6.5 Channel Flow Status	8
6.6 Channel Alteration	9
6.7 Frequency of Riffles/Steps	15
6.8 Bank Stability	Left: 6 Right: 5
6.9 Bank Vegetation Protection	Left: 7 Right: 7
6.10 Riparian Vegetation Zone Width	Left: 4 Right: 8
Total Score	113
Habitat Rating	0.565
Habitat Stream Condition	**Fair**

Narrative:

major historic degradation, aggradation and widening, minor planform adjustment.

Stream: **Wild Branch** Reach # **T17** Segment: **A** Completion Date: **October 5, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **1,285** Segment Location: **This segment continues for approximately 1245 feet upstream where the corridor becomes**

QC Status - Staff: Provisional Cons **Passed**

Step 1. Valley and Floodplain

1.1 Segmentation **Channel Dimensions**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Hilly
Continuous w/	Never	Sometimes
W/in 1 Bankfill	Never	Sometimes
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **1,000**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **No**

Step 2. Stream Channel

2.1 Bankfull Width **46**

2.2 Max Depth (ft) **2.30**

2.3 Mean Depth (ft) **1.78**

2.4 Floodprone Width (ft) **202**

Notes:

Late Stage III. Weak riffle-pool bedform.

Step 2. (Contued)

2.5 Aband. Floodpln **4.30** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **25.84**

2.7 Entrenchment Ratio **4.39**

2.8 Incision Ratio **1.87**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Sedimented**

2.11 Riffle/Step Spacing (ft) **225**

2.12 Substrate Composition

Bedrock	0%
Boulder	6%
Cobble	26%
Coarse Gravel	40%
Fine Gravel	22%
Sand	6%
Silt and smaller	0%

Silt/Clay Present? **Yes**

Detritus **1** %

Large Woody **22**

2.13 Average Largest Particle on

Bed **7.5** **inches**

Bar **6.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Moderate**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	317	402
Erosion Height (ft)	4.14	4.43
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Shrubs/Saplin	Shrubs/Saplin
Sub-dominant	Deciduous	Herbaceous

Bank Canopy	Left	Right
Canopy %	1-25	1-25
Mid-Channel Canopy		Open

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	>100
Sub-dominant	51-100	0-25
W less than 25	71	217

Buffer Veg. Type	Left	Right
Dominant	Shrubs/Saplin	Shrubs/Saplin
Sub-dominant	Herbaceous	Mixed Trees

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Forest
Sub-dominant	Hay	Pasture
Mass Failures	0	87
Height	0	30
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **Minimal**

4.3 Flow Status **Low**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	4	2
Diagonal	**Delta**	**Island**
3	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
3	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
3	0	No

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T17** Segment: **A** Completion Date: **October 5, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Rain: **No**

Segment Length (ft): **1,285** Segment Location: **This segment continues for approximately 1245 feet upstream where the corridor becomes**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**7**	**None**	**Yes**
7.2 Channel Aggradation	**9**	**None**	**No**
7.3 Widening Channel	**11**		**No**
7.4 Change in Planform	**10**		**No**
Total Score	**37**		
Geomorphic Rating	**0.4625**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	6
6.2 Embeddedness	12
6.3 Velocity/Depth Patterns	9
6.4 Sediment Deposition	12
6.5 Channel Flow Status	9
6.6 Channel Alteration	18
6.7 Frequency of Riffles/Steps	15
6.8 Bank Stability	Left: 6 Right: 5
6.9 Bank Vegetation Protection	Left: 7 Right: 7
6.10 Riparian Vegetation Zone Width	Left: 8 Right: 7
Total Score	121
Habitat Rating	0.605
Habitat Stream Condition	**Fair**

Narrative:

major historic degradation, major aggradation, and planform adjustment, minor widening.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T17** Segment: **B** Completion Date: **October 5, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Why Not assessed: Rain: **No**

Segment Length (ft): **1,460** Segment Location: **This segment continues until approximately 1500 feet upstream.**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Channel Dimensions**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Hilly
Continuous w/	Never	Sometimes
W/in 1 Bankfill	Sometimes	Sometimes
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **350**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **No**

Step 2. Stream Channel

2.1 Bankfull Width **32**

2.2 Max Depth (ft) **2.60**

2.3 Mean Depth (ft) **1.91**

2.4 Floodprone Width (ft) **61**

Notes:

Some areas of segment are more depositional than where the cross section was done and have higher w/d ratios, but better flood plain access. Weak riffle-pool bedform.

