STEVENS RIVER WATERSHED

STREAM GEOMORPHIC ASSESSMENT and RIVER CORRIDOR PLAN 2010-2011

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1.0 EXECUTIVE SUMMARY

In 2010, the Caledonia County Natural Resources Conservation District (CCNRCD) engaged Redstart to conduct a fluvial geomorphic assessment and prepare a River Corridor Plan within the Stevens River watershed (primarily in Barnet and Peacham) in Caledonia County, VT (overview map in Fig. 1 on p. 5). This work builds on larger ongoing efforts by the Towns of Peacham and Barnet, CCNRCD, the Stevens River Watershed Council, engaged citizens, lake associations, and fishing groups to address water quality issues and the escalating costs of maintaining an unsustainable relationship with streams in a period of increasingly frequent and intense storms.

Fluvial (= flow-related) geomorphology (geo = earth, morphology = shape) is the study of the physical river forms and processes that explain many of the current conditions observed in streams. Streams have a natural tendency to maintain equilibrium between the amount and power of water moving through the system and the amount and type of sediment being carried by that water. With significant changes in the landscape in the last 200 years, many streams in Vermont, including the Stevens River and some of its tributaries, have been confined to deeper, straighter channels and lost access to historic floodplains. Stream power (including flood intensity and frequency) has increased, resulting in elevated levels of erosion and lack of floodplain storage for the soil and nutrients carried by floodwaters. This has often resulted in elevated levels of damage to human infrastructure and degraded water quality.

Project background

Efforts in the Stevens River watershed to date have included water quality monitoring that has helped guide and assess steps taken along the way. Building on a track record of project implementation and growing results from a variety of groups, CCNRCD began a process of systematic geomorphic assessment in 2005 that led to the development of this River Corridor Plan.

The assessment reported here was conducted using protocols developed by the Vermont River Management Program (VT-RMP), which guide assessments through a series of phases that integrate information from an overarching watershed context down to project site-specific scales, with each previous stage informing the successors. VT-RMP's goal is managing toward, protecting, and restoring the fluvial geomorphic equilibrium condition of Vermont's rivers and streams as a means to help resolve conflicts between human investments and river dynamics in an economically and ecologically sustainable manner.

- Phase 1 assessment of the overall watershed conducted in 2005 and 2006 (using data from topographic and aerial maps, other historic and current sources, and limited "windshield survey" field data collection) assessed impacts to streams and led to the prioritization of 19 reaches included in this Plan (reaches are portions of the stream with similar characteristics in terms of channel geometry, valley and floodplain settings).
- Phase 2 work (entailing field assessments in and along the streams) was conducted on the 19 reaches of the Stevens River, Peacham Hollow Brook and South Peacham Brook in 2010.

Assessment summary

Assessment results are summarized in this report, and analysis and preliminary project identification is presented for reaches included in the Phase 2 assessments. The analysis informs a process designed to identify and catalogue technically feasible projects that can help reduce flood and erosion hazards along stream corridors, improve water quality and aquatic habitat, and enhance recreational opportunities.

Results of the assessments indicate:

- The Stevens River is characterized by significant historic channel straightening (for mill use and road construction and maintenance), partial restriction of access to historic floodplains, and intermittent levels of high and low levels of stream power.
- Stream power increases when water is contained in a deeper, narrower channel, or when a stream loses its meanders (much as water gains force on a mountain trail with no switchbacks). High levels of stream power in the Stevens River basin are largely due to the extent of historic channel straightening and ongoing road encroachments (when they can withstand erosive forces), and can contribute to elevated discharges of water and sediments.
- Low levels of stream power can result when flows are regulated (e.g., at the Harvey's Lake and former Ben's Mill dams); when water is abruptly slowed (such as occurs at significantly undersized bridges or culverts, or sharp bends and bedrock constrictions); or where flows are naturally diffused along low slopes or across wide floodplains. Areas at or downstream of these influences may accrue sediment buildups that are only intermittently redistributed. Stream flows that are unable to move these sediments will move around these sediment the build-ups, increasing lateral movement and erosion. This process is necessary for the stream but will pose risk to encroachments. Floodplains that don't have conflicting uses are able to store and utilize valuable nutrients deposited by floodwaters and decrease the stream power impacts being passed downstream.
- Flash flooding is a primary driver of stream dynamics in the Stevens River watershed, and impacts frequently initiating in upstream portions of the watershed are then passed to downstream areas over a period of decades. Numerous localized flash floods have occurred in assessed areas in the last three decades, and appear to have increased in frequency over that time frame.
- Important "attenuation assets", which are capable of accommodating floodwaters and storing sediment and nutrient discharges within the watershed, are interspersed throughout the assessed streams of the watershed. These assets lessen flood impacts in downstream areas and help the streams of the watershed re-establish balanced conditions more quickly following these events; highest priority for stream projects is thus protection of existing assets.
- Long-standing development in the villages of the watershed, particularly East Peacham, West Barnet, and Barnet villages, presents frequent conflicts with the impacts of flood events and increases the value of attenuation assets upstream of these areas; the majority of conflicts with stream processes outside of these areas

(and thus the focus of impacts from flooding,) is due to extensive road encroachments in stream corridors.

Intermittent distribution of the important stream assets needed for protection and restoration work in the Stevens River basin makes parcel by parcel corridor protection efforts possible on a focused basis, but municipal bodies can achieve many of the same goals more efficiently and effectively through town zoning, setbacks, or other protection. Given the extent of road encroachments and damages over time, a municipal approach to limiting further development in stream corridors is thus a highly cost-effective method of not only reducing future conflicts and damages but also minimizing impacts on existing encroachments.

The top priority recommendation in this report is thus for Peacham and Barnet to consider incorporation of belt-width corridors or similar measures into town-wide planning efforts. Belt-width corridors approximate the extent of lateral adjustments likely to occur over time in a meandering stream, generally a minimum of 3-4 times the stream channel width on each side of the stream. The physical dictates of stream processes mean that a stream denied this room will pass elevated impacts to other areas.

Fluvial Erosion Hazard zones (FEH) are a refinement of belt-width corridors and are recommended as a scientifically based method that uses the size, inherent sensitivity, and current adjustment processes of the stream to determine and map levels of risk and appropriate setbacks. The data needed to inform this process were collected for the nineteen reaches assessed in 2010, and extensive road damage in May 2011 clarified the types of risk posed in these zones.

While the information to develop scientifically backed corridors has been collected during the course of this assessment, it should also be noted that setbacks could be used to adequately accommodate stream processes on the large majority of the smaller streams in the watershed; these may be easier to administer than maintaining maps in these areas. Both Barnet and Peacham currently have some setback regulations regarding lakes and ponds. Allowing a belt-width of 3 times the stream channel width would mean a 50 ft setback on streams that don't have tributaries. For comparison:

- FEH zones on Peacham Hollow Brook exceed 70 ft setbacks downstream of the Bayley-Hazen Rd. junction with Slack St., and approach or exceed 100 ft setbacks downstream of Ewells Mills.
- FEH zones on South Peacham Brook exceed 70 ft setbacks downstream of the County Rd., and exceed 100 ft setbacks downstream of South Peacham village
- All FEH zones in Barnet would well exceed 100 ft setbacks. Due to the locations and joining of tributaries above most road crossings in Barnet (see overview map in Fig. 1 on p. 5), most streams would benefit from 100 ft setbacks; only streams with no tributaries in Barnet would avoid conflicts by using a 50 ft setback.

It would be difficult to overemphasize the importance of the role that small streams play in a watershed such as the Stevens River basin; recent flood damages to roads have been the most notable example of impacts from such streams. Since there have been few houses or structures damaged in these events, the primary exposure that most people have to these events is along roads; it is often not easy to see how these impacts are being amplified by loss of floodplain access or heightened stream power transferred from upstream of the impacts (oftenfrequently due to new encroachments or straightening).

Setbacks, FEH zones, or other belt-width corridors provide accommodation of stream processes that will help break a cycle of impacts being amplified and passed to downstream reaches. Given the importance of flash flooding dynamics in the watershed, as well as dispersed settlement patterns that are placing increased development pressure on small streams, such measures will not only reduce direct risks but can help protect vital resources for minimizing impacts in downstream areas and effectively reducing long-term maintenance costs for roads and other infrastructure. Limiting further encroachments in such areas offers perhaps the most cost-effective measure to limiting damage and controlling costs associated with maintenance of areas that such encroachments are, or need to be, located.

Project recommendation summary

Based on the results of the assessments, the following “short list” of projects, in recommended order of importance, was prioritized:

- Peacham and Barnet: Incorporation of fluvial erosion hazard (FEH) zones or other belt-width corridors into town planning processes. Municipal adoption of FEH zones into town zoning might represent areas where no new development is allowed, and specify that in areas where development already exists within the river corridor no further encroachment is allowed towards the river. Methods to develop these zones and models of various options for implementing them can be found in the Municipal Guide to Fluvial Erosion Hazard Mitigation published by the Vermont River Management Program (VT-RMP FEH 2010).
- South Peacham Brook reach T2.04, upstream and downstream of the Hollow Woods Rd. bridge near the corner with the Peacham-Barnet Rd.: corridor protection, investigate channel management easements and possible berm removal; buffer plantings, fencing and watering options
- South Peacham Brook reach T2.02B, downstream of Harvey’s Lake dam: continue maintenance of check dams; T2.02A investigate channel management easements, buffer plantings, fencing and watering options
- Peacham Hollow Brook reach T1.01 and South Peacham Brook T2.01, shared floodplain downstream of the West Barnet Rd. bridge in between Roy Mountain Rd. and the East Peacham Rd intersection: build on existing buffer plantings, corridor protection, investigate channel management easements
- Stevens River mainstem reach M1.03, upstream of the Interstate-91 culvert and alongside Anderson St.: investigate berm removal and corridor protection
- Peacham Hollow Brook reach T1.03, wildlife sanctuary downstream of East Peacham village and Willow Brook confluence: determine corridor protection status, explore further options; consider educational signs concerning corridor protection at wildlife observation deck
- Peacham Hollow Brook reach T1.02, beaver-controlled floodplain near Peacham-Barnet town line: investigate channel management easements

- Peacham Hollow Brook reaches T1.07 and T1.06, downstream of Bayley-Hazen Rd. bridge at corner of Slack St.: corridor protection, investigate channel management easements

In addition, numerous bridges and culverts assessed in 2010 were undersized, with several bridges or culverts in Peacham sized at less than half of the bankfull stream width. (Bankfull flows are also known as "channel-forming flows" because this is when most sediments are moved and significant channel shape changes might occur; these high flows usually occur once every year or two). None of these structures appeared at risk of imminent failure, but it is recommended that replacement be considered in capital budgeting. Windrowing (removing sediments from the stream bed and placing them on the banks) appears to have occurred at several of these constrictions after floods, and contributes to straightening impacts.

A more complete table of the prioritized projects can be found in Section 6.2 (Project Prioritization) of this report. A "catalogue" of projects, with varying priorities, can be found for each reach with the reach descriptions in Section 6.1, and a consolidated catalogue is found in Appendix 6. A full list of assessed bridges and culverts, findings of the assessments, and potential for retrofitting structures that impede passage for fish and other aquatic organisms can be found in Appendix 8. Primary analysis summaries leading to the project recommendations are found in the section 5.1.4 Existing Sediment Regime Summary and Section 5.2 Sensitivity Analysis.

2.0 INTRODUCTION

Beginning in early 2004, public input was sought for basin planning for water quality throughout Vermont, including Basin 14, the "Little Rivers" Watershed, which includes the Stevens, Wells, Waits and Ompompanoosuc Rivers in eastern Vermont. The forums brought together a wide diversity of stakeholders, and priority issues and remediation strategies identified in each of these watersheds were sufficiently different that separate watershed councils evolved to further identify and prioritize work toward improving water quality.[1] Common water quality issues across all the "Little Rivers" watersheds, however, included stream channel instability, sedimentation and nutrient enrichment. These factors contribute to impacts affecting a wide array of river and stream uses and processes – economic, ecologic and recreational among them.

Over the course of evolving discussions, interest developed among stakeholders to use fluvial geomorphic principles (discussed in brief in the next section of this report, Project Overview) to address these issues. Fluvial geomorphology is the study of how water and sediment move within the landscape, both over distance and over time. Extensive experience and observation indicate that a stream with a balance of these inputs will erode its banks and change course to a relatively minor degree, even in flood situations.

- Fluvial: of or related to rivers and streams (i.e., flowing waters)
- Geomorphology: Geo = earth; morphology = shape

Large – scale changes involving rivers and streams (including land clearing, damming, dredging, straightening and filling of floodplains) have altered the balance of water and sediment in those systems, and many of the heightened erosion and flood impacts being felt in Vermont today are related to such changes. While streams eventually return to some sort of balance, the adjustment processes for that to happen are current in many areas and are often the drivers of impacts felt on a local level (though often not understood as such). These changes often unfold on a time-scale measured in decades, and many of the processes evident in the Stevens watershed today are related to significant land and water use changes that occurred over the last 200 years.

Due in part to a lack of understanding of the broader scale and long-term processes involved, we often find ourselves in an escalating cycle that requires an increasing level of investment to rebuild and/or protect property, livelihoods and ecosystems from damage and hazards caused by flooding, erosion and nutrient loading. Repeated flash flooding in recent years has amplified the message that the time and thought that go into understanding these dynamics can help control the costs of remediating such impacts and lead toward enjoyment of enhanced, vital resources.

The assessment reported here is based on protocols developed by the Vermont River Management Program (VT-RMP 2006), which are designed to guide assessments through a series of phases that integrate information from an overarching watershed context down to project-specific scales, with each previous stage informing the successors. By assessing underlying causes of channel instability at both watershed and

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[1]The history of public involvement in the Stevens River watershed planning process can be found at: http://www.vtwaterquality.org/planning/docs/pl_basin14.final_appendix.6-30-08.pdf

localized scales, management efforts can be directed toward long-term solutions that help curb escalating costs and efforts directed toward resolving conflicts with ongoing stream processes.

Assessment results are summarized in this report, and preliminary analysis is presented through the use of stressor, departure, and sensitivity analysis maps to integrate the findings in a more understandable and intuitive manner. This analysis informs a process designed to identify, catalogue, and prioritize technically feasible projects that can help reduce flood and erosion hazards along stream corridors, improve water quality and aquatic habitat, and enhance recreational opportunities.

2.1 PROJECT OVERVIEW

Following initial identification and prioritization of water quality issues and remediation strategies through public forums, the Stevens River Watershed Council was founded in 2004 to focus on efforts specific to the watershed. Water quality testing was conducted in 2005 in conjunction with the Peacham Conservation Commission and the Connecticut River Joint Commissions. In 2005 and 2006 the Caledonia County Natural Resources Conservation District (CCNRCD) obtained funding from the Connecticut River Mitigation and Enhancement Fund to identify and implement road-related projects to improve water quality by working with the Towns of Barnet and Peacham as well as Lyndon State College, who conducted bridge and culvert inventories (Copans 2008).

With growing appreciation among stakeholders of the potential for river corridor management employing fluvial geomorphic principles to address a broad range of top-priority issues, CCNRCD took a lead role in obtaining Community River Corridor grants to conduct geomorphic assessments of the Stevens and its tributaries. These grants are a primary tool in helping communities employ a science-based approach to achieve VT-RMP's stated goal of managing toward, protecting, and restoring the fluvial geomorphic equilibrium condition of Vermont's rivers and streams as a means to help resolve conflicts between human investments and river dynamics in an economically and ecologically sustainable manner (VT-RMP RCPG 2010; VT-RMP Alternatives 2003). Objectives following from this goal include:

1. fluvial erosion hazard mitigation;
2. sediment and nutrient load reduction; and
3. aquatic and riparian habitat protection and restoration

The stream geomorphic assessment is divided into phases (phases of the geomorphic assessment process are further discussed in section 4, Methods, of this report). A Phase 1 assessment is a preliminary analysis through remotely sensed data such as aerial photographs, maps, and 'windshield survey' data collection. CCNRCD conducted a Phase 1 assessment of 22 reaches (a reach is a relatively homogenous section of stream, based primarily on physical attributes such as valley confinement, slope, sinuosity, dominant bed material, and bed form) in the Stevens watershed in 2005-2006.

Phase 2 involves rapid assessment fieldwork. Community River Corridor Grants from the Vermont Department of Environmental Conservation helped CCNRCD update Phase 1 results in 2009 and engage Redstart in 2010 to conduct Phase 2 assessment on 19 reaches in the Stevens River watershed, prioritized for further assessment on the basis of the Phase 1 results. These reaches were located on the Stevens River mainstem, Peacham Hollow (aka East Peacham) Brook, and South Peacham Brook.

River Corridor Plans analyze the data from the Phase 1 and 2 assessments to inform project prioritization and methodology, and Redstart's work on this is presented here.

3.0 BACKGROUND INFORMATION

3.1 GEOGRAPHIC SETTING

3.1.1 Watershed description

The Stevens River Watershed lies within the larger Connecticut River drainage basin and encompasses roughly 46 square miles draining an area from the highest elevations ringing the western and southern portions of the basin (Cow Hill, 2566 ft above sea level and Lookout Mountain, 2513 ft, are on the western edge of the basin; Roy Mountain in the south is 2103 ft) toward the confluence of the Stevens with the Connecticut River at Barnet in the eastern portion of the drainage basin (elev. 461 ft; Fig. 1). The area lies within the Northern Vermont Piedmont biophysical region (Thompson and Sorenson 2000).

An excellent description of the overall watershed is found in the Basin 14 "Little Rivers" Water Quality plan (Copans 2008):

"The origins of the river's waters are the tributaries that flow from the eastern sides of Lookout Mountain and Macks Mountain into Willow Brook and from the wetlands and ponds in the northern part of Peacham including Ewell Pond to form Peacham Hollow Brook (East Peacham Brook on the USGS map). The other major tributary to the Stevens River is South Peacham Brook, which drains tributaries and ponds on the eastern side of Morse Mountain, Devils Hill, and Jennison Mountain and includes Martins, Mud and Fosters ponds. The southern Stevens River watershed is Jewett Brook which flows through extensive wetlands before entering Harveys Lake which then drains into South Peacham Brook in West Barnet. Peacham Hollow Brook and South Peacham Brook join about a mile east of West Barnet to become the Stevens River, which then flows east to the Connecticut River collecting water from a few small streams, the largest of which is Cloud Brook. On its way to the Connecticut River, the Stevens River goes under Interstate 91 then is impounded by the Barnet Dam just above Route 5 in the center of Barnet. After flowing free for a short stretch after the Barnet dam, the Stevens River meets the backwater of the Connecticut River caused by McIndoes Dam. At the confluence with the Connecticut River, the Stevens River flows through a wetland complex that provides flood storage and wildlife habitat along the Connecticut River corridor."

3.1.2 Political jurisdictions

The Stevens River basin is split primarily between the towns of Peacham (west) and Barnet (east), with smaller portions lying in Danville (north) and Ryegate (south; Fig. 1). These towns are all within Caledonia County, and all are served by the Northeastern Vermont Development Association as well as the Caledonia County Natural Resources Conservation District.