Step 2. (Contued)

2.5 Aband. Floodpln **4.80** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **16.65**

2.7 Entrenchment Ratio **1.93**

2.8 Incision Ratio **1.85**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **158**

2.12 Substrate Composition

Bedrock	0%
Boulder	9%
Cobble	16%
Coarse Gravel	30%
Fine Gravel	32%
Sand	13%
Silt and smaller	0%

Silt/Clay Present? **Yes**

Detritus **1** %

Large Woody **18**

2.13 Average Largest Particle on

Bed **8.0** **inches**

Bar **6.5** **inches**

2.14 Stream Type

Stream Type: **B**

Bed Material: **Gravel**

Subclass Slope: **c**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	547	461
Erosion Height (ft)	5.60	3.58
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Coniferous	Coniferous
Sub-dominant	Herbaceous	Herbaceous

Bank Canopy	Left	Right
Canopy %	51-75	51-75

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	>100
Sub-dominant	None	None
W less than 25	0	0

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Mixed Trees
Sub-dominant	None	None

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Forest
Sub-dominant	None	None
Mass Failures	0	34
Height	0	40
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Minimal**

4.2 Adjacent Wetlands **None**

4.3 Flow Status **Low**

4.4 # of Debris Jams **1**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	1	3

Diagonal	Delta	Island
1	0	1

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
1	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T17** Segment: **B** Completion Date: **October 5, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MN** Rain: **No**

Segment Length (ft): **1,460** Segment Location: **This segment continues until approximately 1500 feet upstream.**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPSTaken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**5**	**C to B**	**Yes**
7.2 Channel Aggradation	**12**	**None**	**No**
7.3 Widening Channel	**12**		**No**
7.4 Change in Planform	**11**		**No**
Total Score	**40**		
Geomorphic Rating	**0.5**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	13
6.2 Embeddedness	14
6.3 Velocity/Depth Patterns	13
6.4 Sediment Deposition	9
6.5 Channel Flow Status	11
6.6 Channel Alteration	18
6.7 Frequency of Riffles/Steps	17
6.8 Bank Stability	Left: 6 Right: 5
6.9 Bank Vegetation Protection	Left: 10 Right: 8
6.10 Riparian Vegetation Zone Width	Left: 10 Right: 10
Total Score	144
Habitat Rating	0.72
Habitat Stream Condition	**Good**

Narrative:

(early stage III in most locations) extreme historic degradation, minor aggradation, widening and planform adjustment.

Stream: **Wild Branch** Reach # **T18** Segment: **0** Completion Date: **October 9, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **4,489** Segment Location: **This segment continues until approximately one half mile upstream, where Collinsville Road**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **None**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	**0**	**0**
height	**0**	**0**
Roads	**138**	**0**
height	**7**	**0**
Railroads	**0**	**0**
height	**0**	**0**
Improved Paths	**0**	**0**
height	**0**	**0**
Development	**0**	**0**

1.4 Adjacent Side	Left	Right
Hillside Slope	**Steep**	**Steep**
Continuous w/	**Always**	**Sometimes**
W/in 1 Bankfill	**Sometimes**	**Sometimes**
Texture	**Not Evalua**	**Not Evalua**

1.5 Valley Features

Valley Width (ft) **250**

Width Determination **Measured**

Confinement Type **Broad**

Rock Gorge? **No**

Human-caused Change? **No**

Step 2. Stream Channel

2.1 Bankfull Width **34**

2.2 Max Depth (ft) **2.90**

2.3 Mean Depth (ft) **2.21**

2.4 Floodprone Width (ft) **77**

Notes:

reach was far from roads and development. Still had some major planform adjustment. Late Stage III. Bankfull elevation was increased by 0.6 feet from that selected in the field to reflect a more defined feature (bench) on the left side of the channel.

Step 2. (Contued)

2.5 Aband. Floodpln **4.40** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **15.52**

2.7 Entrenchment Ratio **2.24**

2.8 Incision Ratio **1.52**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **372**

2.12 Substrate Composition

Bedrock	**0** %
Boulder	**8** %
Cobble	**41** %
Coarse Gravel	**37** %
Fine Gravel	**7** %
Sand	**7** %
Silt and smaller	**0** %

Silt/Clay Present? **Yes**

Detritus **2** %

Large Woody **35**

2.13 Average Largest Particle on

Bed **9.0** **inches**

Bar **7.0** **inches**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	**None**	**0.00**
Gullies	**None**	**0.00**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	**Sand**	**Sand**
Consistency	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type	**Gravel**	**Gravel**
Consistency	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft)	**468**	**1,192**
Erosion Height (ft)	**4.00**	**3.37**
Revetmt. Type	**None**	**None**
Revetmt. Length (ft)	**0**	**0**