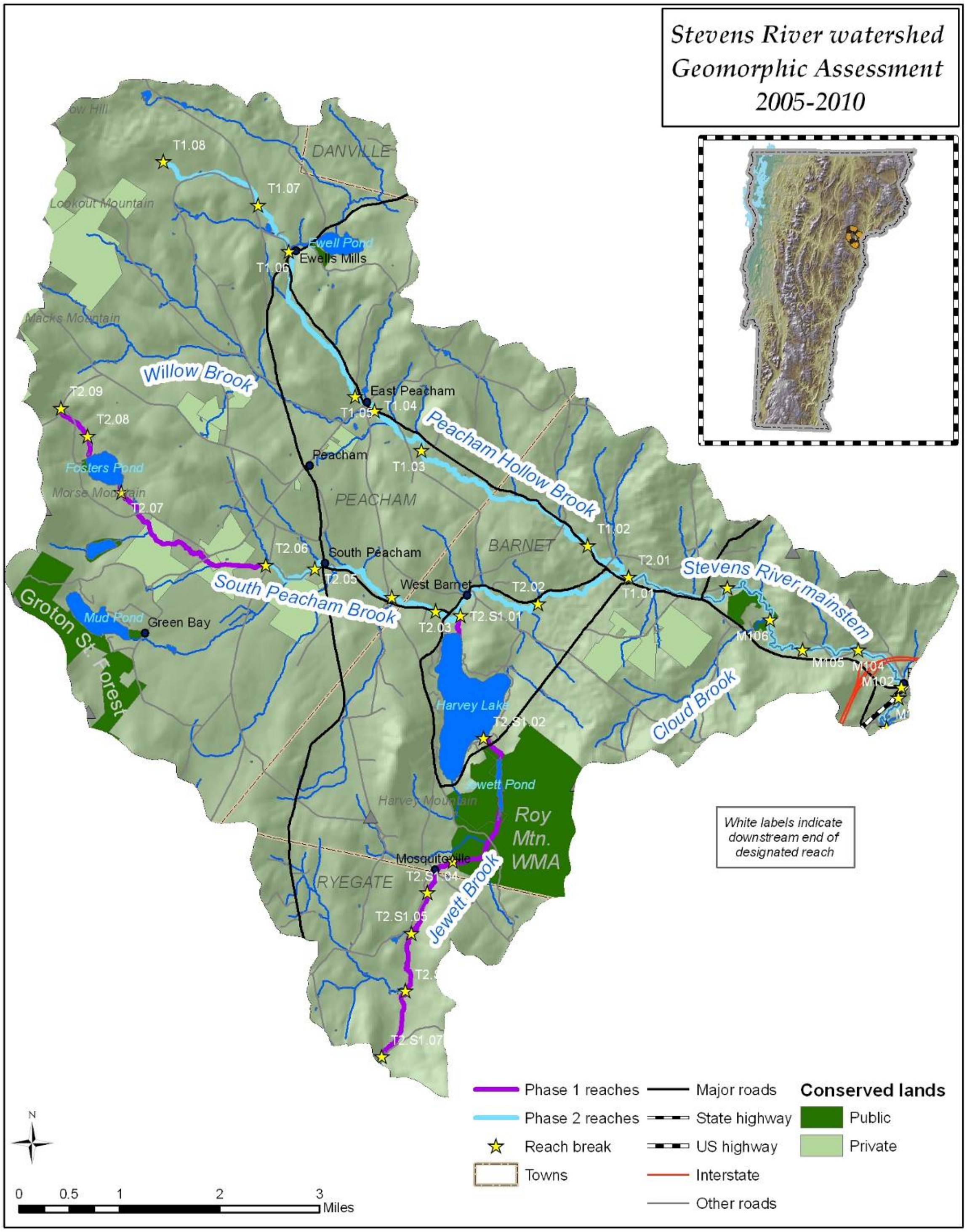

Figure 1. Overview map for geomorphic assessments in the Stevens River watershed.

3.1.3 Land use history and current general characteristics

The Northern Vermont Piedmont region in which the Stevens River basin is located is dominated by calcium-rich bedrock and soils derived from that basis, leading to characteristic "sweet soils" that support rich forests and other natural communities that thrive on these soils, as well as a history of heavy early (1800s) agricultural use following European settlement (Thompson and Sorenson 2000). The area does not appear to have been as heavily used by Native Americans as the Champlain basin and areas further to the south in Vermont, but extensive clearing and European settlement led to a diffuse pattern of development characterized by farms, small villages and a dense network of roads that remains characteristic of the Stevens River basin today. Native American use appears to have been concentrated along larger floodplains and the numerous lakes and ponds that occur in the region (Thompson and Sorenson 2000).

As is characteristic of much of Vermont, the Stevens River watershed has largely reverted to forest land following extensive clearing for 19th century agricultural use, but the pattern of farms interspersed with small villages and diffuse development remains (Fig. 2). Land cover/land use analysis indicates a substantial agricultural base, with roughly 18% agricultural land in the watershed followed by ~8% "urban" land cover/ land use (Table 1; 1990s data). "Urban" in a four-class context (Fig 2) refers to not only densely developed areas, but roads, infrastructure, suburbs, and large-lot residential development as well; roads and infrastructure account for 5.6% of the 8% "urban" landuse in the Stevens River basin (Table 1).

Table 1. Land cover/land use data for the Stevens River watershed derived from 1990s satellite imagery. Shading indicates groupings portrayed by four-class system (UVM-SAL 2002) in Fig. 2.

CONIFEROUS FOREST (generally evergreen)	27.32%	
MIXED CONIFEROUS-BROADLEAF FOREST	23.29%	
BROADLEAF FOREST (generally deciduous)	15.96%	
FORESTED WETLAND	2.20%	
BRUSH OR TRANSITIONAL BETWEEN OPEN AND FORESTED	0.02%	68.78%
Hay/rotation/permanent pasture	9.88%	
Row crops	7.91%	
OTHER AGRICULTURAL LAND	0.04%	17.82%
TRANSPORTATION, COMMUNICATION AND UTILITIES	5.61%	
RESIDENTIAL	2.28%	
COMMERCIAL, SERVICES AND INSTITUTIONAL	0.02%	
OUTDOOR AND OTHER URBAN AND BUILT-UP LAND	0.01%	7.93%
WATER	5.11%	
NON-FORESTED WETLAND*	0.36%	

**non-forested wetland may be classed as urban, ag, or forest in the 4-class typing*

Conserved lands in the Stevens River basin are primarily private farm and forest lands (~2425 acres, ~8% of the land area in the basin), with less than 5% of the basin land area (~1515 ac) located on public conserved lands in the Roy Mountain Wildlife Management Area and portions of Groton State Forest in the southern part of the basin (2009 data; Fig. 1). The public conserved lands protect large portions of the Martins Pond and Harvey's Lake watersheds, and include the shoreline of Mud Pond in Peacham (Copans 2008).

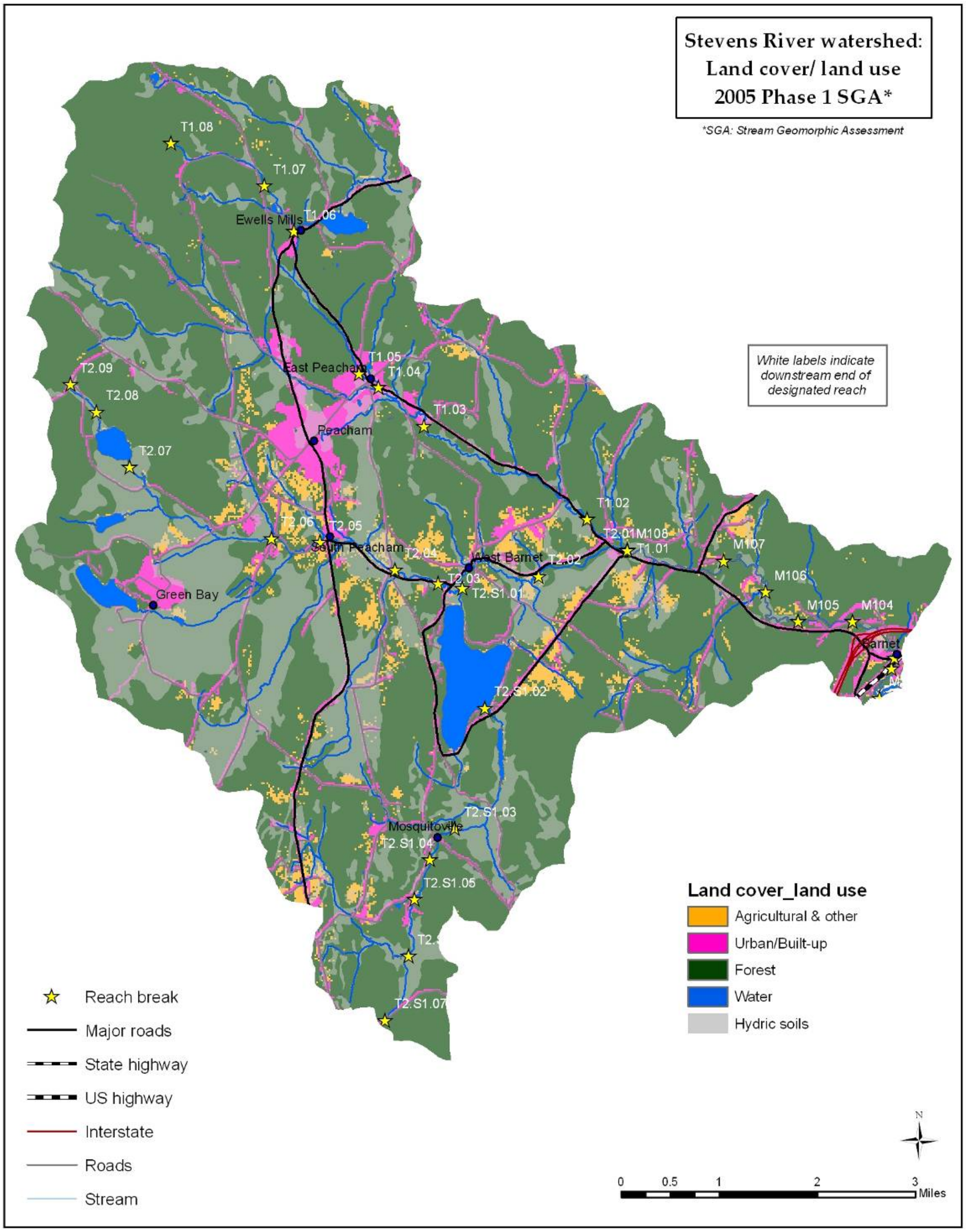

Figure 2. Four-class land cover/land use map (UVM-SAL 2002) for the Stevens River watershed, with hydric soils (SSURGO 2008). Intersecting areas of "urban" and agricultural lands with hydric soils may indicate potential loss of historic wetlands.

The towns in the Stevens River watershed are all relatively small in terms of population (2008 estimates; Vermont Indicators Online):

Danville 2,334	Barnet 1,773	Ryegate 1,201	Peacham 670

There are eight villages dispersed within the watershed, all within the towns of Peacham and Barnet. With the exception of the village of Peacham (aka Peacham Corners), these villages are all clustered along the streams of the basin. Barnet is the largest commercial district within the watershed, but is limited in scope; residents living in these towns report traveling an average of nearly half an hour for employment (Vermont Indicators Online). The nearest larger town is St. Johnsbury, a 15 minute commute from Barnet and half an hour from Peacham. Development pressures within the watershed are thus not as acute as in some other areas of Vermont, but there is significant recreational/seasonal development in the Harvey's Lake area (West Barnet) in particular. Tourism and recreation industries are long-standing in the area, however, and the overall population of these towns has remained relatively stable or declined over time (Vermont Indicators Online; Peacham Town Plan 2005).

As in much of New England, stream power played a large role in development within the Stevens River watershed, with at least 13 historical dams located on the streams of the watershed (Copans 2008). Although many of these have been breached or washed away, they provided power for sawmills, grist mills, manufacturing facilities and other uses (Beers Atlas 1875). The Bens Mill Trust is restoring one such mill on the Stevens River mainstem in Barnet as a working power museum, with strong support from the local community (Copans 2008; Ben's Mill Trailer 2008; Fig. 3). These dams and mills have played a profound role in the history of the watershed, and their legacy is evident in geomorphic adjustment processes observed on the streams of the watershed today.

Figure 3. At the location of one of at least 13 historical dams in the watershed, Ben's Mill on the Stevens River mainstem in Barnet Center is being restored as a working power museum. According to the historical documentation on the wall at the Mill, the dam (remains visible at left in photo of mill) was damaged in a flood in 1990; stream adjustment processes are clearly visible both upstream and downstream of the site.

3.2 GEOLOGIC SETTING

The bedrock formations underlying the Stevens River watershed are dominated by the Waits River and Gile Mountain formations (Doll et al 1961), which are generally calcareous and relatively easily weathered to fertile soils. The weathering of calcareous bedrock contributes much to the fertility that remains heavily utilized by agriculture in the watershed as well as supporting characteristic “rich” land natural communities (Peacham Town Plan 2005; VT-ANR Natural Resource Atlas 2011). Some granite formations associated with the Knox Mountain pluton, which are much harder, more acidic, and less disposed to weathering, have been left exposed in the western and southern portions of the watershed. The mineral composition, erodibility and weathering potential of these bedrock types is an important determinant of natural communities and water quality in various areas, and has been utilized as the basis of the ecological classification of bedrock types displayed in Fig. 4 (Thompson and Sorenson 2000; VCGI 2000).

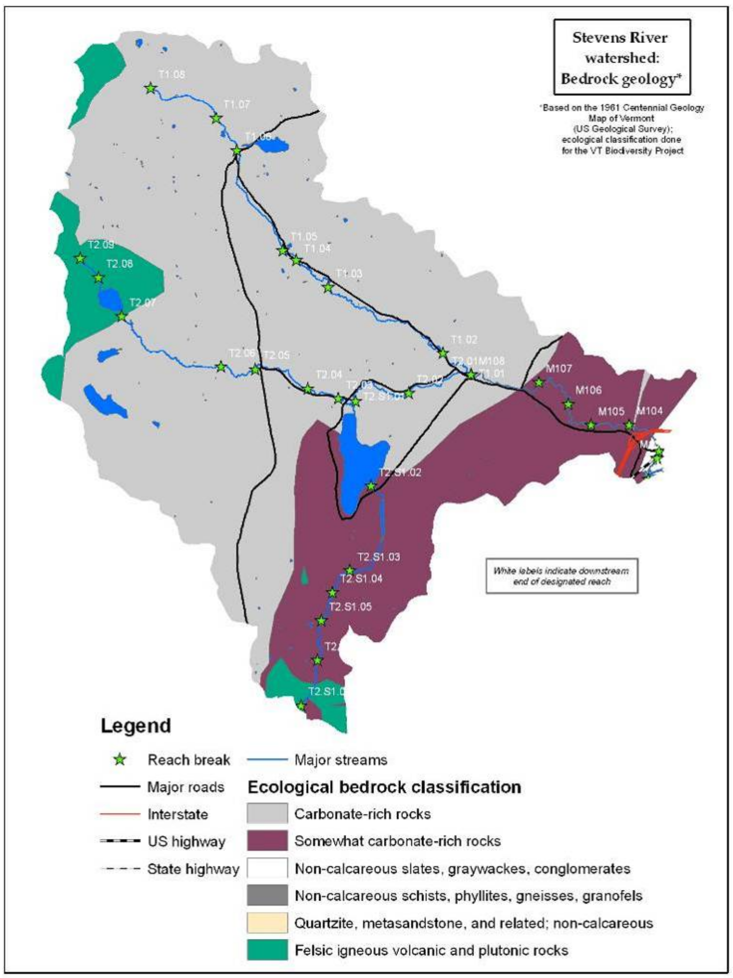

Figure 4. Ecological bedrock map for the Stevens River watershed.

The surficial geology of the watershed is heavily dominated by the influences of the Laurentide Ice Sheet, which was the last major continental-scale glacier that covered New England (Wright and Larsen 2004). Ice (sometimes as much as two miles thick) scraped its way across the landscape, leaving an unsorted mixture of clay, sand, gravel, and boulders known as glacial till.

Glacial advance generally occurred primarily from NNW to SSE. Likely due to the presence of the Knox Mountain pluton to the west and south, however, glacial movement in the Stevens River watershed appears to have come from the north and northeast, and primary processes contributing to surficial deposits were dominated by down wasting during glacial retreat (Doll et al. 1970). This has left ice-contact outwash deposits spread through the basin as well as kettlehole formations, of which Harvey's Lake is an excellent example (Thompson and Sorenson 2000). While this lake is limited in surface area extent, it is relatively deep for its size due to this history of formation.

The dominant down-wasting process contributing to surficial deposits in the Stevens River watershed, along with generally low topographic relief in the basin, has left some distinctive soils in the area. Of particular note are 'saprolites', which are lower soil horizons composed of deeply weathered bedrock found in areas flat enough to allow long-term leaching of weathered residues. Pockets of these soils are dispersed throughout the watershed but are more common along Peacham Hollow Brook in the northern portions of the basin, indicating that bedrock in this area has been in place longer and likely been less scoured by glacial activity than many portions of Vermont (Fig. 5).

"Dense till", sometimes referred to as "hardpan" due to its resistant nature, is concentrated in the southern and western portions of the Stevens River basin. High elevations in the western and southern portions of the watershed are thus composed of scoured, exposed granite and other very hard rock, while mid to lower elevations contain glacial till deposits characterized by loose or compacted deposits of variant composition and moderate-high erodibility. Finer sand and gravel particles (alluvial deposits) have accumulated in some of the broader valleys along South Peacham Brook over time, as well as accompanying extensive areas of organic deposits associated with wetlands along the upper reaches of Jewett Brook south of Harvey's Lake (Fig. 5).

During the period of glacial retreat (from 15,000-12,000 years ago), a large lake formed in the Connecticut River Valley that submerged lower elevations of the Stevens River mainstem (Fig. 5). Lake Hitchcock formed as an impoundment behind large volumes of glacial deposits in central Connecticut that dammed the Connecticut River valley. At its maximum extent, the lake body stretched from Rocky Hill, CT for 200 miles northward to Saint Johnsbury, VT. The edges of Lake Hitchcock extended up about two-thirds of the Stevens River mainstem, and glaciolacustrine deposits at the edges of this glacial lake, along with alluvial soils that have deposited just upstream of these edges over time, have left some of the more highly erodible sediments in the Stevens River watershed. Sand and gravel particles carried by streams settled at lake margins, but finer silts and clays settled in deeper waters of Lake Hitchcock to form the glaciolacustrine deposits concentrated in the lower reaches of the Stevens River watershed.