Near Bank Veg. Type	Left	Right
Dominant	**Shrubs/Saplin**	**Shrubs/Saplin**
Sub-dominant	**Herbaceous**	**Herbaceous**

Bank Canopy	Left	Right
Canopy %	**51-75**	**51-75**

Mid-Channel Canopy **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-dominant	**None**	**None**
W less than 25	**0**	**0**

Buffer Veg. Type	Left	Right
Dominant	**Coniferous**	**Coniferous**
Sub-dominant	**Deciduous**	**Deciduous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**None**	**None**
Mass Failures	**28**	**41**
Height	**10**	**12**
Gullies	**0**	**0**
Height	**0**	**0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Abundant**

4.2 Adjacent Wetlands **Minimal**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
6	**4**	**9**

Diagonal	Delta	Island
2	**1**	**1**

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
1	**0**	**1**	**0**

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
2	**0**	**No**

5.4 Stream Ford or Animal **Yes**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T18** Segment: **0** Completion Date: **October 9, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **4,489** Segment Location: **This segment continues until approximately one half mile upstream, where Collinsville Road**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions **None**

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**11**	**None**	**Yes**
7.2 Channel Aggradation	**12**	**None**	**No**
7.3 Widening Channel	**15**		**No**
7.4 Change in Planform	**9**		**No**
Total Score	**47**		
Geomorphic Rating	**0.5875**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	13
6.2 Embeddedness	13
6.3 Velocity/Depth Patterns	16
6.4 Sediment Deposition	10
6.5 Channel Flow Status	10
6.6 Channel Alteration	18
6.7 Frequency of Riffles/Steps	13
6.8 Bank Stability	Left: 7 Right: 6
6.9 Bank Vegetation Protection	Left: 8 Right: 8
6.10 Riparian Vegetation Zone Width	Left: 10 Right: 10
Total Score	142
Habitat Rating	0.71
Habitat Stream Condition	**Good**

Narrative:

minor historic degradation, aggradation, widening, major planform adjustment.

Project: **Wild Branch**

Phase 2 Segment Summary

February 10, 2010 SGAT Version: 4.56

Stream: **Wild Branch** Reach # **T19** Segment: **A** Completion Date: **October 9, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: Rain: **Yes**

Segment Length (ft): **1,428** Segment Location: **This segment continues until approximately 1325 feet upstream of the Square Road Bridge.**

QC Status - Staff: Provisional Cons Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Channel Dimensions**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	670	0
height	7	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Hilly
Continuous w/	Sometimes	Never
W/in 1 Bankfill	Sometimes	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft) **466**

Width Determination **Measured**

Confinement Type **Very Broad**

Rock Gorge? **No**

Human-caused Change? **Yes**

Step 2. Stream Channel

2.1 Bankfull Width **39**

2.2 Max Depth (ft) **1.80**

2.3 Mean Depth (ft) **1.14**

2.4 Floodprone Width (ft) **52**

Notes:

Segmented because upstream segment has multiple channels and is significantly impacted by beaver dams.

Multiple revetments include minor rip rap and hard bank in the vicinity of the bridge.

Step 2. (Contued)

2.5 Aband. Floodpln **5.20** ft.

Human Elev Floodpln **0.00** ft.

2.6 Width/Depth Ratio **34.21**

2.7 Entrenchment Ratio **1.32**

2.8 Incision Ratio **2.89**

Human Elevated Inc Rat **0.00**

2.9 Sinuosity **Low**

2.10 Riffles Type **Complete**

2.11 Riffle/Step Spacing (ft) **245**

2.12 Substrate Composition

Bedrock	0%
Boulder	8%
Cobble	37%
Coarse Gravel	36%
Fine Gravel	17%
Sand	2%
Silt and smaller	0%

Silt/Clay Present? **No**

Detritus **3** %

Large Woody **13**

2.13 Average Largest Particle on

Bed **9.0** **inches**

Bar **6.0** **inches**

2.14 Stream Type

Stream Type: **B**

Bed Material: **Gravel**

Subclass Slope: **c**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type (if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope **Steep**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive
Bank Erosion	Left	Right
Erosion Length (ft)	443	462
Erosion Height (ft)	3.66	3.23
Revetmt. Type	Multiple	Multiple
Revetmt. Length (ft)	60	77
Near Bank Veg. Type	Left	Right
Dominant	Coniferous	Shrubs/Saplin
Sub-dominant	Deciduous	Deciduous
Bank Canopy	Left	Right
Canopy %	51-75	26-50
Mid-Channel Canopy	Open	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	>100
Sub-dominant	None	0-25
W less than 25	0	134
Buffer Veg. Type	Left	Right
Dominant	Coniferous	Mixed Trees
Sub-dominant	Deciduous	Shrubs/Saplin