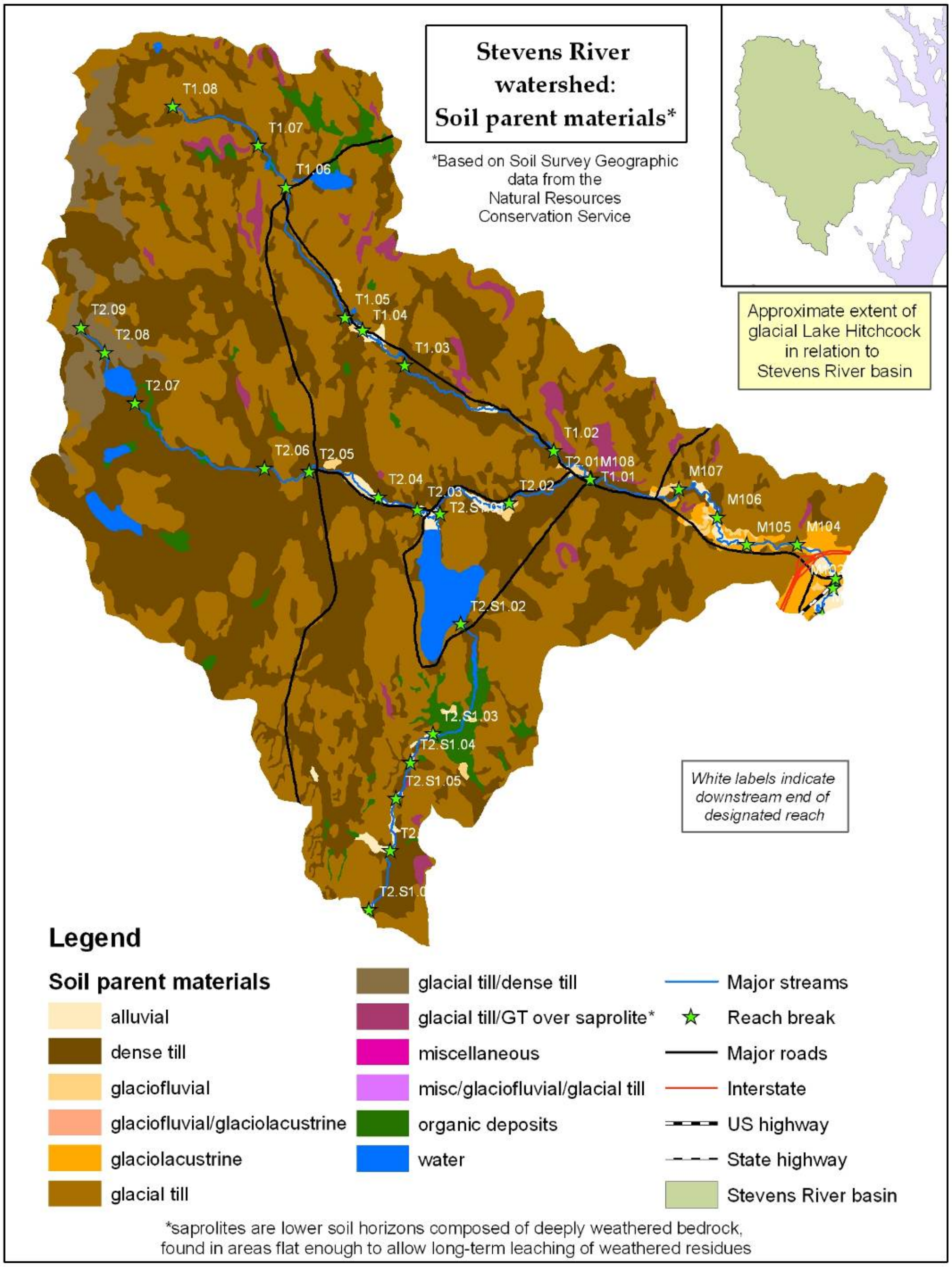

Figure 5. Surficial geology map for the Stevens River watershed.

Stream processes since the last glacial period have contributed to further development of alluvial deposits along South Peacham Brook (Fig. 6) and small pockets along Peacham Hollow Brook in the northern portion of the watershed (Fig. 5).

Figure 6. Alluvial deposition: May 2011 flooding deposited large amounts of sediment at a likely alluvial fan on South Peacham Brook, at the Hollow Woods Road corner with the Peacham-Barnet Road.

While alluvial and glaciolacustrine soils are often considered to have relatively low erosive potential due to gentle slopes, the materials are actually highly erodible and can be a significant source of sediment from unstable stream banks, particularly when well vegetated buffers are lacking. These fine-grained sediments contribute to “wash loads” during high flows. In general, the Stevens River tributaries tend to have a greater proportion of coarser “bed-load” sediments than finer grained “wash-load” sediments due to the underlying geology of the watershed, while finer sediments are concentrated in the downstream portions of the Stevens River mainstem (Table 2).

Table 2. Stevens River basin geology and soils for reaches assessed in 2005 Phase 1 assessments (updated 2010).

	Reach point	Alluvial fan	Grade control	Dominant geological material	Dominant geological material_ percent	Subdominant geological material	Subdominant geological material_ percent	Valley slope_ left	Valley slope_ right
Stevens River mainstem	M1.01	None	None	Alluvial	89	Glacial Lake	9	Flat	Hilly
	M1.02	None	Waterfall	Glacial Lake	98	Alluvial	1	Steep	Very Steep
	M1.03	None	Waterfall	Glacial Lake	65	Alluvial	34	Steep	Very Steep
	M1.04	None	Ledge	Glacial Lake	59	Till	39	Very Steep	Very Steep
	M1.05	None	None	Alluvial	59	Glacial Lake	35	Extremely Steep	Very Steep
	M1.06	None	None	Till	61	Alluvial	28	Very Steep	Very Steep
	M1.07	None	None	Till	85	Glacial Lake	7	Very Steep	Steep
Peacham Hollow Brook	T1.01	None	Ledge	Till	76	Ice-Contact	23	Hilly	Steep
	T1.02	None	None	Till	87	Alluvial	11	Very Steep	Very Steep
	T1.03	None	None	Till	58	Alluvial	40	Steep	Very Steep
	T1.04	None	None	Till	79	Ice-Contact	13	Steep	Very Steep
	T1.05	None	Ledge	Till	99	Alluvial	0	Extremely Steep	Extremely Steep
	T1.06	None	Ledge	Till	76	Other	22	Hilly	Very Steep
	T1.07	None	Multiple	Till	99	Alluvial	0	Steep	Hilly
South Peacham Brook	T2.01	None	None	Till	90	Alluvial	4	Steep	Steep
	T2.02	None	Dam	Alluvial	59	Till	39	Steep	Steep
	T2.03	None	None	Till	67	Alluvial	31	Steep	Steep
	T2.04	Yes	None	Till	47	Alluvial	37	Steep	Steep
	T2.05	None	Ledge	Till	99	Alluvial	0	Hilly	Hilly
	T2.06	None	Ledge	Till	69	Other	30	Very Steep	Steep
Jewett Brook	T2.S1.02*	NA	None	Other	68	Till	26	Very Steep	Extremely Steep
	T2.S1.03	None	None	Till	60	Alluvial	39	Very Steep	Hilly
	T2.S1.04	None	None	Till	77	Alluvial	21	Very Steep	Very Steep
	T2.S1.05	None	None	Alluvial	74	Till	24	Steep	Very Steep

* T2S101 is Harvey's Lake, which was not assessed

3.3 GEOMORPHIC SETTING

For the purposes of geomorphic assessment and corridor planning, streams in the study area were divided into "reaches". A reach is a relatively homogenous section of stream, based primarily on physical attributes such as valley confinement, slope, sinuosity, dominant bed material, and bed form, as well as predicted morphology based on hydrologic characteristics and drainage basin size (methods are further discussed in Section 4.0 of this report). Classification parameters pertinent to establishing these reference stream types are listed in Table 3.

Table 3. Reference stream type summary indicating classification parameters pertinent to Stevens River watershed reaches included for 2010 fluvial geomorphic assessments (VT-RMP 2009, Phase 1 Protocols, p. 28).

Reference stream type	Confinement (Valley Type)	Slope
A	Confined (NC)	Very Steep: 4.0–6.5%
B	Confined or Semiconfined (NC, SC)	Steep: 3.0–4.0%
B	Confined, Semiconfined, or Narrow (NC, SC, NW)	Moderate–Steep: 2.0–3.0%
C or E	Unconfined (NW, BD, VB)	Moderate–Gentle: <2.0%

NC: Narrowly Confined; SC: Semi-Confined; NW: Narrow; BD: Broad; VB: Very Broad

Streams may diverge somewhat from these broad classifications, particularly in the area of slope. A reference "subslope class" is assigned to a reach that has a higher or lower slope than that typically associated with a reach of that type, and the class designation reflects the stream type normally associated with that slope (but in a lower case letter rather than upper case:

Subslope class	Slope
a	Very Steep: 4.0–6.5%
b	Moderate–Steep: 2.0–4.0%
c	Moderate–Gentle: <2.0%

A and B type streams (steeper slopes) are primarily expected to be sediment Transport reaches, as will be further discussed in Section 5.1.4 of this report. Under reference conditions, only 1 reach (4%) of the 24 included in Phase 1 assessment of the Stevens River watershed is considered an A type stream, and 4 reaches (17%) have a B reference type (Table 4).

Stream reaches with C and E reference types utilize their floodplains extensively in stream processes and would be expected to store sediment, high flows and nutrients within the watershed under reference conditions. Of the 24 reaches assessed in Phase 1, 13 reaches (54%) would be considered C type streams and 6 reaches (25%) would be considered E type streams (Table 4).

Table 4. Reference stream type classifications for 24 reaches included in Phase 1 analysis in the Stevens River watershed during 2005 (updated 2010).

	Reach	Confinement type	Reference type	Subclass slope	Bedform	Bed material
Stevens River mainstem	M1.01	VB	C		Riffle-Pool	Gravel
	M1.02	SC	B	c	Riffle-Pool	Cobble
	M1.03	VB	C		Riffle-Pool	Gravel
	M1.04	SC	B	c	Step-Pool	Cobble
	M1.05	BD	E		Riffle-Pool	Sand
	M1.06	BD	C		Riffle-Pool	Cobble
	M1.07	BD	C		Riffle-Pool	Cobble
Peacham Hollow Brook	T1.01	VB	C		Riffle-Pool	Cobble
	T1.02	VB	C		Riffle-Pool	Cobble
	T1.03	VB	E		Riffle-Pool	Gravel
	T1.04	VB	E		Riffle-Pool	Gravel
	T1.05	VB	C	b	Riffle-Pool	Cobble
	T1.06	VB	C	b	Riffle-Pool	Gravel
	T1.07	VB	C	b	Riffle-Pool	Cobble
South Peacham Brook	T2.01	NW	C		Riffle-Pool	Cobble
	T2.02	VB	E		Riffle-Pool	Gravel
	T2.03	BD	C		Riffle-Pool	Cobble
	T2.04	VB	C	b	Riffle-Pool	Cobble
	T2.05	BD	C	b	Step-Pool	Cobble
	T2.06	SC	A		Step-Pool	Cobble
Jewett Brook	T2.S1.02	VB	E		Dune-Ripple	Sand
	T2.S1.03	SC	B		Plane Bed	Gravel
	T2.S1.04	SC	B		Plane Bed	Cobble
	T2.S1.05	NW	E		Dune-Ripple	Gravel

Visual assessment of the distribution of these stream types in the watershed indicates the widespread nature of the lower gradient stream types throughout the watershed (Fig. 7). B-type streams are interspersed in a couple of short reaches on the Stevens River mainstem, but are primarily concentrated in the upper elevations of South Peacham and Jewett Brooks. Reach M1.02 (overall B-type stream) includes the location of Barnet (aka Stevens) Falls, a 60-ft waterfall that effectively isolates the remainder of the Stevens River watershed from the Connecticut River basin in terms of upstream aquatic organism passage.

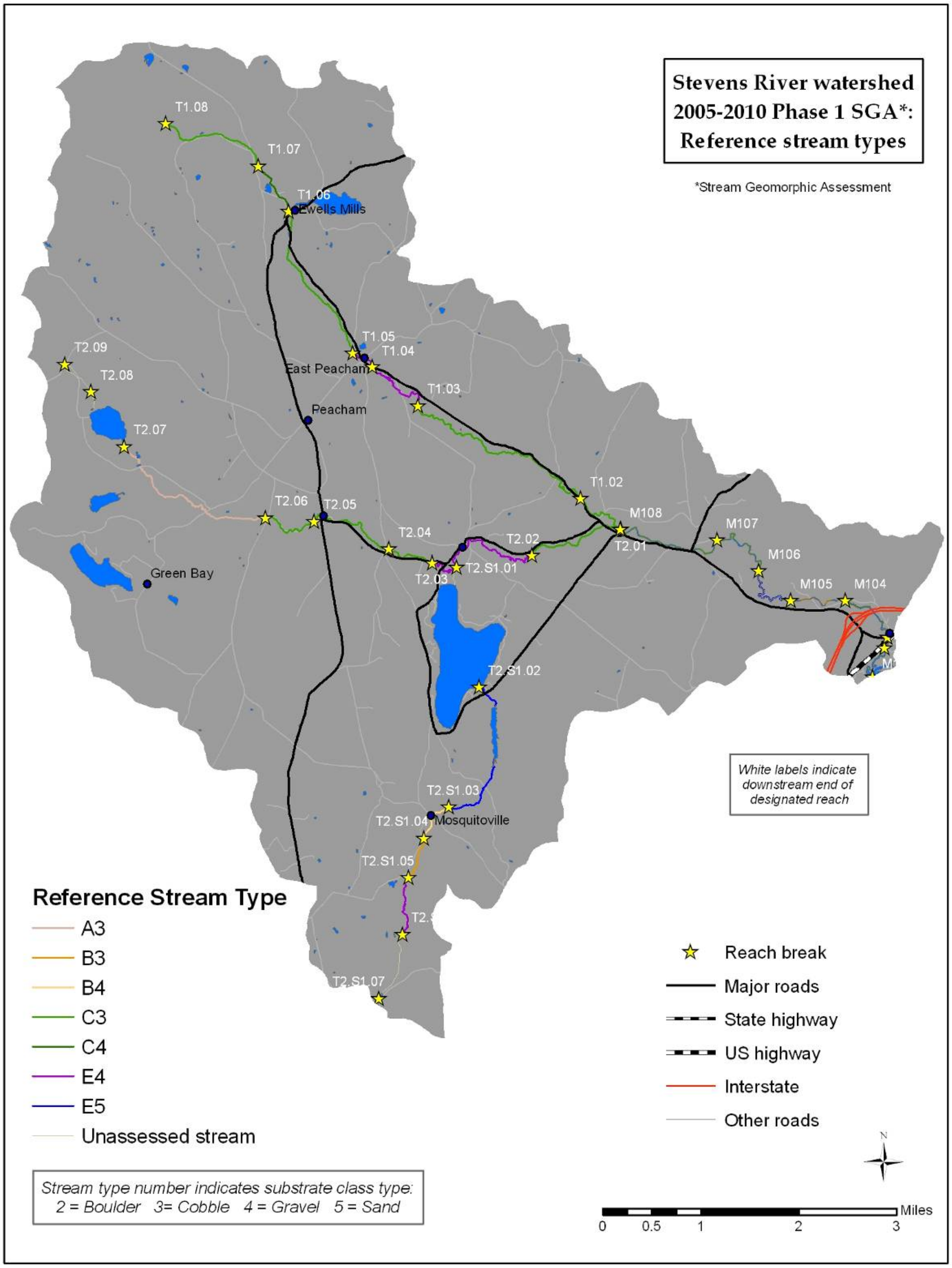

Figure 7. Reference stream type map for Phase 1 reaches in the Stevens River watershed.

Longitudinal profiles of the streams included in Phase 2 assessments (Figs. 8-10) indicate steeper gradient reaches primarily in the headwaters, with gentler gradients through much of the watershed. The Stevens River watershed is typical of the Northern Piedmont area (as described by Thompson and Sorenson 2000), having rolling hill topography that is frequently dissected by narrow stream valleys. The streams located within the valleys, however, primarily have relatively gentle gradients throughout much of the lower elevations; the primary changes in elevation are often covered in a short distance over ledge grade controls or waterfalls in the uplands and at the bottom of the watershed, but grade controls (features that would prevent the bed of the river from lowering in elevation, such as channel-spanning bedrock) are largely absent in the mid-elevations (Table 2).

The concentration of steeper slopes and ledge in the headwaters appears to predispose the uplands to elevated impacts from flash flooding, while widespread gentler gradients in lower elevations has likely helped limit the degree of historic downcutting in streams of the Stevens River basin, diminishing restriction of access to historic floodplains despite a lack of grade controls at mid- and lower elevations.

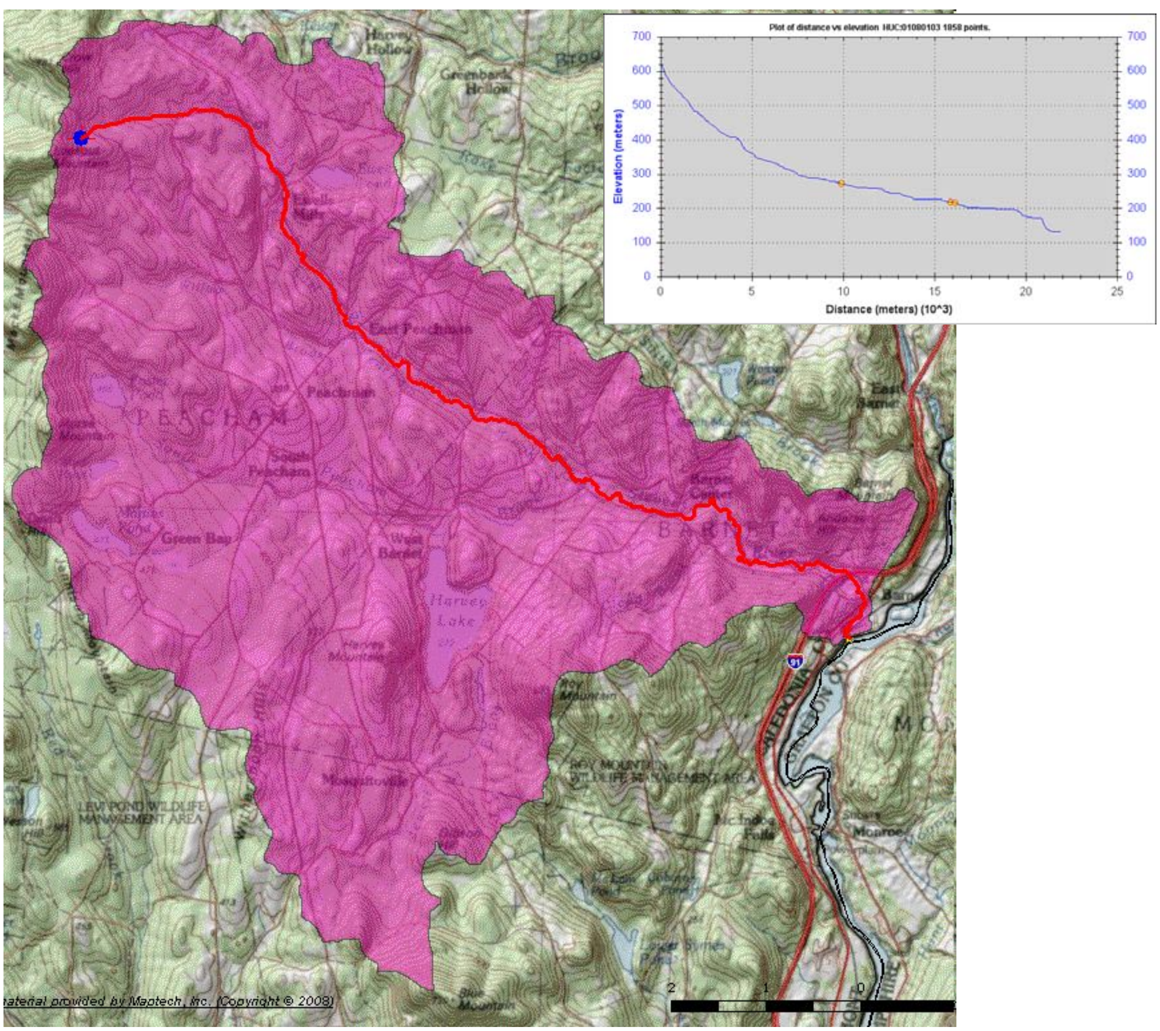

Figure 8. Longitudinal profile for Stevens River mainstem and Peacham Hollow Brook (graphics courtesy USGS StreamStats website).