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Forest
Sub-dominant	None	Residential
Mass Failures	0	0
Height	0	0
Gullies	0	0
Height	0	0

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps **Abundant**

4.2 Adjacent Wetlands **Minimal**

4.3 Flow Status **Moderate**

4.4 # of Debris Jams **0**

4.5 Flow Regulation Type **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams **0**

Affected Length (ft) **0**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
0	1	8

Diagonal	Delta	Island
1	0	0

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
0	0	0	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
1	0	No

5.4 Stream Ford or Animal **No**

5.5 Straightening **None**

Straightening Length: **0**

5.5 Dredging **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T19** Segment: **A** Completion Date: **October 9, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **1,428** Segment Location: **This segment continues until approximately 1325 feet upstream of the Square Road Bridge.**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?
Bridge	24.0	Yes	No	Yes	Yes
Problem	Deposition Above,Deposition Below,Scour				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**5**	**C to B**	**Yes**
7.2 Channel Aggradation	**13**	**None**	**No**
7.3 Widening Channel	**10**		**No**
7.4 Change in Planform	**13**		**No**
Total Score	**41**		
Geomorphic Rating	**0.5125**		
Channel Evolution Model	**F**		
Channel Evolution Stage	**III**		
Geomorphic Condition	**Fair**		
Stream Sensitivity	**Very High**		

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type **High**

	Score
6.1 Epifaunal Substrate - Available Cover	15
6.2 Embeddedness	15
6.3 Velocity/Depth Patterns	14
6.4 Sediment Deposition	15
6.5 Channel Flow Status	12
6.6 Channel Alteration	15
6.7 Frequency of Riffles/Steps	13
6.8 Bank Stability	Left: 5 Right: 5
6.9 Bank Vegetation Protection	Left: 9 Right: 9
6.10 Riparian Vegetation Zone Width	Left: 10 Right: 9
Total Score	146
Habitat Rating	0.73
Habitat Stream Condition	**Good**

Narrative:

extreme historic degradation, minor aggradation, planform adjustment, major widening.

Stream: **Wild Branch** Reach # **T19** Segment: **B** Completion Date: **October 9, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Why Not assessed: **beaver dam** Rain: **Yes**

Segment Length (ft): **2,430** Segment Location: **This segment continues approximately 2430 feet upstream and is heavily impacted by**

QC Status - Staff: Provisional Consultant: Passed

Step 1. Valley and Floodplain

1.1 Segmentation **Channel Dimensions**

1.2 Alluvial Fan **None**

1.3 Corridor Encroachments

Length (ft)	One	Both
Berms	0	0
height	0	0
Roads	0	0
height	0	0
Railroads	0	0
height	0	0
Improved Paths	0	0
height	0	0
Development	0	0

1.4 Adjacent Side	Left	Right
Hillside Slope	Hilly	Hilly
Continuous w/	Sometimes	Never
W/in 1 Bankfill	Sometimes	Never
Texture	Not Evalua	Not Evalua

1.5 Valley Features

Valley Width (ft): **625**

Width Determination: **Estimated**

Confinement Type: **Very Broad**

Rock Gorge?: **No**

Human-caused Change?: **No**

Step 2. Stream Channel

2.1 Bankfull Width: **0**

2.2 Max Depth (ft): **0.00**

2.3 Mean Depth (ft): **0.00**

2.4 Floodprone Width (ft): **0**

Notes:

One channel avulsion, two flood chutes, numerous islands and two beaver dams are in this segment. The segment also had a number of beaver ponds. Huge depositional features and multiple channels made it

Step 2. (Contued)

2.5 Aband. Floodpln: **0.00** ft.

Human Elev Floodpln: **0.00** ft.

2.6 Width/Depth Ratio: **0.00**

2.7 Entrenchment Ratio: **0.00**

2.8 Incision Ratio: **0.00**

Human Elevated Inc Rat: **0.00**

2.9 Sinuosity

2.10 Riffles Type

2.11 Riffle/Step Spacing (ft): **0**

2.12 Substrate Composition

Silt/Clay Present?

Detritus: **0** %

Large Woody: **0**

2.13 Average Largest Particle on

Bed: **0.0**

Bar: **0.0**

2.14 Stream Type

Stream Type: **C**

Bed Material: **Gravel**

Subclass Slope: **None**

Bed Form: **Riffle-Pool**

Field Measured Slope:

2.15 Reference Stream Type

(if different from Phase 1)

3.3 old	Amount	Mean Height
Failures	None	0.00
Gullies	None	0.00

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Moderate**

Bank Texture	Left	Right
Upper		
Material Type	Sand	Sand
Consistency	Non-cohesive	Non-cohesive
Lower		
Material Type	Gravel	Gravel
Consistency	Non-cohesive	Non-cohesive

Bank Erosion	Left	Right
Erosion Length (ft)	191	102
Erosion Height (ft)	2.47	3.00
Revetmt. Type	None	None
Revetmt. Length (ft)	0	0

Near Bank Veg. Type	Left	Right
Dominant	Deciduous	Deciduous
Sub-dominant	Coniferous	Coniferous

Bank Canopy	Left	Right
Canopy %	26-50	26-50

Mid-Channel Canopy: **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	>100	>100
Sub-dominant	None	None
W less than 25	0	0

Buffer Veg. Type	Left	Right
Dominant	Mixed Trees	Mixed Trees
Sub-dominant	None	None

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	Forest	Forest
Sub-dominant	None	None
Mass Failures	0	0
Height	0	0
Gullies		0
Length		0
Height		0.00

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps

4.2 Adjacent Wetlands

4.3 Flow Status

4.4 # of Debris Jams: **1**

4.5 Flow Regulation Type: **None**

Flow Regulation Use

Impoundments

Impoundmt. Location

4.6 Up/Down strm flow reg: **None**

(old) Upstrm Flow Reg

4.9 # of Beaver Dams: **2**

Affected Length (ft): **2,600**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid	Point	Side
1	0	2

Diagonal	Delta	Island
0	0	4

5.2 Other Features

Flood	Neck Cutoff	Avulsion	Braiding
2	0	1	0

5.3 Steep Riffles and Head Cuts

Steep Riffles	Head Cuts	Trib Rejuv.
0	0	

5.4 Stream Ford or Animal: **No**

5.5 Straightening: **None**

Straightening Length: **0**

5.5 Dredging: **None**

Note: Step 1.6 - Grade Controls and Step 4.8 - Channel Constrictions are on The second page of this report - with Steps 6 through 7.

Stream: **Wild Branch** Reach # **T19** Segment: **B** Completion Date: **October 9, 2007**

Organization: **Bear Creek Environmental** Observers: **CS, MA** Rain: **Yes**

Segment Length (ft): **2,430** Segment Location: **This segment continues approximately 2430 feet upstream and is heavily impacted by**

1.6 Grade Controls **None**

Type	Location	Total	Total Height Above Water	Photo Taken	GPS Taken

4.8 Channel Constrictions

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?

Step 7. Rapid Geomorphic Assessment Data

Confinement Type

Channel Evolution Model

Channel Evolution Stage

Geomorphic Condition **Fair**

Stream Sensitivity

Step 6. Rapid Habitat Assessment Data

Stream Gradient Type

Habitat Stream Condition

Narrative:

Stream Geometry Data

Wild Branch

		Phase 2 Stream Type					Phase 1 Data			Phase 2 Channel Data											
Reach	Seg-ment	Stream Type	Bed Material	Bedform	Subcl. Slope	Sub Rch?	Channel Slope	Channel width	Bankfull width	Max. depth	Mean depth	Floodpr. width	Abandn FldPln	W/D Ratio	Entrench-ment	Incision Ratio	Stage Evol.	Evol. Model	RGA Cond.	RHA Cond.	QC Stf	QC Aut
T01	0	C	Gravel	Riffle-Pool	None	No	0.44	65.91	78.2	5.0	4.15	625.5	6.3	18.84	8.00	1.26	IId	D	Fair	Fair	P	P
T02	0	C	Gravel	Riffle-Pool	None	No	0.38	65.60	89.4	4.6	3.3	175.0	5.3	27.09	1.96	1.15	IId	D	Fair	Good	P	P
T03	0	C	Gravel	Riffle-Pool	None	No	0.53	65.51	84.0	4.7	3.43	345.0	4.7	24.49	4.11	1.00	IId	D	Fair	Good	P	P
T04	0	C	Gravel	Riffle-Pool	None	No	0.63	64.84	71.5	5.0	3.46	935.0	5.0	20.66	13.08	1.00	IId	D	Fair	Fair	P	P
T05	0	C	Gravel	Riffle-Pool	None	No	0.46	64.05	73.1	4.3	3.36	353.8	4.3	21.76	4.84	1.00	IId	D	Fair	Fair	P	P
T06	0	C	Cobble	Riffle-Pool	None	No	0.63	63.60	59.0	4.3	3.09	158.5	5.7	19.09	2.69	1.33	III	F	Fair	Fair	P	P
T07	0	C	Gravel	Riffle-Pool	None	No	0.67	63.08	94.9	3.45	2.87	425.0	5.25	33.07	4.48	1.52	III	F	Fair	Fair	P	P
T08	0	C	Gravel	Riffle-Pool	None	No	0.73	56.55	76.0	3.3	2.52	322.0	4.6	30.16	4.24	1.39	III	F	Fair	Fair	P	P
T09	0	B	Gravel	Riffle-Pool	c	No	0.85	53.63	76.5	3.2	2.43	141.0	7.3	31.48	1.84	2.28	III	F	Fair	Fair	P	P
T10	A	F	Cobble	Plane Bed	None	No	1.08	49.56	51.0	3.6	2.82	55.5	8.0	18.09	1.09	2.22	II	F	Fair	Fair	P	P
T10	B	B	Gravel	Riffle-Pool	c	No	1.08	49.56	53.3	3.8	2.54	78.0	6.7	20.98	1.46	1.76	III	F	Fair	Fair	P	P
T10	C	C	Gravel	Riffle-Pool	None	No	1.08	49.56	75.0	2.6	2.22	241.0	4.5	33.78	3.21	1.73	III	F	Fair	Fair	P	P
T10.01	0	B	Cobble	Riffle-Pool	c	No	0.33	22.90	24.5	2.2	1.28	37.0	6.5	19.14	1.51	2.95	III	F	Fair	Good	P	P
T11	0	B	Gravel	Riffle-Pool	c	No	1.24	48.50	68.5	2.6	1.42	142.2	5.3	48.24	2.08	2.04	III	F	Poor	Fair	P	P
T12	A	F	Gravel	Plane Bed	None	No	1.05	47.15	59.5	3.0	2.12	70.5	11.2	28.07	1.18	3.73	III	F	Fair	Fair	P	P
T12	B	F	Gravel	Riffle-Pool	None	No	1.05	47.15	79.8	2.9	1.9	95.8	4.9	42.00	1.20	1.69	III	F	Poor	Fair	P	P
T13	0	F	Gravel	Riffle-Pool	None	No	0.38	46.01	39.5	2.6	2.2	52.0	5.4	17.95	1.32	2.08	III	F	Fair	Fair	P	P
T14	A	C	Gravel	Riffle-Pool	None	No	0.33	42.07	38.5	3.3	2.49	100.0	4.6	15.46	2.60	1.39	III	F	Fair	Fair	P	P
T14	B	C	Gravel	Plane Bed	None	No	0.33	42.07											Fair		P	F
T14	C	C	Gravel	Riffle-Pool	None	No	0.33	42.07	42.0	3.0	2.28	85.5	4.4	18.42	2.04	1.47	III	F	Fair	Fair	P	P
T15	A	C	Gravel	Riffle-Pool	None	No	0.63	41.05	41.0	3.1	2.33	223.0	5.5	17.60	5.44	1.77	III	F	Fair	Fair	P	P
T15	B	C	Gravel	Riffle-Pool	None	No	0.63	41.05	41.0	3.0	2.21	205.0	4.4	18.55	5.00	1.47	III	F	Fair	Good	P	P
T15	C	C	Gravel	Riffle-Pool	None	No	0.63	41.05	52.5	2.5	1.96	120.0	4.1	26.79	2.29	1.64	III	F	Fair	Good	P	P
T16	0	C	Gravel	Riffle-Pool	None	No	0.65	36.46	47.2	2.7	1.57	114.5	4.1	30.06	2.43	1.52	III	F	Fair	Fair	P	P
T17	A	C	Gravel	Riffle-Pool	None	No	1.31	30.79	46.0	2.3	1.78	202.0	4.3	25.84	4.39	1.87	III	F	Fair	Fair	P	P
T17	B	B	Gravel	Riffle-Pool	c	No	1.31	30.79	31.8	2.6	1.91	61.3	4.8	16.65	1.93	1.85	III	F	Fair	Good	P	P
T18	0	C	Gravel	Riffle-Pool	None	No	1.49	30.26	34.3	2.9	2.21	77.0	4.4	15.52	2.24	1.52	III	F	Fair	Good	P	P
T19	A	B	Gravel	Riffle-Pool	c	No	1.39	24.95	39.0	1.8	1.14	51.5	5.2	34.21	1.32	2.89	III	F	Fair	Good	P	P
T19	B	C	Gravel	Riffle-Pool	None	No	1.39	24.95											Fair		P	F