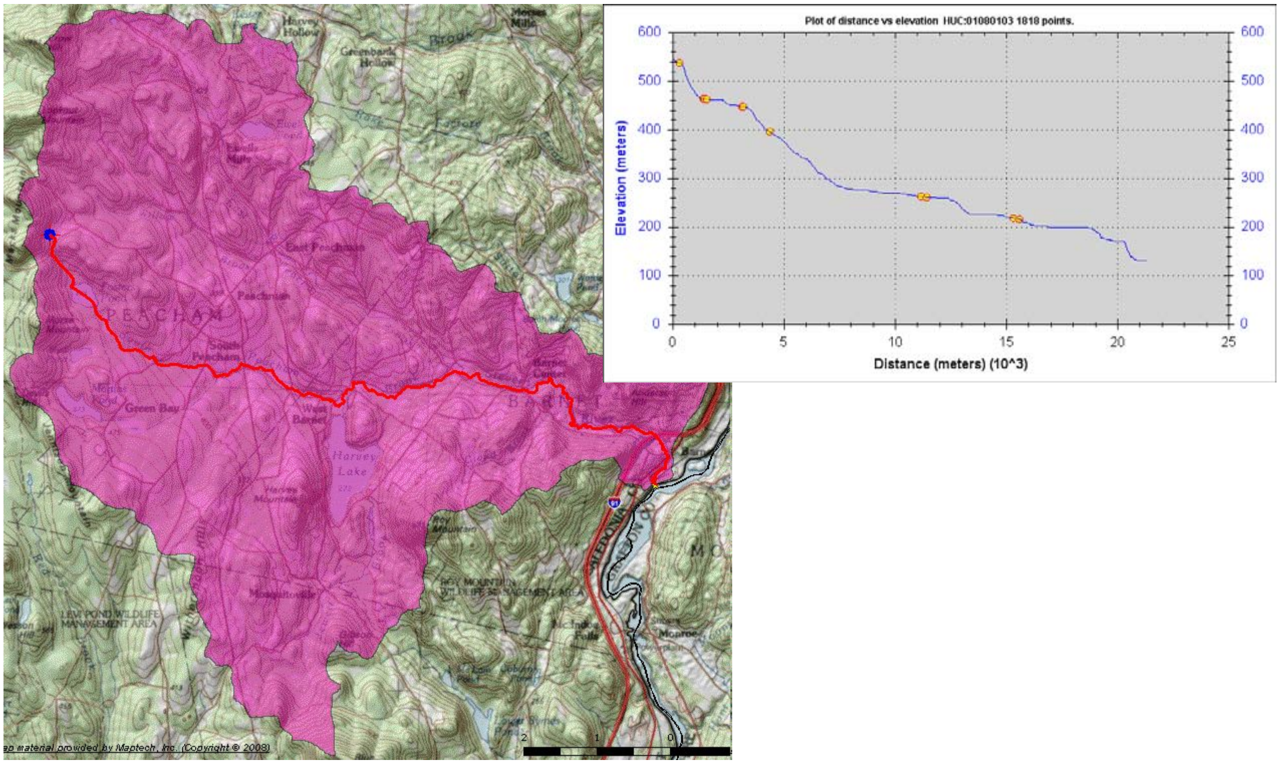

Figure 9. Longitudinal profile for Stevens River mainstem and South Peacham Brook (graphics courtesy USGS StreamStats website).

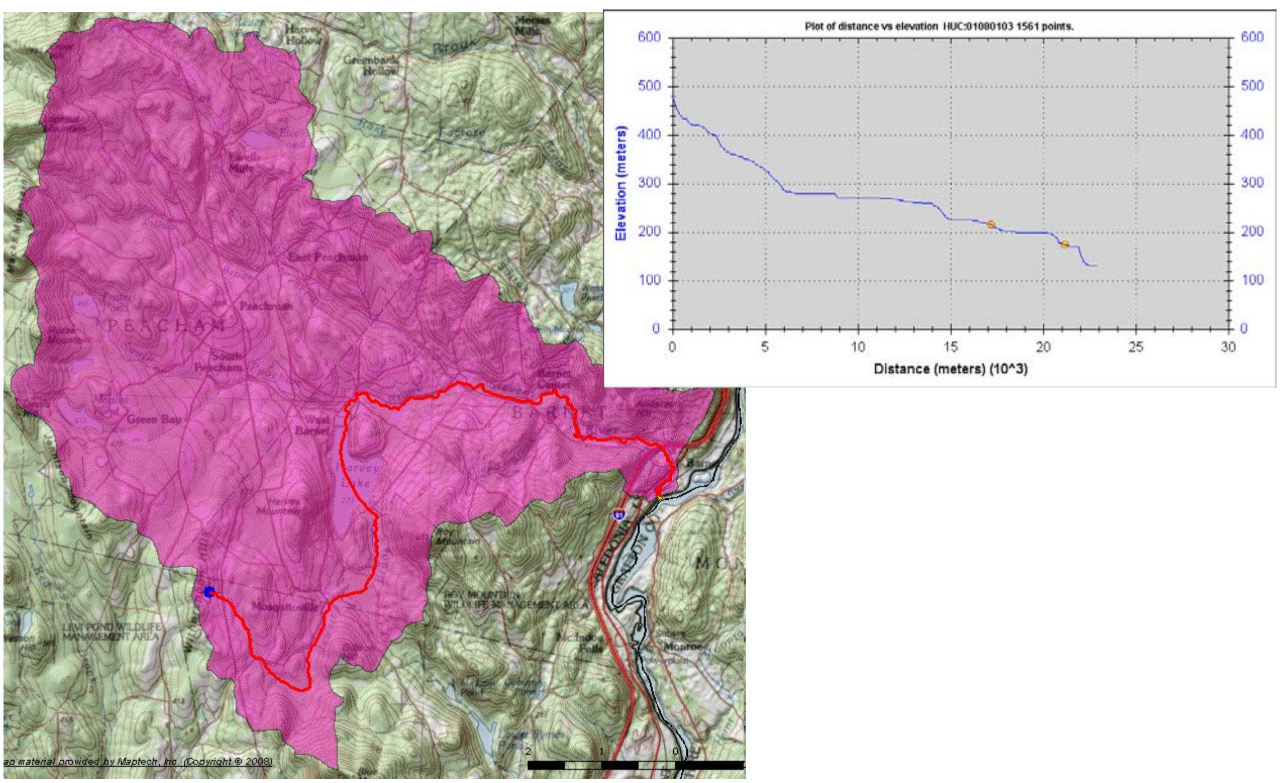

Figure 10. Longitudinal profile for Stevens River mainstem and Jewett Brook (graphics courtesy USGS StreamStats website).

3.4 HYDROLOGY

Hydrology describes the movement and storage of water in and around the earth, which is subject to both natural fluctuations and human modification (Dunne and Leopold 1978). The information presented in this section deals very briefly with the basis of natural fluctuations, while human modifications are discussed further in section 5.1.1, *Watershed-scale hydrologic regime stressors.*

3.4.1 Stevens River basin StreamStats

The United States Geological Survey (USGS) administers a *StreamStats in Vermont* website, which is designed to help compute streamflow and drainage basin characteristics for ungaged sites (http://water.usgs.gov/osw/streamstats/Vermont.html). Drainage basin characteristics for the overall Stevens River basin are indicated as follows:

Stevens River Basin Characteristics Report

Area in square miles	46.4
Percent of area covered by lakes and ponds	2.05
Mean annual precipitation, in inches	41.3
High Elevation Index - Percent of area with elevation > 1200 ft	62.6

Mean annual precipitation in the Stevens River basin ranges from relatively high in the highlands at the western edge of the basin to the lower end of the range for Vermont near the Connecticut River valley at its eastern extent, in the rain shadow of the highlands to the west (NWS-Burlington 1990; Fig. 11).

Lakes, ponds and wetlands can help store flow and sediment discharges in extreme weather events unless the event is extreme enough to cause these to overflow, at which point the impacts of these events can be amplified rapidly. (A microburst storm in 1998 revealed design limitations on a pond on Cloud Brook, which burst and caused large trap rock to dislodge and burst the Barnet School water line; pers. comms., Burleigh Huntoon, Barnet school custodian and Ben Copans, Basin 14 watershed coordinator). With roughly 2 percent of the watershed in lakes and ponds and an additional 2.6% in wetlands (Table 1), there is some buffering capacity within the watershed, particularly for the Jewett Brook subbasin in the southern portion of the Stevens basin due to the presence of Harvey’s Lake.

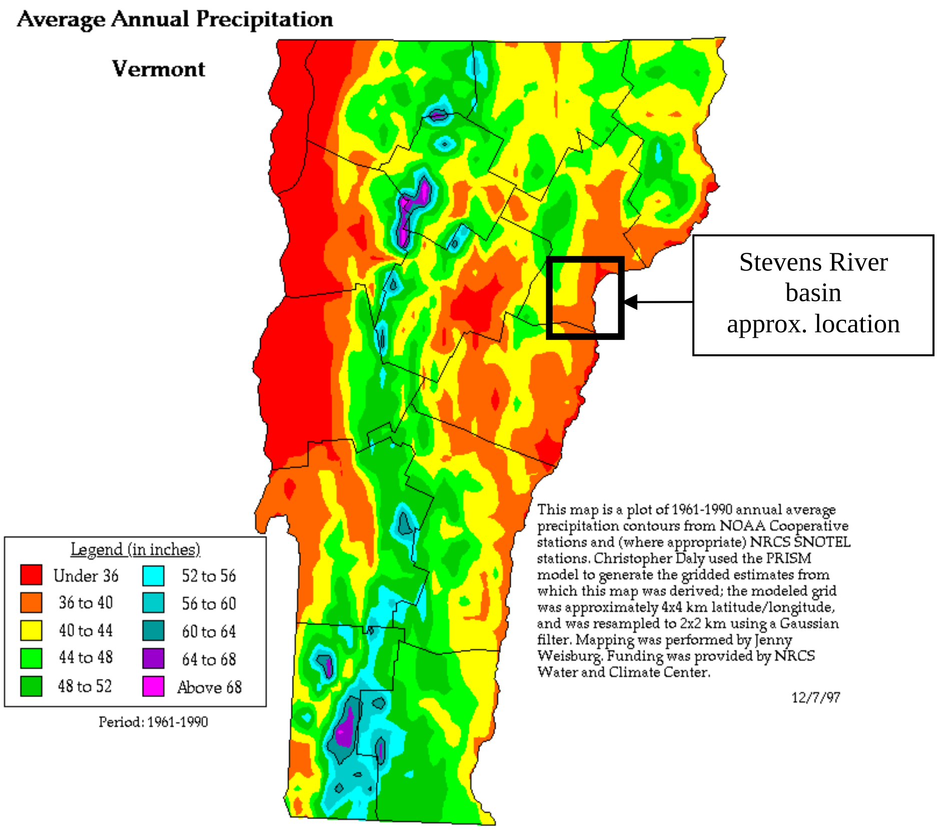

Figure 11. The Stevens River basin ranges from relatively high annual rainfall in the highlands at the western edge of the basin to the Connecticut River valley in the east, one of the drier areas of Vermont due to the rain shadow of the highlands to the west.

3.4.2 Stevens River basin flood history

There is only one stream gage operated by the US Geological Survey in the Stevens River drainage basin. This gage is located on South Peacham Brook at West Barnet, but was only operated from 1939-1946; the limited span of available data makes it difficult to use for obtaining information about flood history, but the highest flows at the site were recorded in 190 and 1945. Little other information about flooding in the Stevens River basin was turned up in limited internet and literature searches at the beginning of the Phase 2 work.

The nearest stream gages with longer term records that are helpful for deriving some information concerning flood history are in the Wells River watershed to the south and the Passumpsic watershed to the north (Fig. 12). The flow in both of these streams is regulated by dams and diversions, but the overall patterns can be helpful. The Wells basin (~98.4 sq. mi) is closer in size to the Stevens River (~46 sq mi) but slightly drier in terms of annual precipitation, while the Passumpsic is much larger (~436 sq. mi draining to the USGS gage) but probably more congruent in terms of precipitation patterns.

The Wells River exceeded the 50-year discharge level at the USGS stream gage in 1973, and surpassed the 10-year discharge in 1984 and 1998 (Redstart 2010).

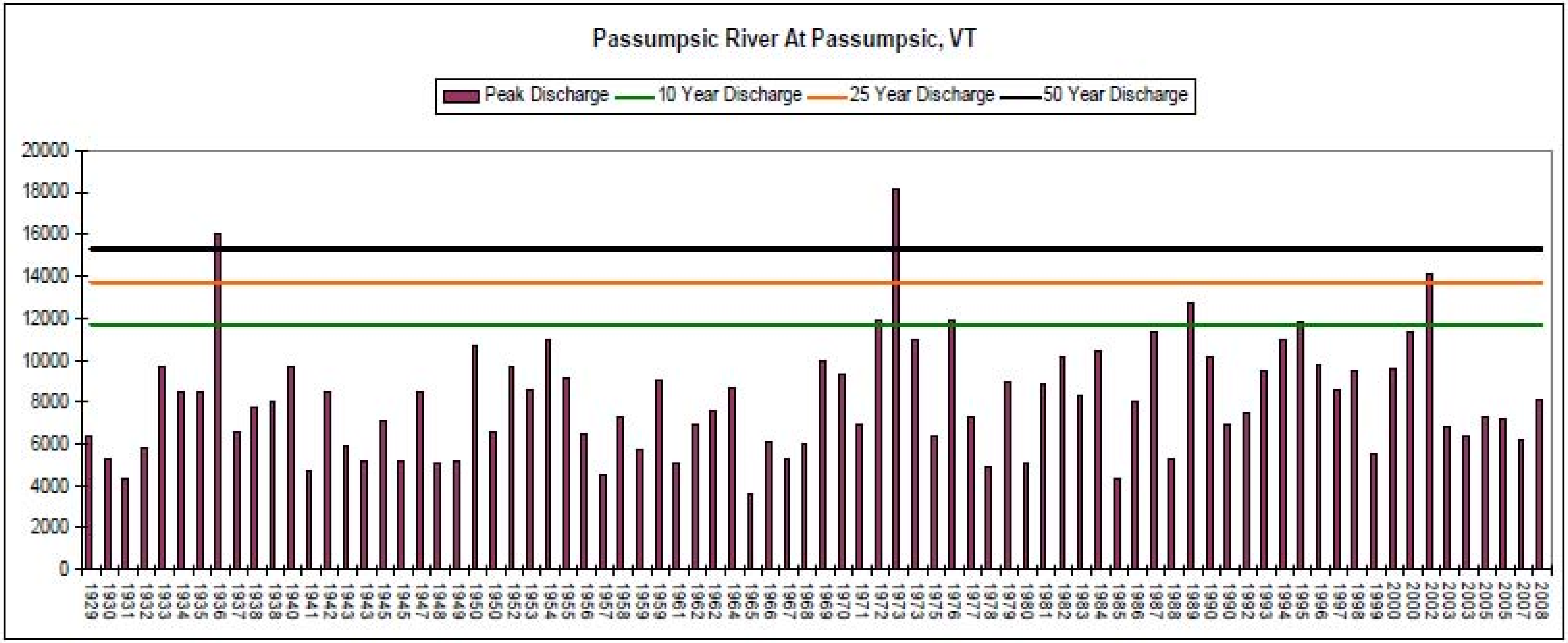

Figure 12. Flood history from the closest (to the Stevens River basin) long-term USGS stream gage, on the Passumpsic River (VT-RMP 2009).

The Passumpsic River USGS stream gage indicates the 50-year discharge was exceeded in 1936 and again in 1973. The 25-year discharge was surpassed in 2002, and the ten-year discharge was eclipsed in 1972, 1976, 1989 and 1995.

As in much of Vermont, flash flooding appears to be the predominant type of flooding in the Stevens River basin, making extrapolation from the records in neighboring watersheds tricky. Direct accounts from watershed residents were relatively scarce as well, although a flash flood in 1998 was noted (see section 3.4.1 of this report), possibly congruent with the 10-year event recorded at the Wells River gage.

Documentation at Ben Threshers Mill in reach M1.07 indicates that the old dam at that site was damaged by a flood in 1990 (the dam was breached and has now been replaced by a penstock to supply power to the mill; millfixer1 2009). It is not clear if this may have been the same 10-year event that was recorded in March 1989 at the Passumpsic River gage (Fig. 12). Eroded banks just upstream of the old dam indicate rapid loss of legacy sediments (deposited above the dam while it was in place) when the dam was breached (Fig. 13) , and a stream channel neck cut-off and large stretches of sediment deposits appear to have occurred downstream at this time (see Sec 6.1.7).

Figure 13. Legacy sediments behind the old dam at Ben's Mill show a distinct pattern of banding indicating cyclic deposition over the years the dam was in place; a heavy sediment discharge and subsequent erosion have occurred since the dam breached (around 1990).

Flash floods occurred on August 6 and 8, 2010 during Phase 2 assessments in the Stevens River basin. In addition, spring 2011 (after completion of Phase 2 fieldwork) was the wettest spring in 130 years of recordkeeping in Vermont and was capped with a storm in May that dropped 4-5 inches of rain in the Stevens River basin in a 24-hr period (NWS-Burlington 2011). The Town of Peacham posted photos of the damage from this storm to the internet, including numerous photos along the streams assessed for this report (http://www.photobucket.com/TownofPeacham). The Federal Emergency Management Administration released disaster funds in response to this event in early July 2011.

While flash flooding dominates the flooding regime in the Stevens River basin, inundation flooding (like filling a bathtub) can occur and did occur in April 2011 at the base of the watershed along the Connecticut River in reach M1.01 (Fig. 14).

Figure 14. While flash flooding is more common in the Stevens River basin, inundation flooding on the Connecticut River combined with high flows on the Stevens to surround Morrison Feeds during late April 2011 (Connecticut in background in picture at right, Stevens in foreground in both).

3.5 ECOLOGICAL SETTING

The Stevens River watershed lies within the Northern Vermont Piedmont biophysical region (Thompson and Sorenson 2000). The area has hilly topography and abundant rivers, and is dominated by coniferous forests as its location at the northern edge of this biophysical region evidences a transition from Northern Hardwood Forests more prevalent to the south to Spruce-Fir-Northern Hardwoods forest types that are more prevalent in cooler northern climes. The bedrock dictates much of the vegetation of this region, as calcareous-rich bedrock supports northern hardwoods and rich northern hardwoods on the Waits River Formation, as well as extensive areas of northern white cedar along the floodplains and wetlands of the basin. Conifer and mixed forests occupy higher elevation, granitic bedrock in the western and southern portions of the Stevens River watershed.

Saprolites, which are lower soil horizons composed of deeply weathered bedrock (see discussion sec. 3.2 of this report) support a number of unusual plant communities and occurrences in the northern portions of the basin, particularly around Ewells Mills (VT-ANR Natural Resource Atlas 2011).

The Northern Piedmont region has been altered by land clearing for agricultural purposes and forest/wood products, and also has a very dense network of roads and settlements. Therefore, very few large, undisturbed areas exist in this area currently (Thompson and Sorenson 2000). The Groton State Forest, Roy Mountain Wildlife Management Area and Barnet School Forest provide expanses of protected lands within the matrix of a relatively rural community, helping maintain travel corridors and habitat for wide ranging animals such as moose, fisher, and mink. The Town of Peacham has enhanced these values by providing protection around many of the larger ponds and lakes in the basin (Peacham Town Plan 2008). The Stevens River mainstem in Barnet connects lands to the north and south that have been identified by the Vermont Department of Fish and Wildlife as important bear habitat.

Although the ~80-ft Barnet Falls at the base of the watershed close to the Connecticut River largely prevents upstream aquatic organism passage, the Stevens River watershed has taken on an important role as a salmon nursery basin through stocking above the falls, thus playing an important role in Connecticut River salmon restoration efforts. Peacham Hollow Brook and South Peacham Brook support wild trout populations, while the Stevens mainstem and many of the ponds and lakes in the basin are stocked. An excellent general discussion of the fisheries of the Stevens River basin can be found in the Basin 14 Water Quality Management Plan (Copans 2008).

4.0 METHODS

4.1 STREAM GEOMORPHIC ASSESSMENT

In an effort to provide a sound basis for decision-making and project prioritization and implementation, the Vermont Agency of Natural Resources River Management Program (VT-RMP) has developed protocols for conducting geomorphic assessments of rivers. The results of these assessments provide the scientific background to inform planning in a manner that incorporates an overall view of watershed dynamics as well as reach-scale, or localized, dynamics. Incorporating upstream and downstream dynamics in the planning process can help increase the effectiveness of implemented projects by addressing the sources of river instability that are largely responsible for erosion conflicts, increased sediment and nutrient loading, and reduced river habitat quality (VT-RMP 2007). Trainings have been held to provide consultants, regional planning commissions, and watershed groups with the knowledge and tools necessary to make accurate and consistent assessments of Vermont's rivers.

The stream geomorphic assessments are divided into phases. A Phase 1 assessment is a preliminary analysis of the condition of the stream through remotely sensed data such as aerial photographs, maps, and 'windshield survey' data collection. This phase of work identifies a 'reference' stream type for each reach assessed. A reach is a similar section of stream, primarily in terms of physical attributes such as valley confinement, slope, sinuosity, dominant bed material, and bed form, as well as predicted morphology based on hydrologic characteristics and drainage basin size.

Phase 2 involves rapid assessment fieldwork to inform a more detailed analysis of adjustment processes that may be taking place, whether the stream has departed from its reference conditions, and how the river might continue to evolve in the future. This sometimes requires further division of 'reaches' into 'segments' of stream, based on such field-identified parameters as presence of grade controls, change in channel dimensions or substrate size, bank and buffer conditions, or significant corridor encroachments. The data collected in Phase 2 also help identify the inherent sensitivity to changes in watershed inputs of a given stream segment, and these data can be used to map and classify Fluvial Erosion Hazard zones (VT-RMP FEH 2008; VT-RMP RCProtect 2008). River Corridor Plans analyze the data from the Phase 1 and 2 assessments to inform project prioritization and methodology. Phase 3 involves detailed fieldwork for projects requiring survey and engineering-level data for identification and implementation of management and restoration alternatives.

All Phase 1 and Phase 2 data are entered into the most current version of the VTANR Stream Geomorphic Assessment (SGA) Data Management System (DMS) (https://anrnode.anr.state.vt.us/ssl/sga/security/frmLogin.cfm), where they are available for public review. Phase 1 data are updated, where appropriate, using the field data from Phase 2 assessments; these changes are tracked and documented within the DMS. Spatial data for bank erosion, grade control structures, bank revetments, beaver dams, debris jams, depositional features, and other important features are documented within field-assessed segments and entered into the spatial component of the statewide data base using the Feature Indexing Tool of the Stream Geomorphic Assessment Tools (SGAT) ArcView extension, which permits geographic information systems implementation of the data. Using data from both Phase 1 and 2 assessments, maps displaying this information are being made available for public use as well (http://maps.vermont.gov/imf/sites/ANR_SGAT_RiversDMS/jsp/launch.jsp?popup_blocked=true).

4.2 QUALITY ASSURANCE, QUALITY CONTROL, AND DATA QUALIFICATIONS

VT-RMP is committed to providing watershed groups, towns, regional planning commissions, consultants and other interested parties with technical assistance and shares responsibility for a thorough quality assurance/quality control (QA/QC) procedure for data collected in geomorphic assessments. Checks were initially conducted by Caledonia County Natural Resource Conservation District and Redstart personnel utilizing the QA/QC tools developed by VTANR and implemented through the online Data Management System. Documentation of these quality control checks is maintained within the DMS as well. Further review by both RMP personnel and the consultants conducting the assessments were cross-checked to verify integrity of the data, and this iterative process was completed in May 2011; further documentation of that process can be found in Appendix 5. General questions about data collection methods can be answered by referencing the SGA Protocols (VTANR 2007).

Phase 2 assessments in 2010 originally lumped segment M1.06-A with downstream reach M1.05, with which it has numerous similarities, and similarly lumped segment M1.07-A (a very short segment of stream) with downstream segment M1.06-B. Cross-sections were thus not taken for these two portions of stream in 2010, opting to use the cross-section measurements from the segments with which they were lumped. After reconsideration of this decision during the Quality Assurance process, cross-sections were taken for M1.06-A and M1.07-B in June 2011, and the measurements taken are included in the analysis presented here. It should be noted, however, that these measurements were taken after a flash flood on May 26, 2011 that likely affected the channel dimensions recorded.

It should also be noted that the geomorphic assessment protocols are periodically revised to increase the value of the data collected. In 2007, significant revisions to the scope of Phase 1 assessments were undertaken in identifying and establishing reach breaks (points where the stream exhibits significant changes in characteristics) early in the assessment of a watershed, with an eye to incorporating as many small streams into the analysis as feasible. These revisions were in part related to increases in the frequency of intense, localized storms that emphasize how small tributary streams can suddenly become major contributors to watershed dynamics. In situations where small streams were not included in initial watershed assessments and reach breaks were not established on such streams in Phase 1, these shifts in dynamics are difficult to incorporate into analysis and planning without essentially starting the watershed assessment over again.

Phase 1 assessments on the Stevens River occurred in 2005 and preceded these revisions. The May 2011 flooding in the Stevens basin exemplified the dynamics that provoked the revisions to the protocols, with small streams in particular gullying roads and contributing large amounts of sediments to streams in areas hit by the storms (Fig. 15).

Figure 15.Sediment from portions of Gov. Mattocks Rd. taken out by South Peacham Brook suddenly became a significant contribution to stream dynamics after an intense storm in May 2011 (photos from Town of Peacham).

Although some of the streams that were hit were already included in the assessments of the watershed, observations during August 2010 flooding and following May 2011 flooding indicated that significant sediment loading is occurring from Willow Brook. The limited number of stream reaches included in initial watershed analysis of the Stevens basin (under the older protocols in use at the time) did not include Willow Brook, and it will be difficult to incorporate that stream into the geomorphic assessment process at this point. Cloud Brook was also not included in the Phase 1 assessments and is likely contributing to stream adjustments in portions of the Stevens River mainstem due to flash flooding impacts (see sec. 3.1.4 of this report). While these streams would be difficult to incorporate into the full analysis presented here, the small size of the watershed and similar flash flooding events on other streams that were included in the assessments make it possible to understand the role such events play in overall watershed dynamics and stream adjustments. This presents possibilities for accommodating these processes while minimizing conflicts with infrastructure and activities around streams, and many of the project recommendations in chapter 6 are applicable along these streams.

5.0 RESULTS

The following sections summarize pertinent results of Phase 1 and 2 SGA data collection in the Stevens River watershed. Stressor, departure, and sensitivity maps are presented as a means to integrate the data that have been collected and show the interplay of watershed and reach-scale dynamics. These maps should assist in identifying practical restoration and protection actions that can move the river toward a healthy equilibrium (VT-RMP RCPG 2007). Single page maps are included with the text for ease of reference in regards to the text; larger maps can be found in Appendix 7.

Alterations to watershed-scale hydrologic and sediment regimes can profoundly influence reach-scale dynamics, and greater understanding of these processes is vital to increasing the effectiveness of protection and restoration efforts at a reach level (VT-RMP RCPG 2007). Section 5.1 presents an analysis of stream departure from reference conditions. Sections 5.1.1 and 5.1.2 summarize watershed-scale stressors contributing to current stream conditions. Two points are important to keep in mind in using these maps:

1) The watershed-scale maps attempt to convey patterns rather than details; more detailed impacts appear in the reach maps in section 6.0, *Project identification.*

2) A " zoomed in" map (such as the reach maps in section 6) is easier to read in some respects, but does not fully capture indications of watershed-scale alterations. Because fluvial geomorphic processes often unfold over decades, the "bigger picture" relationships are critical to understanding how upstream processes (either historic or current) affect what may be happening further downstream.

Sections 5.1.3–5.1.6 characterize reach-scale stressors. Section 5.1.7 characterizes the hydrologic and sediment regime departures for reaches included in Phase 2 assessment within the Stevens River watershed. Section 5.2 presents a sensitivity analysis of these reaches, indicating the likelihood that a stream will respond to a watershed or local disturbance or stressor as well as an indication of the potential rate of subsequent channel evolution (VT-RMP 2009, Phase 2, Step 7.7; VT-RMP RCPG 2007, Section 5.2).

Data used for the analyses can be found in the appendices. Reach/segment summary statistics and channel geometry data are found in Appendix 1. Phase 1 observations, assembled at a reach scale, are summarized in Appendix 2. Reach/segment scale data from Phase 2 fieldwork are provided as summary sheets in Appendix 3. Plots of channel cross sections are found in Appendix 4. Appendix 5 includes Quality Assurance review notes. Appendix 6 is a consolidated list of projects identified in Chapter 6. Appendix 7 contains 11x17 in. maps for both select analysis (Chapter 5 maps) and individual stream reaches assessed in 2010 Phase 2 assessments (Chapter 6 maps). Appendix 8 contains the results of bridge and culvert assessments for structures located on Phase 2 reaches.

5.1 DEPARTURE ANALYSIS

5.1.1 Hydrologic regime stressors

The hydrologic regime involves the timing, volume, and duration of flow events throughout the year and over time; as addressed in this section, the regime 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. Where hydrologic modifications are persistent, an impacted stream will adjust morphologically (e.g., enlarging through either downcutting or widening when stormwater peaks are consistently higher) and often result in significant changes in sediment loading and channel adjustments in downstream reaches (VT-RMP RCPG 2010).

As noted in section 3.1.3 of this report, *Land use and general characteristics*, the Stevens River watershed is roughly 69% forested today. As in much of Vermont, however, the watershed was heavily deforested during the 19th century, with the "sweet" soils of the basin leading to particularly heavy agricultural development in the area (Thompson and Sorenson 2000).

Trees play a large role in attenuating and slowing water inputs to the stream, both through the interception of water during precipitation events but also through large amounts of water that are taken up and cycled through transpiration. This can most easily be observed by the length of time that water levels remain high after a storm when leaves are off of deciduous trees (commonly 2 or 3 days after a moderate to heavy rain) in comparison with a summer storm, when water levels might recede within four to eight hours after the same type of storm. A simple experiment on a stream with well-forested buffers illustrates similar dynamics: a stick placed in a sand bar close to water level during the day will often be submerged first thing in the morning, after the period of time that trees have not been actively cycling water as rapidly as when they are exposed to sunlight. These observations help clarify the types of changes that occur in hydrologic dynamics when trees are removed from a larger landscape: water reaches the stream more quickly and in higher quantities than in areas that have trees present.

Subwatersheds draining historically deforested portions of the watershed have thus experienced significant changes in land cover and land use that are still contributing to channel adjustments. Preliminary research has indicated that “urban” land use conversions approaching 10% of a subwatershed can be sufficient to be reflected in stream dynamics (Booth and Jackson 1997), and agricultural land use (cropland in particular, as opposed to hay and pasture) can strongly affect hydrology as well (Schilling and Wolter 2005). In the Stevens River basin all assessed subwatersheds have only low levels of cropland use, but the 10% “urban” use threshold is exceeded in the subwatershed for reach T1.03, which includes portions of East Peacham village and the Willow Brook drainage coming from Peacham village (Fig. 16).

Historical clearing initially contributed to higher runoff of both water and sediment (USDA-FS 2001). While this situation tended to diminish with reforestation, continued factors contributing to hydrologic changes in the Stevens River watershed are notable in two particular areas: flow regulation road density.

At least thirteen mills were located in the watershed historically (Copans 2008) and flow regulation included water storage and release for mill use that contributed to “pulse” flows. The combination of an intermittent increase in stream power and “sediment starving” at the dams (Fig. 13) has likely contributed to “hungry water”, a phenomenon that helps explain a significant degree of channel incision (also referred to as downcutting or degradation of the channel). These factors serve to increase stream power downstream of dams, which has likely contributed to some of the historic downcutting that has occurred on 15 of 19 reaches (27 of 36 segments) assessed in Phase 2. In all but 3 of these cases, this has meant a reduction in floodplain access rather than a full loss of access to historical floodplains.

A relatively high density of roads in the watershed helped alter the rainfall-runoff regime to make the watershed’s hydrologic regime more “flashy”. Road density is a significant contribution to the “urban” land uses noted. With the advent of heavy equipment, it has also become cost-effective to expand road ditching rather than have to continually repair roads from the damages of heavy frost heaving and washouts. Expanded ditching further amplifies the “flashy” nature of the basin by increasing the rate and intensity of water flowing to the streams. Careful attention to directing these surface water inputs to well vegetated surfaces can help mitigate the effects of direct surface water inputs to streams, but in many instances it is difficult to reduce the amount of water that is now entering these streams without percolating through soil first.

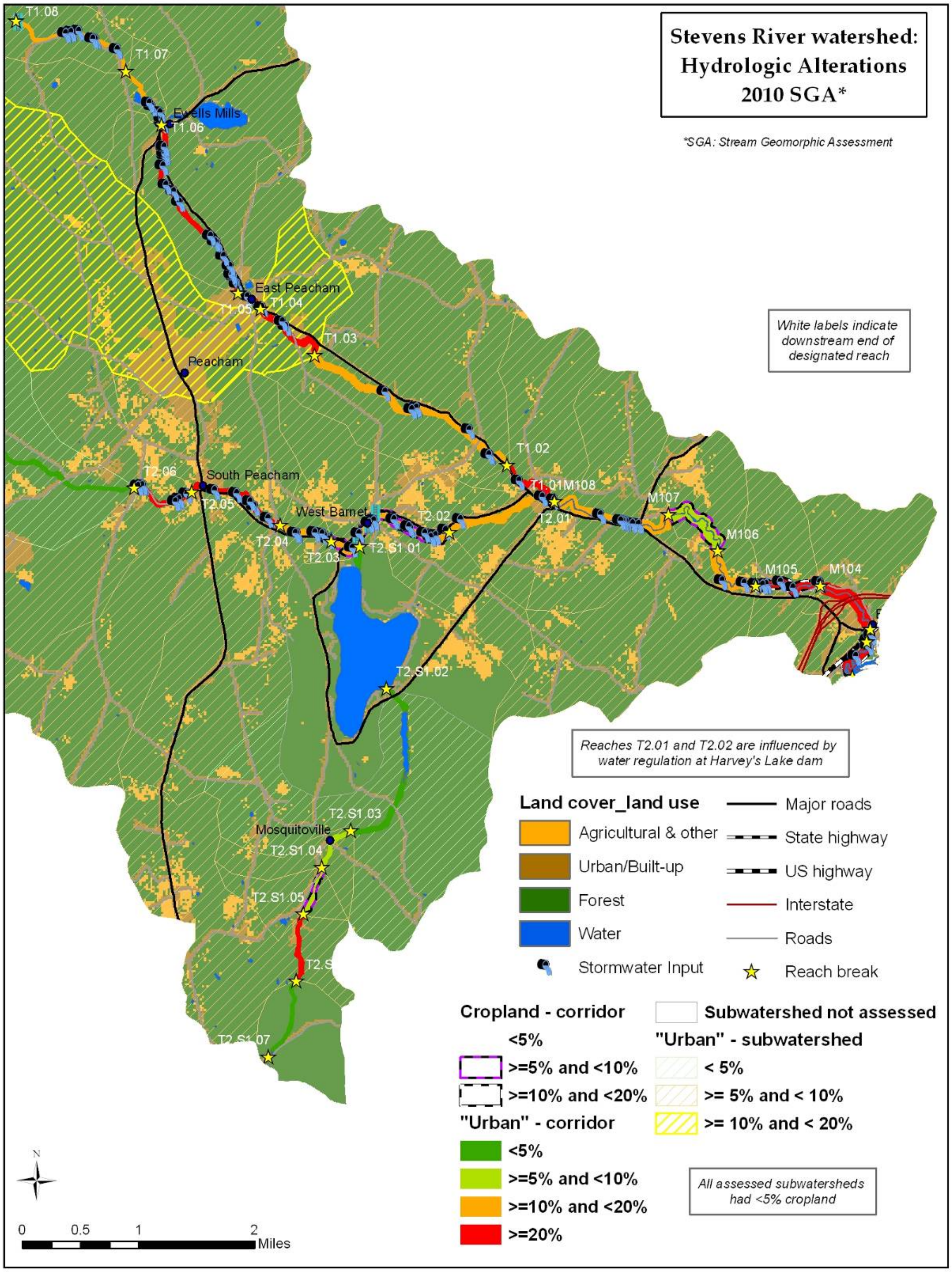

Figure 16. Hydrologic alterations map for the Stevens River watershed.

Developed ("urban") land uses along the streams exceed 20% of the corridor land use in all of the village areas in the Stevens River basin, as well as reach T1.01 near the confluence of the mainstem with South Peacham and Peacham Hollow Brooks (junction of Peacham-Barnet and East Peacham roads; Fig. 16). All other reaches assessed in Phase 2 exceed at least 10% “urban” corridor land use except reach M1.05 (near Patenaude Rd. and Karme Cho-ling). The impacts of these developed land uses are frequently amplified by direct stormwater inputs to streams along these reaches, and the cumulative impacts may be surprising in an area that appears to be relatively rural at first glance.