Rapid Geomorphic Assessment

Wild Branch

Reach	Segment	Sub-Rch?	Degradation			Aggradation			Widening		Planform		Geo. Score	Geo. Condition	Evol. Stage	Confinement Type	Sensitivity	QC Stf	QC Aut
			Score	STD	Historic	Score	STD	Historic	Score	Historic	Score	Historic							
T01	0	No	14	None	Yes	8	None	No	12	No	9	No	0.54	Fair	IId	VB	Very	P	P
T02	0	No	15	None	No	8	Other	No	13	No	12	No	0.60	Fair	IId	BD	Very	P	P
T03	0	No	16	None	No	7	None	No	14	No	14	No	0.64	Fair	IId	VB	Very	P	P
T04	0	No	16	None	No	7	None	No	12	No	9	No	0.55	Fair	IId	VB	Very	P	P
T05	0	No	16	None	No	8	None	No	11	No	7	No	0.53	Fair	IId	BD	Very	P	P
T06	0	No	13	None	Yes	8	None	No	11	No	10	Yes	0.53	Fair	III	BD	High	P	P
T07	0	No	9	None	Yes	6	None	No	10	No	8	No	0.41	Fair	III	BD	Very	P	P
T08	0	No	11	None	Yes	8	None	No	7	No	10	No	0.45	Fair	III	BD	Very	P	P
T09	0	No	4	C to B	Yes	7	None	No	9	No	10	No	0.38	Fair	III	BD	Very	P	P
T10	A	No	2	C to F	Yes	13	None	No	14	No	15	No	0.55	Fair	II	VB	Extreme	P	P
T10	B	No	5	C to B	Yes	13	None	No	12	No	13	No	0.54	Fair	III	BD	Very	P	P
T10	C	No	8	None	Yes	7	None	No	8	Yes	13	No	0.45	Fair	III	BD	Very	P	P
T10.01	0	No	4	C to B	Yes	14	None	No	12	No	11	No	0.51	Fair	III	BD	Very	P	P
T11	0	No	5	C to B	Yes	5	None	No	5	No	3	No	0.23	Poor	III	BD	Very	P	P
T12	A	No	3	C to F	Yes	12	None	No	7	No	13	No	0.44	Fair	III	BD	Extreme	P	P
T12	B	No	5	C to F	Yes	7	None	No	5	No	9	No	0.33	Poor	III	BD	Extreme	P	P
T13	0	No	5	C to F	Yes	10	None	No	13	No	11	No	0.49	Fair	III	VB	Extreme	P	P
T14	A	No	12	None	Yes	13	None	No	13	No	11	No	0.61	Fair	III	VB	Very	P	P
T14	B	No											0.00	Fair		VB		P	F
T14	C	No	9	None	Yes	10	None	No	10	No	6	No	0.44	Fair	III	VB	Very	P	P
T15	A	No	8	None	Yes	6	None	No	13	No	12	No	0.49	Fair	III	VB	Very	P	P
T15	B	No	9	None	Yes	10	None	No	14	No	17	No	0.63	Fair	III	VB	Very	P	P
T15	C	No	9	None	Yes	12	None	No	13	No	14	No	0.60	Fair	III	NW	Very	P	P
T16	0	No	9	None	Yes	8	None	No	10	No	12	No	0.49	Fair	III	VB	Very	P	P
T17	A	No	7	None	Yes	9	None	No	11	No	10	No	0.46	Fair	III	VB	Very	P	P
T17	B	No	5	C to B	Yes	12	None	No	12	No	11	No	0.50	Fair	III	VB	Very	P	P
T18	0	No	11	None	Yes	12	None	No	15	No	9	No	0.59	Fair	III	BD	Very	P	P
T19	A	No	5	C to B	Yes	13	None	No	10	No	13	No	0.51	Fair	III	VB	Very	P	P
T19	B	No											0.00	Fair		VB		P	F