While reach M1.05 is the only reach that does not exceed 10% “urban” corridor land use, it is the only reach in the Stevens basin that exceeds 10% corridor cropland use according to the 1990s landuse analysis used in Phase 1 assessment. Most of the land in M1.05 appears to be in hay and pasture in the early 21^{st} century (field observations) so corridor cropland use appears to currently be greater in reaches T2.02 and T2.03 on South Peacham Brook around West Barnet where it falls into the 5-10% of corridor land use class.

It should also be noted that mill use of these streams often entailed removal of large woody debris from stream channels to prevent damage to infrastructure. Large woody debris can be an important component of stream power diffusion, pool formation, and fine sediment retention, and frequently plays a large role in smaller headwater streams in particular (USDA-FS 2001). Beyond the role large woody debris plays in enhancing physical stability of the channel, it also is an important habitat feature utilized as cover for many stream dwelling fish and invertebrates.

5.1.2 Sediment regime stressors

The following description of issues related to the sediment regime is taken from the most current version of the VT ANR River Corridor Planning Guide (VT ANR 2008):

> The sediment regime may be defined as the quantity, size, transport, sorting, and distribution of sediments. Sediment erosion and deposition patterns, unique to the equilibrium conditions of a stream reach, create habitat. Generally, these patterns provide for relatively stable bed forms and bank conditions…
>
> ….During high flows, when sediment transport typically takes place, small sediments become suspended in the water column. These wash load materials are easily transported and typically deposit under the lowest velocity conditions, which exist on floodplains and the inside of meander bendways at the recession of a flood. When these features are missing or disconnected from the active channel, wash load materials may stay in transport until the low velocity conditions are encountered….This … unequal distribution of fine sediment has a profound effect on aquatic plant and animal life. Fine-grained wash load materials typically have the highest concentrations of organic material and nutrients.
>
> Bed load is comprised of larger sediments, which move and roll along the bed of the stream during floods…. The fact that it takes greater energy or stream power to move different sized sediment particles results in the differential transport and sorting of bed materials….When these patterns are disrupted, there are direct impacts to existing aquatic habitat, and the lack of equal distribution and sorting may result in abrupt changes in depth and slope leading to vertical instability, channel evolution processes, and a host of undesirable erosion hazard and water quality impacts.

At a watershed scale, the Stevens River basin does not appear to be a particularly high bed or wash load system at the current point in time. Sediment loads sufficient to split channel flows ("braiding") found in reaches M1.07, T2.01 and T2.05 appeared to be "slugs" of sediment discharged in releases that were then followed by insufficient flows to redistribute the sediments to date (Fig. 16). In reach M1.07 this likely occurred after the Ben's Mill dam was breached around 1990, and in reach T2.05 there was evidence of recent flash flooding (2010) contributing to these depositional features. Reach T2.01 is located downstream of the Harvey's Lake dam, and it is conceivable that "pulse" flows related to the seasonal store and release regime connected with flow regulation at the dam contributes to the formation of these features.

Depositional features were distributed throughout the reaches included in Phase 2 assessments, with high levels of depositional features (>5 features/mi.) noted on all 19 reaches (34 of 36 segments). Most of these depositional features were not large, however, and indications of well-formed, relatively stable pools and bed features were generally lacking in the assessed reaches. Rapid Habitat assessments rated Good on only 6 of 36 segments (and no reaches scored in the highest Reference category), partly due to the lack of such stable or well-formed features. On the other hand, only one segment rated Poor in the Rapid Habitat assessments, and weak riffle and step formation meant that few stretches of plane bed streams were observed in the watershed.

Plane bed stretches that did occur in the watershed appeared to be related to disruptions to the sediment regime, including aggrading sediments above the dams at Barnet Falls dam (hydroelectric) at the base of reach M1.03 and the Harvey's Lake dam (actually located on South Peacham Brook reach T2.02); windrowing (placing sediments from the bed along the banks) in M1.03 (interstate I-91 construction), M1.07 (replacement of Barnet Ctr. Rd. bridge) and T2.03 (repeated windrowing historically on a likely alluvial fan); and small scale gravel removals in reach T.105. In addition, segments T2.02B on South Peacham Brook (which appeared almost entirely ditched) and T2.02-C above the Harvey's Lake dam were noted for nearly continuous pools located along most of their extent.

At a watershed scale, the Stevens River basin is notable in its retention of fine-grained wash load sediments intermittently throughout the watershed, with major sediment loading occurring historically at the Ben's Mill dam in M1.07 and an apparent old mill site in reach T2.02, as well as currently at the Harvey's Lake dam in reach T.2.02 and the Barnet Falls dam in M1.03. In addition to these human-constructed dams, similar sediment loading has occurred at beaver dams in reaches T1.06, T1.05, T1.02 (see sec. 5.1.3b); at an alluvial fan in reach T2.03, and in reach T1.03 downstream of the confluence with Willow Brook.

Wash-load sediments are being generated in the Stevens River basin primarily in flash-flood events in higher elevations of the watershed; only two segments (T2.03-B upstream of Harvey's Lake dam and M1.05 on the Stevens River mainstem) indicated erosion levels on >20% of the streambanks in the segment.

Mass failures and gullies, triggered primarily in flash flooding in the Stevens River basin, generate both wash-load and bed-load sediments and were generally not extensive. These occurred most prominently in reaches M1.04, T1.02, T2.04 and T2.05. A mass failure that is healing over was noted on reach M1.07 at a distance of several hundred feet back from the current stream location, indicating the strength of stream impacts when the Ben's Mill dam breached.

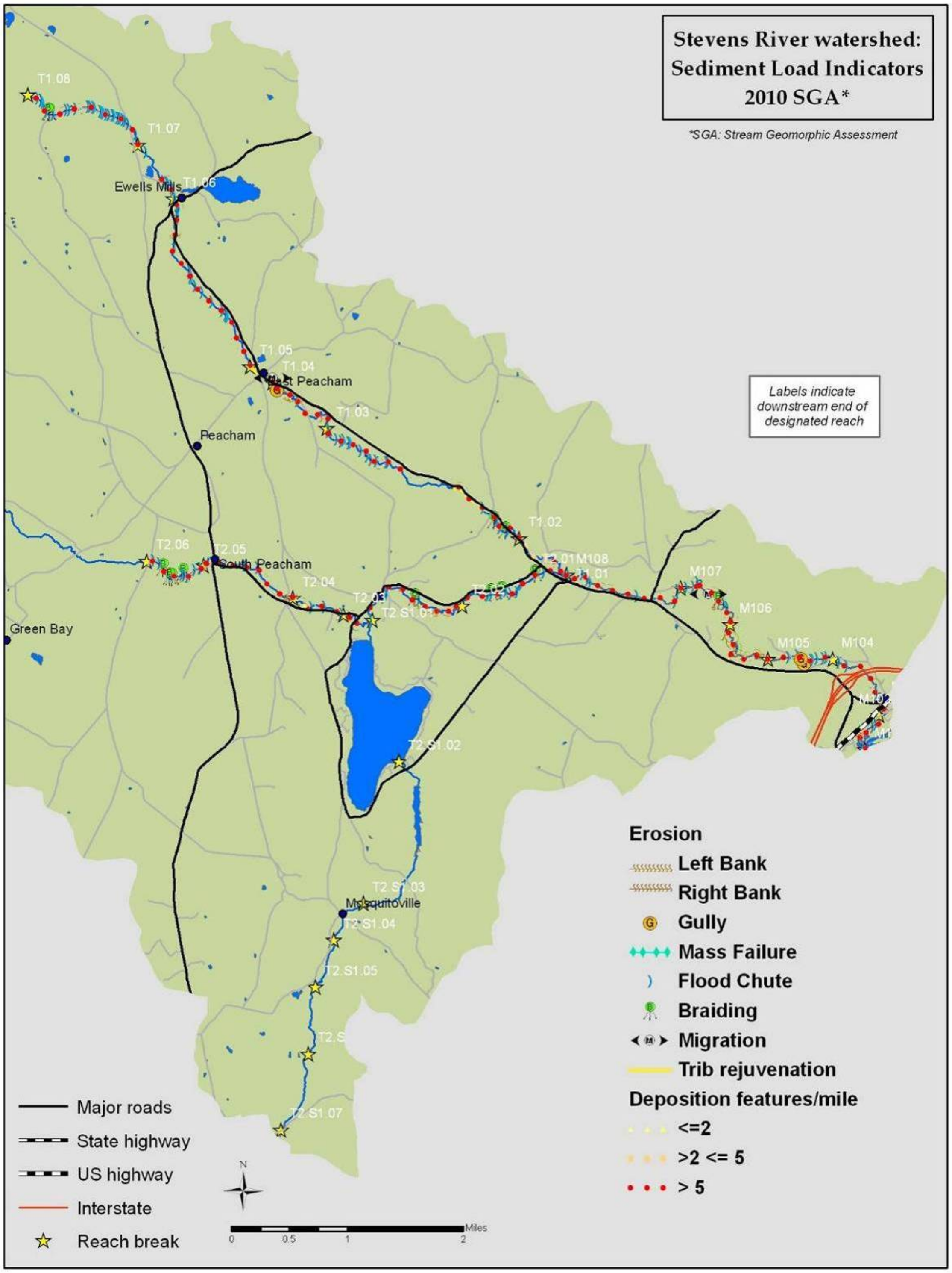

Figure 17. Sediment load indicators map for the Stevens River watershed.

The hydrologic and sediment load watershed-scale stressors described above form a hierarchical pretext for understanding the timing and degree to which reach-scale modifications are contributing to field-observed channel adjustments (VT ANR 2007). Modifications to the valley, floodplain, and channel, as well as boundary (bank and bed) conditions, can change the hydraulic geometry, and thus change the way sediment is transported, sorted, and distributed (Table 5). Phase 1 and Phase 2 assessments provide semi-quantitative datasets for examining stressors and their effects on sediment regime when channel hydraulic geometry is modified.

Table 5. Reach level stressors: relationship of energy grade and boundary conditions in sediment transport regime (VT-RMP-RCPG 2007).

		Sediment Transport Increases	**Sediment Transport Decreases**
	Stream power as a function of:	**Stressors that lead to an increase in power**	**Stressors that lead to a decrease in power**
Energy Grade	**Slope**	• Channel straightening, • River corridor encroachments, • Localized reduction of sediment supply below grade controls or channel constrictions	• Upstream of dams, weirs, • Upstream of channel/floodplain constrictions, such as bridges and culverts
	Depth	• Dredging and berming, • Localized flow increases below stormwater and other outfalls	• Gravel mining, bar scalping, • Localized increases of sediment supply occurring at confluences and backwater areas
Boundary Conditions	**Resistance to power by the:**	**Stressors that lead to a decrease in resistance**	**Stressors that lead to an increase in resistance**
	Channel bed	Snagging, dredging, windrowing	Grade controls and bed armoring
	Stream bank and riparian	Removal of bank and riparian vegetation (influences sediment supply more directly than transport processes)	Bank armoring (influences sediment supply more directly than transport processes)

Channel Slope and Depth Modifier Maps (Sections 5.1.2 and b, respectively) can be used to determine whether stream power has been significantly increased or decreased. A Channel Boundary and Riparian Modifiers Map (Section 5.1.2c) can help explain whether the resistance to stream power has been increased or decreased.

5.1.2a Channel slope modifiers

Analysis of channel slope modifiers in the Stevens River watershed indicates that channel straightening is the predominant stressor in the basin, with indications of straightening observed in at least some portion of every reach and segment assessed in Phase 2 (Fig. 18). Channel straightening occurred historically through direct channel manipulation to supply mills on each of the assessed streams and possibly some of the other smaller tributaries of the watershed as well. In addition, straightening has occurred through a

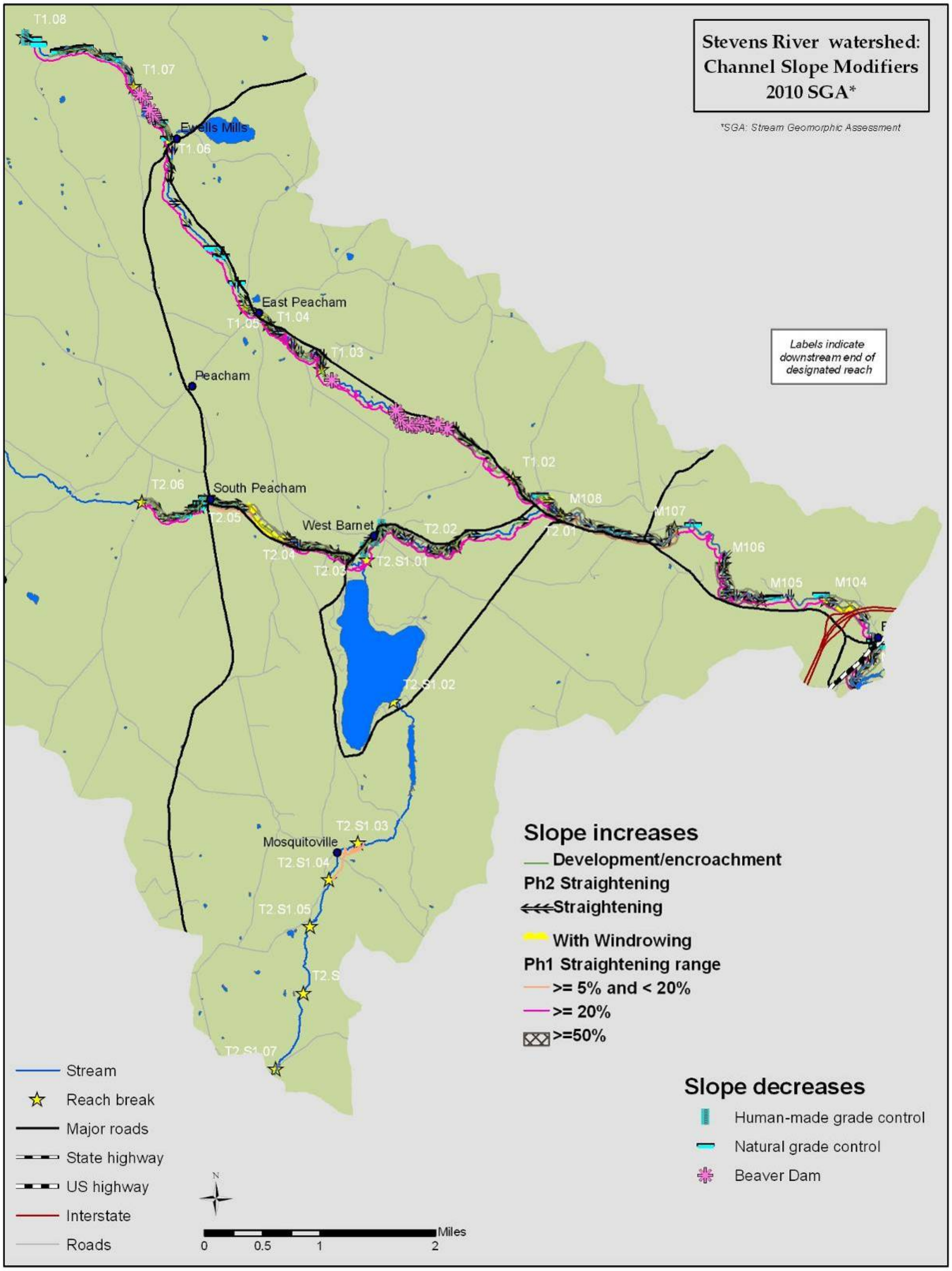

Figure 18. Channel slope modifiers map for the Stevens River watershed.

combination of incremental impacts including: road and development encroachments; structural measures such as riprap and bank toe stabilization; less direct maintenance of the channel "in its place" through field cultivation and ditching; and remediation of flood damage through windrowing of stream sediments, removal of debris jams, and channel "clean-outs" in the areas of bridges and culverts damaged in floods and subsequently repaired or replaced.

Channel straightening can heighten stream power when slope increases occur as a stream loses its meanders (similar to putting a driveway straight up a steep slope rather than installing switchbacks). In areas with erodible bed materials, elevated stream power may contribute to bed downcutting (channel incision) that further enhances stream power and sediment transport capacity as a result of the increased slope and depth at flood stage. Although not extensive in the Stevens River watershed, intermittent ledge and bedrock outcrops and grade controls (Fig. 18) have helped limit the vertical extent of stream bed downcutting in the watershed overall. Although 15 of 19 reaches assessed in Phase 2 showed some indications of historical incision, only 3 segments indicated complete loss of access to historic floodplains.

Slope increases also appear to be limited by widespread low slope gradients in the Stevens watershed as a whole. Extensive beaver activity was noted in reach T1.02 and to a lesser extent in T.106, and field observations indicated there are likely beaver impacts on a number of tributaries as well. Beaver activity often amplifies slope decreases in these low gradient areas through dam building and meander development along flooded side channels. Meander development decreases slope (and stream power) when the stream moves across slope gradients rather than dropping more directly. Channel straightening and development/encroachment in these areas thus negatively impacts an important mechanism for diffusion of stream power and sediment storage. It should be noted that much of the historical incision (downcutting) within the Stevens River watershed likely occurred during the 19th century, a period when beavers were virtually extirpated in the state (Thompson and Sorenson 2000, p. 241).

5.1.2b Channel depth modifiers

In addition to the hydrologic alterations related to road density in the Stevens River watershed, with an increase in impervious surfaces causing more water to be delivered to streams more quickly, stream power is further increased by road encroachments. Although there are instances where roads are at the same grade as the surrounding terrain, elevated roads within the river corridor increase the depth of flood flows and thus also increase stream power.

Phase 1 and 2 data collection indicate road encroachments exceeding 20% of the length of the stream segment on 26 of 36 segments (in 17 of 19 reaches assessed in Phase 2) in the Stevens basin. An additional 6 segments have encroachments along 5-20% of the segment length, leaving just 4 segments in 4 reaches without significant road encroachments in the stream corridor. Stormwater inputs such as road and field ditches can amplify these effects as well (Fig. 18). Flash flooding impacts in May 2011 clarified possible implications of this, as road gullying and erosion were prominent in numerous areas along streams (Fig. 15).