VERMONT

Stream Geomorphic Assessment

Agency of Natural Resources

VT DEC

Vermont.gov

Aquatic Organism Passage, Geomorphic Compatibility, Retrofit Potential

Explanation of codes used in table header -- Explanation of data acquisition

AOP Coarse Screen		AOP Geomorphic Compatibility		AOP Retrofit Potential	
Green	Full AOP for all aquatic organisms	**Green**	Structure is fully compatable geomorphically 20 < GC < 25	**H**	High probablity the existing culvert can be retrofited
Gray	Reduced AOP for all aquatic organisms	**Light Green**	Structure is mostly compatable geomorphically 15 < GC < 20	**M**	Medium probablity the existing culvert can be retrofited
Orange	No AOP for all aquatic organisms except adult salmonids	**Yellow**	Structure is partially compatable geomorphically 10 < GC < 15	**L**	Low probablity the existing culvert can be retrofited
Red	No AOP for all aquatic organisms including adult salmonids	**Orange**	Structure is mostly incompatable geomorphically 5 < GC < 10	**Pos 1 (left)**	For strong swimmers
		Red	Structure is fully incompatable geomorphically 0 < GC < 5	**Pos 2 (center)**	For moderate swimmers
				Pos 3 (right)	For weak swimmers

Wild Branch - AOP Results

Town	Road	Stream Name	Structure: SgaID / struct_num	AOP Coarse Screen	AOP Geomorphic Compatibility	AOP Retrofit Potential	Percent Bankfull Width
Wolcott	BROOK RD	Wild Branch trib	70000809111500X 700008014508103	Reduced AOP	Partially Compatable	LLL	0 %
Wolcott	BROOK RD	Wild Branch trib	70000809121500X 700008014108103	Reduced AOP	Partially Compatable	MLL	36 %
Wolcott	CORLEY RD	Lamoille River trib	70003804791500X	Reduced AOP	Mostly Compatable	Missing Data	--- %
Wolcott	CORLEY RD	Lamoille River trib	70003804841500X	Reduced AOP	Partially Compatable	LLL	0 %
Wolcott	E HILL RD	Tamarack Brook	70001407411500X 700014020708103	Reduced AOP	Mostly Compatable	Missing Data	0 %
Wolcott	E HILL RD	Tamarack Brook	70001407441500X	Reduced AOP	Partially Compatable	LLL	0 %
Wolcott	E HILL RD	Tamarack Brook trib	70001407651500X	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	E HILL RD	Wolcott Pond Brook	70001407311500X	Unknown	Mostly Compatable	LLL	0 %
Wolcott	E HILL RD	Wolcott Pond Brook	70001407321500X	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	ELMORE POND RD	Wild Branch trib	70000403801500X 700004008608103	Reduced AOP	Partially Compatable	LLL	0 %
Wolcott	FORT HILL RD	Wild Branch trib	70000208991500X	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	GULF RD	Wild Branch trib	70001504931500X	No AOP Including Adult Salmonids	Partially Compatable	LLL	0 %
Wolcott	HINES RD	Wild Branch trib	70001607131500X	Reduced AOP	Partially Compatable	LLL	0 %
Wolcott	KEELER RD	Wild Branch trib	70002108731500X	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	KEELER RD	Wolcott Pond Brook	70002108711500X	Reduced AOP	Mostly Compatable	Missing Data	--- %
Wolcott	MARSH RD	Lamoille River trib	70002508041500X 700025030708103	Reduced AOP	Mostly Compatable	Missing Data	0 %
Wolcott	MOREY HILL RD	Wild Branch trib	70004109031500X	Reduced AOP	Partially Compatable	LLL	0 %
Wolcott	MOREY HILL RD	Wild Branch trib	70004109041500X	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	N WOLCOTT RD	Wild Branch trib	70000103931500X	Reduced AOP	Partially Compatable	LLL	0 %
Wolcott	N WOLCOTT RD	Wild Branch trib	70000103961500X	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	N WOLCOTT RD	Wild Branch trib	70000104211500X	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	N WOLCOTT RD	Wild Branch trib	70000104231500X	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	TOWN HILL RD	Tamarack Brook	70000606931500X 700006011208103	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	TOWN HILL RD	Tamarack Brook trib	70000606941500X 700006011108103	Reduced AOP	Mostly Compatable	LLL	0 %
Wolcott	W HILL RD	Wild Branch trib	70001806511500X	Reduced AOP	Partially Compatable	LLL	0 %
Wolcott	YOUNG RD	Lamoille River trib	70002708411500X	Reduced AOP	Mostly Compatable	LLL	0 %

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Wild Branch Watershed and Small Tributaries to the Lamoille River
Culvert Evaluation
Geomorphic Compatibility and Aquatic Organism Passage