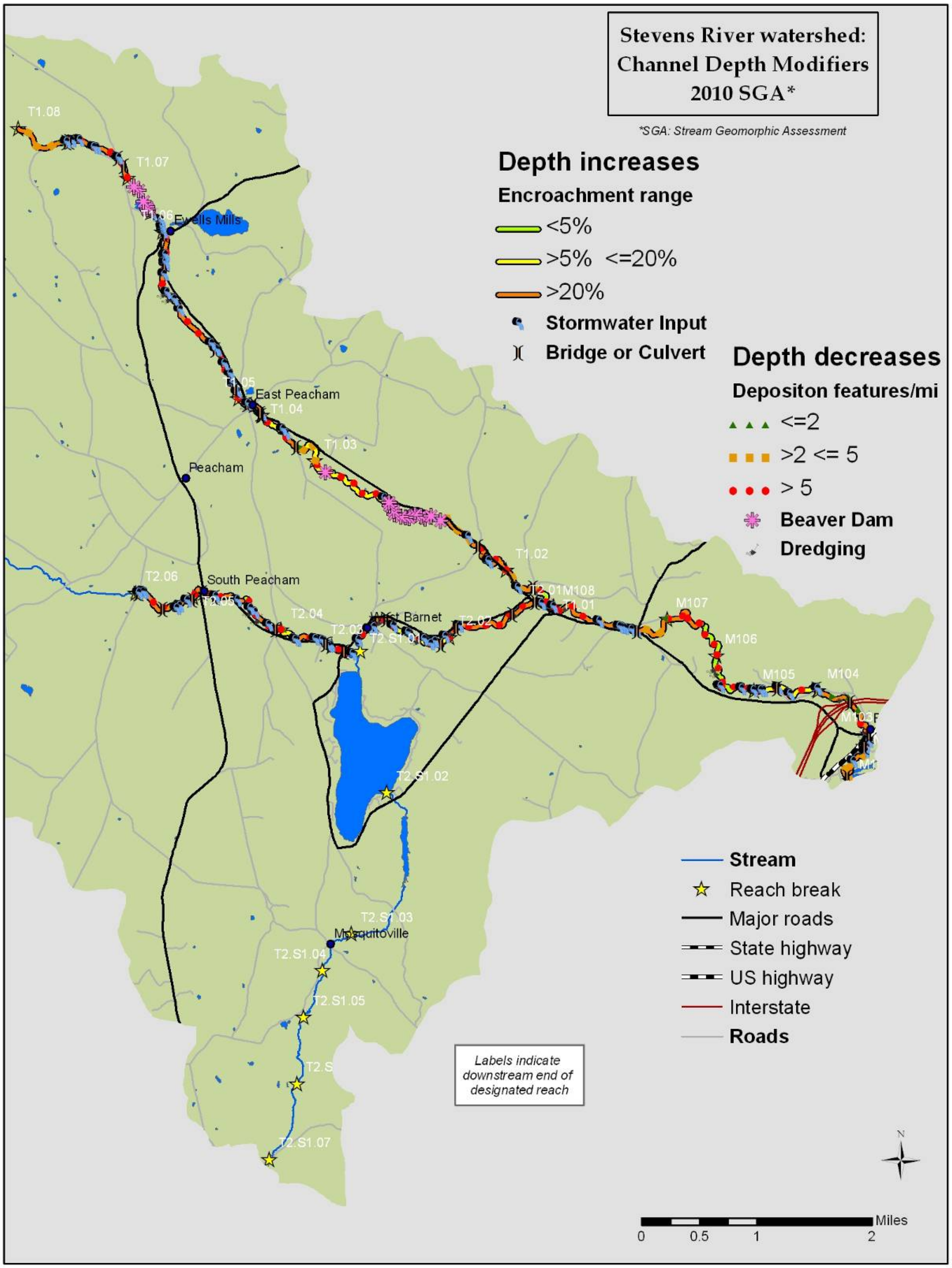

Figure 19. Channel depth modifiers map for the Stevens River watershed.

Depth increases were also notable in reach T2.02 near the Harvey's Lake dam. Segment T2.02B at the Choate farm downstream of the dam and segment T2.02C, including the dam and continuing upstream to the Harvey Mountain Road were nearly continuous pools. Both of these segments were dominated by alluvial soils, and though the continuous pools made them appear ditched there was little evidence of dredged material along the banks. There appeared to be a former mill/dam site upstream of the Choate farm as well, and it is likely that these continuous pools have actually been cut through aggraded sediments associated with these dams.

Depth decreases in the Stevens River watershed were generally denoted by increased deposition occurring in: a) widened (or actively widening) portions of the stream and b) upstream of constrictions, which are primarily human constructions in the Stevens basin (not many bedrock constrictions were observed). Notable areas in the first regard include the decreases in stream power and attendant deposition associated with small scale gravel removals in reach T1.05, where subsequent deposition seems to quickly accrue in the areas widened by the gravel removal (Fig.20).

Figure 20. Small-scale gravel removals in reach T1.05 (gravel stockpiled in background) are quickly followed by further gravel aggradation when stream power is reduced as it flows through the widened channel in this section, dropping sediments as it loses power. Areas downstream may lack coarse sediments to rebuild stable stream features until the water and sediment loads come back into balance.

An alluvial fan in the mid- and upstream portion of reach T2.04 (upstream end of the Roy fields approaching Mill Trace in South Peacham) has accrued significant deposition, including very large stone, over a long period of time. This area has had much of the stone removed from the stream and placed along the banks, to the extent that field assessments questioned whether there were old bridge abutments in the field area (nothing appears on old maps to corroborate this). The top of the reach near Mill Trace and up to South Peacham hosted a number of mills and stream-powered businesses in a very small stretch historically (Beers Atlas 1875). Augmented by bedrock grade controls and channeled by road encroachments and stone removed from the stream and placed along the banks over time, the flash flood of May 26, 2011 dumped significant amounts of sediment into the Roy fields from South Peacham to Hollow Woods Road (Fig. 6). This dynamic reflects the interplay of depth increases (road encroachments) and depth decreases (aggradation over which the floodwaters rose to access the floodplain) and exemplifies the highly dynamic nature of alluvial fans, warranting large amounts of room to accommodate these processes or significant impacts if the processes are not accommodated without conflicts.

Beaver dams spaced intermittently in the Stevens River basin also reflect interplay of depth increases and decreases. In general, these dams aggrade with sediment deposition behind the dams, slowing flows and dispersing floodwaters onto adjoining floodplains as well as diffusing stream power via the multiple debris jams present. The dams observed in reach T1.02, however, had a deep channel incised through the sediments along the main channel, and sufficient water has been present in a series of wet summers to increase depths sufficiently to inundate large portions of adjoing cedar forest, causing significant mortality that is visible in comparisons of 1990s and late 2000s aerial imagery.

While the analysis here thus attempts to portray general trends in contributions these various features contribute to stream dynamics, the specific features are decidedly reach-scale, rather than watershed-scale stressors. Primary stressors in each reach are noted in sec. 6 for Project Identification.

5.1.2c Boundary condition and riparian modifiers

Stream boundaries include bed and banks, and are strongly affected by the underlying geology and the state of buffer vegetation in the riparian corridor. Root systems from woody vegetation (and, to a lesser extent, herbaceous vegetation) help bind stream bank soils and diffuse stream power.

Coarse bed substrates were present in at least part of every reach assessed in Phase 2 except for reach M1.01 near the confluence with the Connecticut River. In addition to M1.01, segments lacking coarse substrates included M1.03A (behind Barnet Falls dam); T2.02C (behind Harvey's Lake dam); T1.02C (beaver-controlled); T1.06C (beaver-controlled and the site of an old mill dam); and T1.07C (including a small cedar swamp and a headwaters seepage swamp with a portion recently converted to a pond).

Cohesive banks were noted in just one of the 36 segments assessed in Phase 2, segment T1.06A upstream of Ewells Mills village and downstream of an old dam site at Still Run. Given that fact, it is mildly surprising that high levels of erosion were noted on just two reaches in the Phase 2 assessment, M1.05 and T2.03A (Fig. 21). Three more segments (M1.03A above the Barnet Falls dam, T1.03C around the wildlife sanctuary just downstream of East Peacham village and the Willow Brook confluence, and T1.07B off Slack St) had moderate levels of erosion (5-20% of the segment length) on both banks. An additional 10 segments, fairly evenly distributed throughout the extent of the reaches assessed in Phase 2, had moderate levels of erosion one bank or the other.

The relatively low levels of erosion noted in Phase 2 are likely due in part to the fact that historic floodplains remain at least partially accessible on most reaches, and low gradient slopes and beaver-dominated reaches are interspersed in central portions of the watershed so that stream power is dissipated intermittently in flood events. In assessing these levels of erosion, however, it is also important to look at levels of bank revetments and armoring.

Although bank armoring represents temporarily increased boundary resistance, it requires maintenance and usually indicates where banks are prone to failure or erosion if not armored. In addition, bank armoring frequently represents a hindering of channel evolution processes and a transfer of impacts (notably elevated stream power) to areas further downstream. Phase 2 assessments in the Stevens River watershed indicated

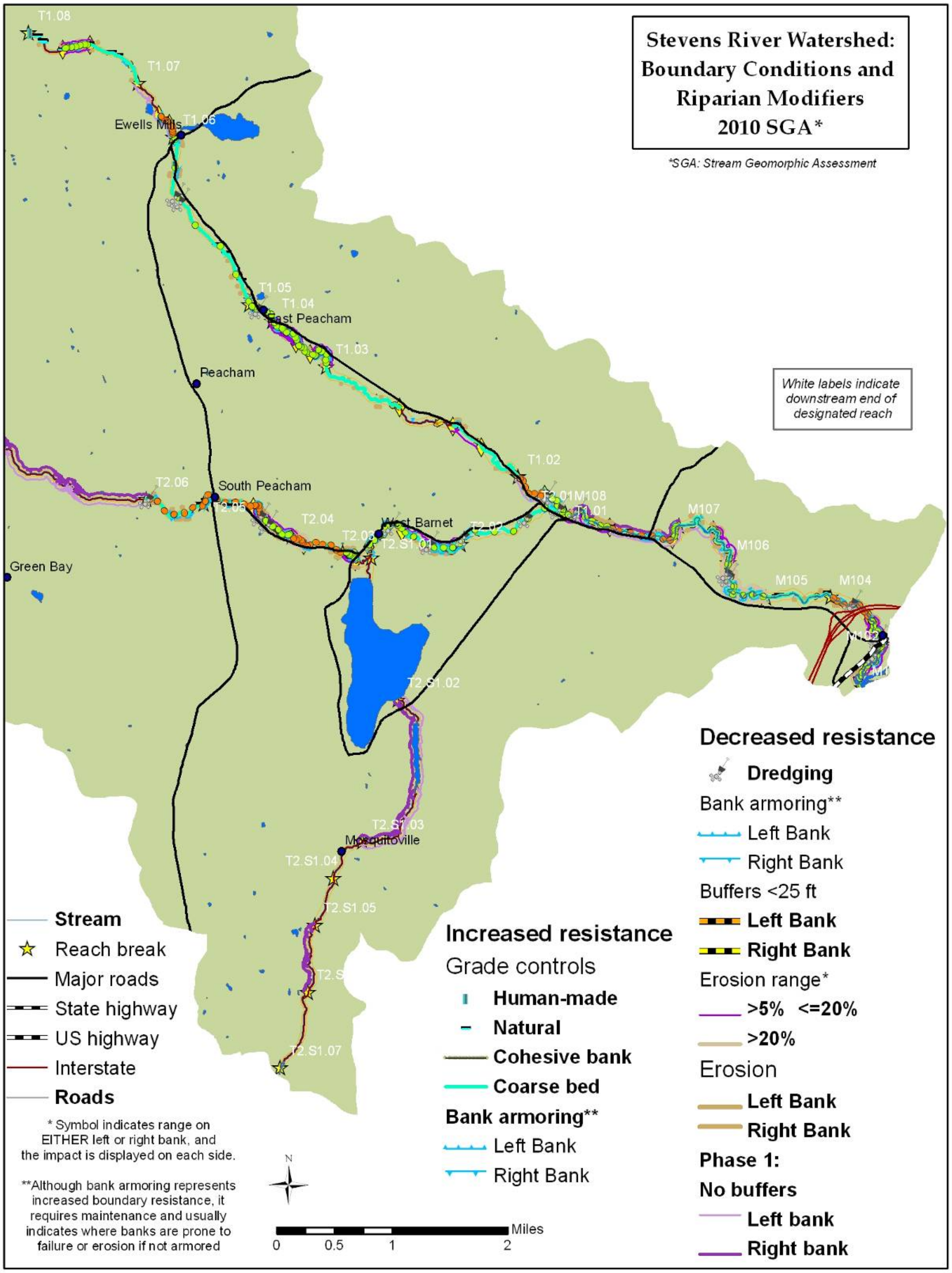

Figure 21. Boundary Conditions and Riparian modifiers map for the Stevens River watershed.

two segments with >20% of the segment length armored on both banks: T1.03B beneath the 30-ft embankments of Interstate-91, and T2.04B on the likely alluvial fan downstream of South Peacham village at the edge of the Roy fields (see discussion in sec. 5.1.3b). Fifteen additional segments had one bank or the other heavily armored (>20% of the segment length). This brings the total to 17 out of 36 – nearly half of the segments assessed in Phase 2 heavily armored. An additional 24 of 36 segments had moderate levels of bank armoring and revetments (5-20%) on at least one bank. These armored reaches are dispersed throughout the reaches assessed in 2010.

It thus appears that relatively low levels of erosion may be somewhat deceptive at first glance, and that bank armoring is quite extensive in assessed portions of the Stevens basin. It should be noted that much of the riprap and bank-toe stabilization has been in place for a long period of time, and in many areas is beginning to fail. If failure is significant these areas are generally included with erosion documented in Phase 2, but smaller areas or areas that are just beginning to fail may not be noted. In addition there have been frequent intense storms throughout Vermont in the last several years, including August 2010 and May 2011 storms in the Stevens River basin, that amplify channel adjustments including erosion. Continued maintenance of armoring in these areas is likely to be increasingly expensive to maintain and will impede channel evolution in areas where it is maintained, transferring impacts in such storms to areas further downstream.

Wooded buffers along the streams are good in many areas, but are lacking a width of 25 feet in at least a portion of all but one segment assessed in phase 2. Dominant buffer widths of <25 ft on at least one bank exist on 9 segments in 6 reaches, and subdominant buffer widths of <25 ft were subdominant on either bank in an additional 12 segments in 10 reaches. Some of these areas are due to road encroachments that present difficult planting conditions or conflicts with maintenance of infrastructure, but establishing and maintaining good wooded buffers generally can help slow the intensity and rate of water entering the stream, stabilize stream banks, physically diffuse stream power in high flows, and reduce maintenance costs or needs for armoring and similar practices. Large woody debris located in the stream channel originating from wooded buffers can also help retain fine sediments within the watershed, and were playing a notable role in doing this in portions of reaches T1.02, T1.05 and T.107 on Peacham Hollow Brook as well as T2.01, T2.04 and T2.05 on South Peacham Brook.

5.1.3 Sediment regime departure, constraints to sediment transport, and attenuation

Within a reach, the principals 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 in the balance of these forces and lead to an uneven distribution of power and sediment (Fig. 22). Whether a project works with or against the physical processes at play in a watershed is primarily determined by examining the source, volumes, and attenuation of flood flows and sediment loads from one reach to the next within the stream network. If increasing 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 (VT-RMP RCPG 2010).

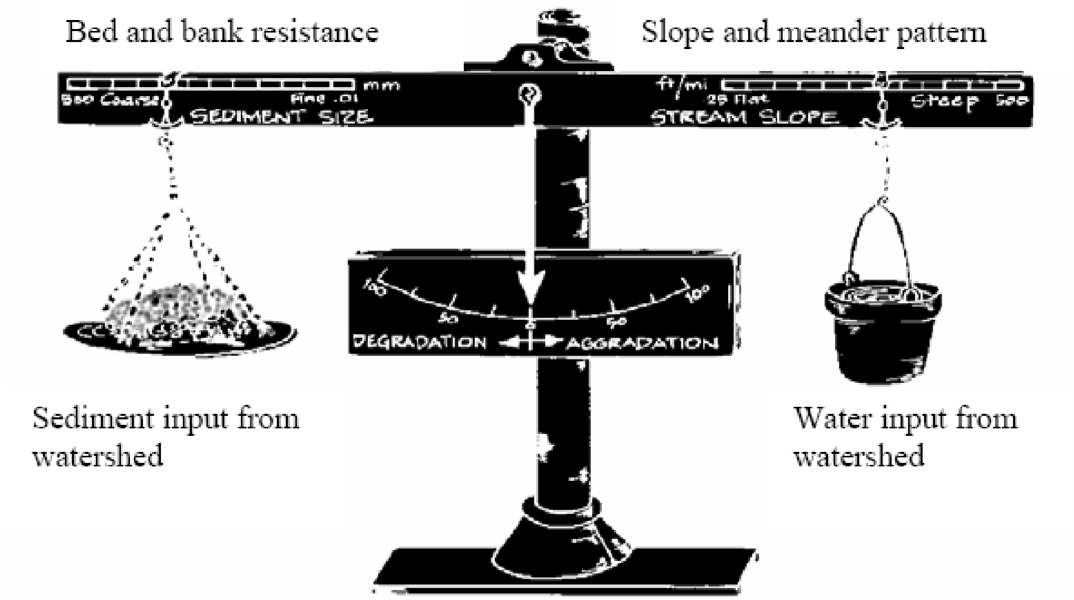

Figure 22. The channel balance indicates how changes in watershed inputs influence channel adjustment processes (Lane 1955).

When stream power and sediment are relatively balanced, the streams located in narrower valleys on steeper gradients in a watershed (primarily A- and some B-type streams) tend to exhibit a "Transport" sediment regime, contributing minor amounts of various sized sediments to downstream reaches but not storing many sediments. Streams in wider valleys with lower slope gradients (primarily C- and E- type streams) provide for sediment storage in a dynamic balance with water moving through the system (in = out: i.e., stream power, which is produced as a result of channel gradient and hydraulic radius, is balanced by the sediment load, sediment size, and channel boundary resistance). Under reference conditions, these streams would provide for coarse particle equilibrium and fine sediment deposition at annual flood flows, largely on the floodplains and at bendways and meanders (Coarse Equilibrium and Fine Deposition sediment regime, Table 6; VT-RMP RCPG 2010, p.43).

Sediment Regime	Narrative Description
Transport	Steeper bedrock and boulder/cobble cascade and step-pool stream types; typically in more confined valleys, do not supply appreciable quantities of sediments to downstream reaches on an annual basis; little or no mass wasting; storage of fine sediment is negligible due to high transport capacity derived from both the high gradient and/or natural entrenchment of the channel.
Coarse Equilibrium (in = out) & Fine Deposition	Sand, gravel, or cobble streams with equilibrium bed forms; at least one side of the channel is unconfined by valley walls; these streams transport and deposit coarse sediment in equilibrium (stream power—produce as a result of channel gradient and hydraulic radius—is balanced by the sediment load, sediment size, and channel boundary resistance); and store a relatively large volume of fine sediment due to the access of high frequency (annual) floods to the floodplain. Look for unconfined streams, which are not incised or entrenched, have boundary resistance (woody buffers), minimal bank erosion, and vegetated bars. These streams are Stage I, late Stage IV, and Stage V.

Figure 23. Pertinent characteristics for Phase 1 classification of reference sediment regimes on Stevens River watershed reaches.

Based primarily on valley slope and confinement, Phase 1 assessments in the Stevens River watershed classified just 4 of 24 reaches with Transport sediment regimes under reference conditions (Fig. 23). Reach M1.02, the short portion of stream including Barnet Falls, was the only Transport reach in the lower elevations of the watershed; T2S1.03 and T2S1.04 are on Jewett Brook upstream of Harvey's Lake, and T2.06 is on South Peacham Brook upstream of South Peacham village.

The remaining 20 reaches assessed in Phase 1 would be expected to have Coarse Equilibirium and Fine Deposition (CEFD) sediment regimes under reference conditions.

Sediment regime departure

Phase 2 sediment regimes (which help identify current departures from reference conditions) are determined based on a number of parameters measured in rapid field assessments (Fig. VT-RMP RCPG 2010, p. 44). These include signs of active adjustment processes indicating that streams are in a state of disequilibrium, including a likely stage of channel evolution (Fig. 24; criteria list left to right in order of relative importance).

Sediment Regime	Delimiting criteria related to sediment supply, transport, and storage	Stage of Channel Evolution Geomorphic Condition	Common Existing Stream Type	Natural Valley Type
Transport	Bedrock gorge = yes	Stage I or V Good-Ref	A1, A2, B1, B2 G1,G2, G3 F1, F2, F3	NC, SC, NW
	Incision ratio < 1.3	Stage I or V Good-Ref	A3, B3, B4	NC, SC, NW
Confined Source and Transport	Incision ratio > 1.3	Stage II-IV Fair-Good	A3, B3*	NC, SC, NW
	Incision ratio > 1.3	Stage II-IV Fair-Good	A4, A5 B4*, B5*	Any Type
Unconfined Source & Transport	Bank armor > 50% Straightening > 50% W/d < 30 Incision ratio > 1.3	Stage II - III Poor-Fair	G3, G4, G5 F3, F4, F5	NW, BD, VB
		Stage II - III Poor-Fair	E3, E4, E5 C3, C4, C5 B3c, B4c, B5c	NW, BD, VB
Fine Source & Transport and Coarse Deposition	Bank armor < 50% W/d > 30** Incision ratio > 1.3	Stage II-IV Poor-Fair	E3, E4, E5 C3, C4, C5 B3c, B4c, B5c F3, F4, F5	NW, BD, VB
	Bank armor < 50% Incision ratio > 1.3	Stage II-IV Poor-Fair	D3, D4, D5	NW, BD, VB
Coarse Equilibrium (in = out) & Fine Deposition	Incision ratio < 1.3	Stage I -V Fair-Good-Ref	D3, D4, D5	NW, BD, VB
	W/d < 30 Incision ratio < 1.3	Stage I -V Fair-Good-Ref	C2, C3, E3	NW, BD, VB
	W/d < 30 Incision ratio < 1.3	Stage I -V Fair-Good-Ref	C4, C5 E4, E5	NW, BD, VB

Figure 24. Pertinent parameters for characterizing existing sediment regime using Phase 2 data.

*B streams with the slope of a C stream, or a Bc stream type, in an unconfined valley setting (NW, BD, VB) may be classed as either "unconfined source and transport" or "fine source and transport & course deposition" depending on other delimiting criteria.

The only stream segments noted in a stable stage (I or V) of channel evolution during 2010 assessments were M1.04 on the Stevens River mainstem and T1.06A on Peacham Hollow Brook.

Once a stream has entered a state of disequilibrium, it will begin a series of channel adjustments or evolutions to fulfill the physical mandates of restoring equilibrium. Schumm (1977 and 1984) has described five stages of channel evolution for reaches where the stream has a bed and banks that are sufficiently erodible to be shaped by the stream over time ("F-model" evolution; Fig. 27). The five stages of channel evolution for F-model evolution are paraphrased from the SGA protocols (VT-RMP geoassesspro 2007, Appendix C) as follows:

I. Stable — In regime, reference to good condition. Insignificant to minimal adjustment; planform is moderately to highly sinuous.

II. Incision — Fair to poor condition, major to extreme channel degradation. High flow events are contained in the channel, and channel slope is typically increased.

III. Widening/Migration — Fair to poor condition, major to extreme widening and aggradation. (An incised, entrenched and widened channel is an "F-type stream", hence F-model evolution)

IV. Stabilizing — Fair to good condition, major reducing to minor aggradation, widening and planform adjustments

V. Stable — In regime, reference to good condition. Insignificant to minimal adjustment.

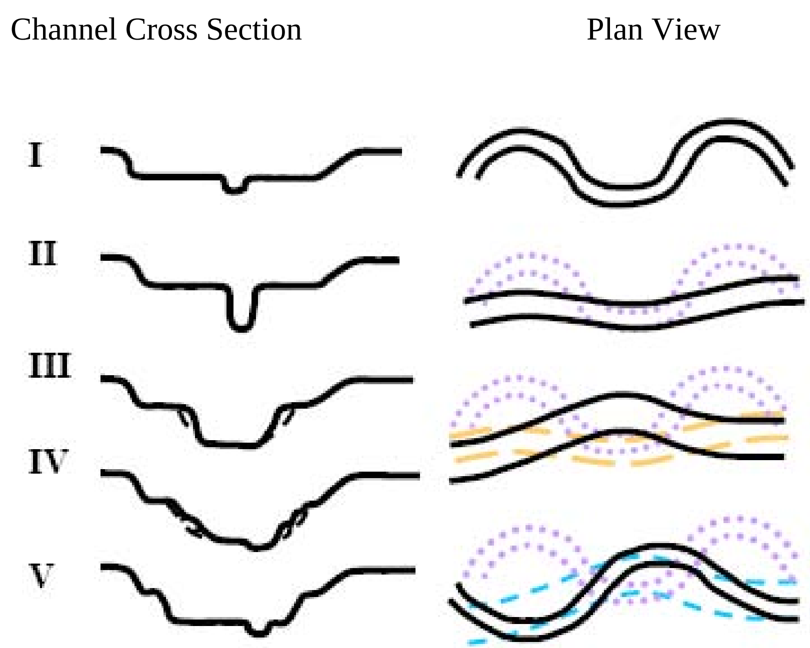

Figure 25. Channel evolution process showing channel downcutting or incision in Stage II (cross section), widening through Stages III and IV, and floodplain reestablishment in Stage V. Stages I and V represent equilibrium conditions. Plan view shows straightening and meander redevelopment that accompany cross-section changes, a primarily flood-driven process often taking place over decades (VT-RMP geoassesspro, AppendixC).

Three stream segments in the Stevens River watershed exhibited a second model of channel evolution (“D-model” evolution) that is more typical in areas where stream banks are more erodible than the bed. Under these conditions the stream does not significantly incise and instead evolves primarily through widening and/or lateral movement. The three stages for D-model channel evolution are paraphrased from the SGA protocols (VT-RMP geoassesspro 2007, Appendix C) as follows:

> **I. Stable** — in regime, reference to good condition. Insignificant to minimal adjustment; planform is moderately to highly sinuous.

Then either of the following Stage II scenarios may occur:

> **Stage IIc. Widening/Migration** — Widening and migrating laterally through bank erosion caused by increased stream power. The balance between stream power and boundary materials is re-established when the slope flattens after a process of channel lengthening and increased sinuosity.
>
> **Stage IId. Braiding** — Extreme deposition and braiding, with water flowing in multiple channels at low flow stage (“D” stream type). Channel width narrows through aggradation and the development of bar features. Main channel may shift back and forth through different channels and chute cut-offs, continuing to erode banks or terraces.

Stage III. Stable — Channel adjustment process is complete (back to a B, C or E stream type).

D-model channel evolution appears to be occurring on Peacham Hollow Brook segments T1.03C (by the Thelma and Charles White wildife sanctuary observation deck downstream of the Willow Brook confluence near East Peacham village); T1.04 (a possible alluvial fan in East Peacham village, currently heavily armored); and T1.06A (Ewells Mills Rd. just upstream of the Peacham-Groton Rd.). In T1.03C and T1.04A the banks are more erodible than the bed because of the sand dominating the banks, and in T1.06A the banks are more erodible primarily because the bed is largely bedrock-controlled.

With field-assessed measures such as bank armoring, straightening, channel incision, and stage of channel evolution accounted, Phase 2 assessment helps identify an existing sediment regime for each stream segment. Comparing reference sediment regimes (Phase 1 assessments) side by side with field-assessed existing sediment regimes (Fig. 26) gives a sense of sediment regime departure within the watershed.

Phase 2 assessments in the Stevens River watershed indicated that, in contrast to eighteen Phase 1 reaches that would function as Coarse Equilibrium and Fine Deposition (CEFD) areas under reference conditions, only thirteen (of thirty-six total) segments in eleven Phase 2 reaches currently function with CEFD sediment regimes. While this indicates greatly diminished functions for sediment, nutrient and floodwater storage within the watershed, the fact that the thirteen segments are intermittently spaced through the watershed (Fig. 26) is helpful in terms of overall stream functions and health. Visual assessment indicates, however, that the current sediment regime is out of balance in terms of an even distribution of sediment loads and bed features.

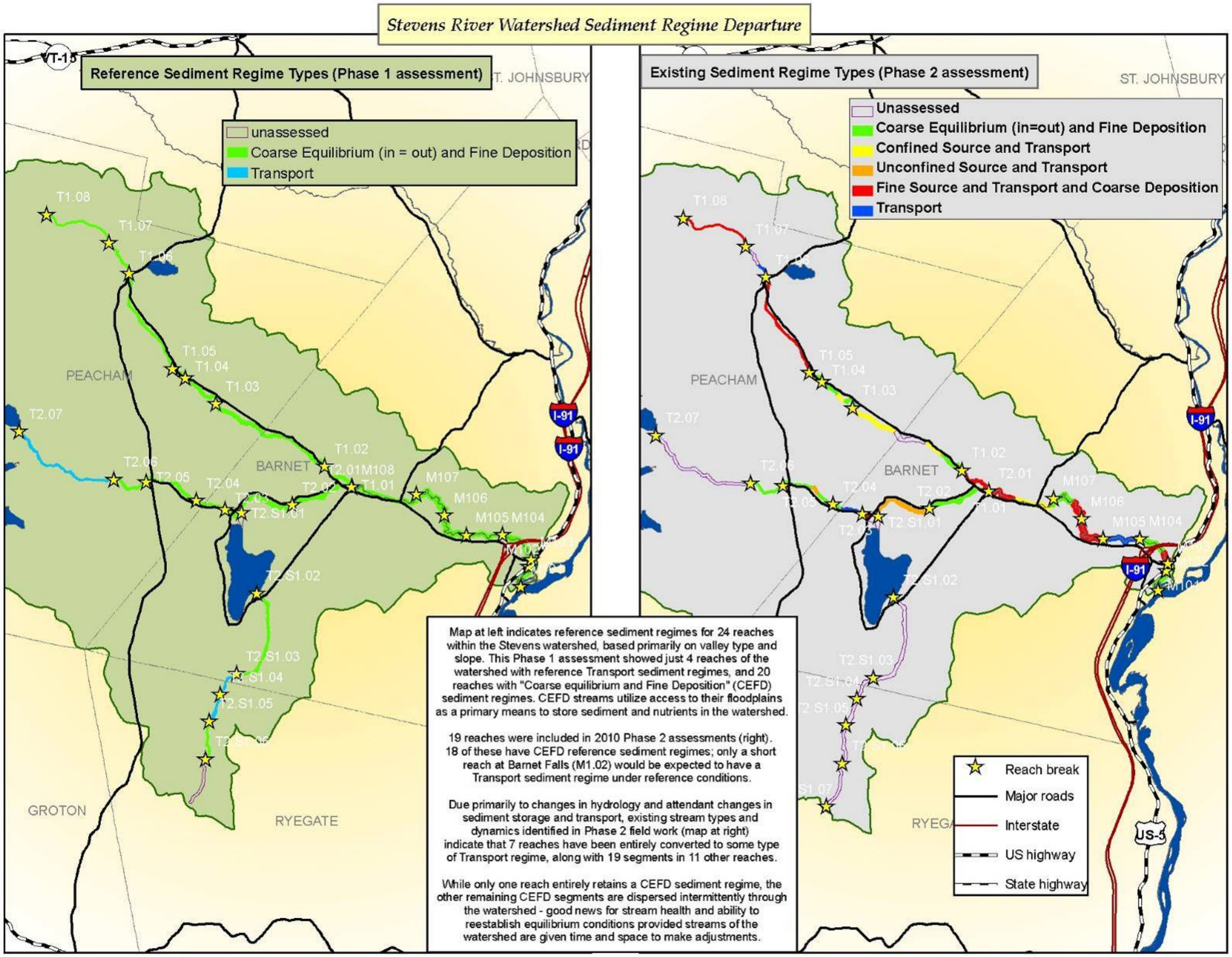

Figure 26. Sediment regime departure maps for the Stevens River watershed.

Sediment regime departure in the Stevens watershed appears to currently be primarily related to alternation of levels in stream power. Due to the significant conversion of CEFD sediment regimes to various transport sediment regimes in Phase 2 reaches, fine grained “washload” materials are often being transported long distances through the watershed, dropping out primarily when low velocity conditions are encountered and frequently contributing to infilling of planebeds (sedimented areas of the stream with no major elevations or depressions) in downstream reaches. Coarser “bedload” sediments appear to be:

- primarily moving through the stream network in sediment “slugs” discharged in flash flood events and then slowly moved through the system or incorporated into planform changes as the stream evolves in lower level, annual or bi-annual flood events (i.e., “channel-forming” or “bankfull” flows: Fig. 27);
- accruing at overwidened sections of stream or channel constrictions such as undersized bridges or culverts; or
- disrupted from setting up stable bed features by more flash flooding, gravel removal, or to “clean out” the stream above constrictions (particularly following flood events)

Figure 27. A sediment “slug” in reach M1.06B downstream of the breached former dam at Ben’s Mill currently splits flows in this widened section of the Stevens River mainstem. With this bar revegetating, this feature will likely become part of a new planform as the stream evolves.

Fine Source and Transport and Coarse Deposition regimes (coded red in Fig. 26) now exist in eleven stream segments that lack extensive bank armoring and are characterized by channel widening, elevated levels of erosion and concentrated deposition at channel constrictions, tributary mouths, and overwidened sections of the stream. Backwater areas behind the Harvey’s Lake dam (T2.02C (excluded from full assessment) and T2.02D) and Barnet Falls dam (M1.03A) have significantly aggraded with fine sediments over time, and are accruing sediment “slugs” from upstream reaches as well as their own banks. The relatively recent (~1990) breach of the Ben’s Mill dam has contributed to deposition and widening in segments M1.05, M1.06A and M1.07C on the Stevens mainstem. Similar dynamics in segments T1.01A and B and T1.05, and T1.07 A, B and C on Peacham Hollow Brook appear related to flash flooding in the past decade or two, and this current sediment regime appears related to the movement of flood-related sediment discharges through this portion of the stream network. Widespread mill history (implying historic “pulse” flows), extensive presence of transitory beaver dams, and an apparent history of flash flooding in upstream portions of the watershed have likely contributed to the dynamics on Peacham Hollow Brook.

Unconfined Source and Transport sediment regimes (coded orange in Fig. 26) currently dominate three segments: T2.02A and B and T2.04B, all on South Peacham Brook. While these areas would have floodplain access and storage under reference conditions, historic and current channel management practices leave little ability to store sediments or high flows and thus transfer impacts to downstream reaches. Segment T2.02A along the Choate fields appears to have also had a dam at the upstream end of the segment (no longer present) and the primarily sand banks are extensively lined with large stone for bank toe stabilization; some of it has failed over time and clearly requires maintenance to remain intact. Segment T2.02B is located downstream of the Harvey’s Lake dam in West Barnet village and is essentially walled in along one bank for much of the segment; check dams are in place on this segment to prevent further incision of the bed and require maintenance to fulfill that function. T2.04A is located on a likely alluvial fan just downstream of a number of historic mill and stream-powered business locations (see description in sec. 5.1.3b).

Confined Source and Transport sediment regimes (coded yellow in Fig. 26) exist in the narrower valleys of the Stevens River watershed, which are relatively limited in extent but are prone to mass failures and erosion along the valley walls that contribute sediment discharges that quickly transfer to downstream reaches due to elevated stream power in these narrower valleys. Segment M1.07B from Ben’s Mill downstream to the Barnet Center Road bridge on the Stevens River mainstem is confined by the Peacham-Barnet Rd. on the right bank (looking downstream); the opposite side evidences the impacts of the breached Ben’s Mill dam via a large mass failure healing over on the left valley wall. The narrow valley portions of reach T1.02 lie alongside the Peacham-Barnet Rd. on either side of the Peacham-Barnet town line, but are separated by a broader, beaver-controlled valley in segment T1.02C that is able to store some of the sediment discharges from upstream. T1.03B is a confined portion of Peacham Hollow Brook running alongside Stevenson Rd., and it is likely that construction of the road has combined with the features of a “pinch point” in the valley, created by glacial streams, to leave relatively steep slopes with erodible soils along the valley walls.

With flash flooding playing such a prominent role in the dynamics and sediment regime of the Stevens River basin, restricted access to historic floodplains (noted on 28 of 36 segments assessed in Phase 2) and consequent heightened stream power can play a large role in disrupting sediments from setting up stable bed features and pools. Windrowing of coarse materials (i.e., pulling or pushing them to the edges of the stream, a common response to sediment slugs following flash floods) and bank armoring are likely to curtail the rate of channel evolution and exacerbate the impacts of increased stream power on downstream reaches.

Channel adjustments due to increased flows can be difficult to remediate in downstream reaches (Booth and Jackson 1997), potentially prolonging the stages of disequilibrium in these streams and leaving them open to heightened flood impacts in future events. This places a premium on attenuation of high flows and sediment discharges in the shortest distance downstream possible, and increases the importance of:

a) protecting and maintaining floodplain access even on small streams high in the watershed, including current beaver-controlled areas;

b) limiting development and encroachments within stream corridors;

c) establishing and maintaining woody buffers in riparian corridors and

d) managing stormwater inputs to minimize direct discharges to streams.

Constraints to channel evolution

Ledge outcrops that help prevent further bed incision (thus providing limits to vertical channel evolution) are interspersed on most of the Stevens River mainstem and Peacham Hollow Brook as well as South Peacham Brook moving upstream starting in segment T2.03C, and widening and planform change dominate stream adjustment processes in these areas. Natural grade controls such as these are not as evident on South Peacham Brook downstream of the Harvey's Lake dam, and placement of check dams in reach T2.02 are an acknowledgement of the possibilities for downcutting. The possibilities for incision are amplified by the extensive bank armoring in West Barnet village, which limits the possibilities for widening and planform adjustments as an alternative response to heightened stream power. These structures require maintenance to prevent downcutting, and their presence in conjunction with the extensive bank armoring in West Barnet village means the impacts of elevated stream power are largely transferred to reach T2.01 and eventually the Stevens River mainstem.

Lateral constraints to channel evolution are more common in the Stevens River watershed, but are not commonly found as bedrock outcrops in the reaches assessed in 2010. In fact, the relatively few narrow valleys in the assessed portions of the watershed often contain erodible materials in the valley sidewalls and can easily contribute sediments from mass failures and heightened erosion when subjected to elevated stream power.

With widening and planform adjustments the dominant phase of channel evolution in the watershed, human-constructed constraints to lateral channel evolution are thus primary stressors in the Stevens River basin. Settlement patterns in the watershed have featured extensive road encroachment, with concentrated development in a number of villages situated in close proximity to the stream (Fig. 28). With few natural constraints to widening and planform adjustments, the physical mandates of stream adjustments to flash floods and other events (and changes that have amplified the impacts of these types of events - particularly straightening, encroachments and increased stormwater inputs) are likely to impact human-constructed lateral constraints. This implies escalating costs and effort to remediate conflicts with human-constructed lateral constraints already placed in stream corridors within the basin, and emphasizes the value of minimizing future conflicts by limiting introduction of new lateral constraints. It also implies that minimizing these costs and efforts regarding existing encroachments will require careful attention to protecting existing floodplain access.

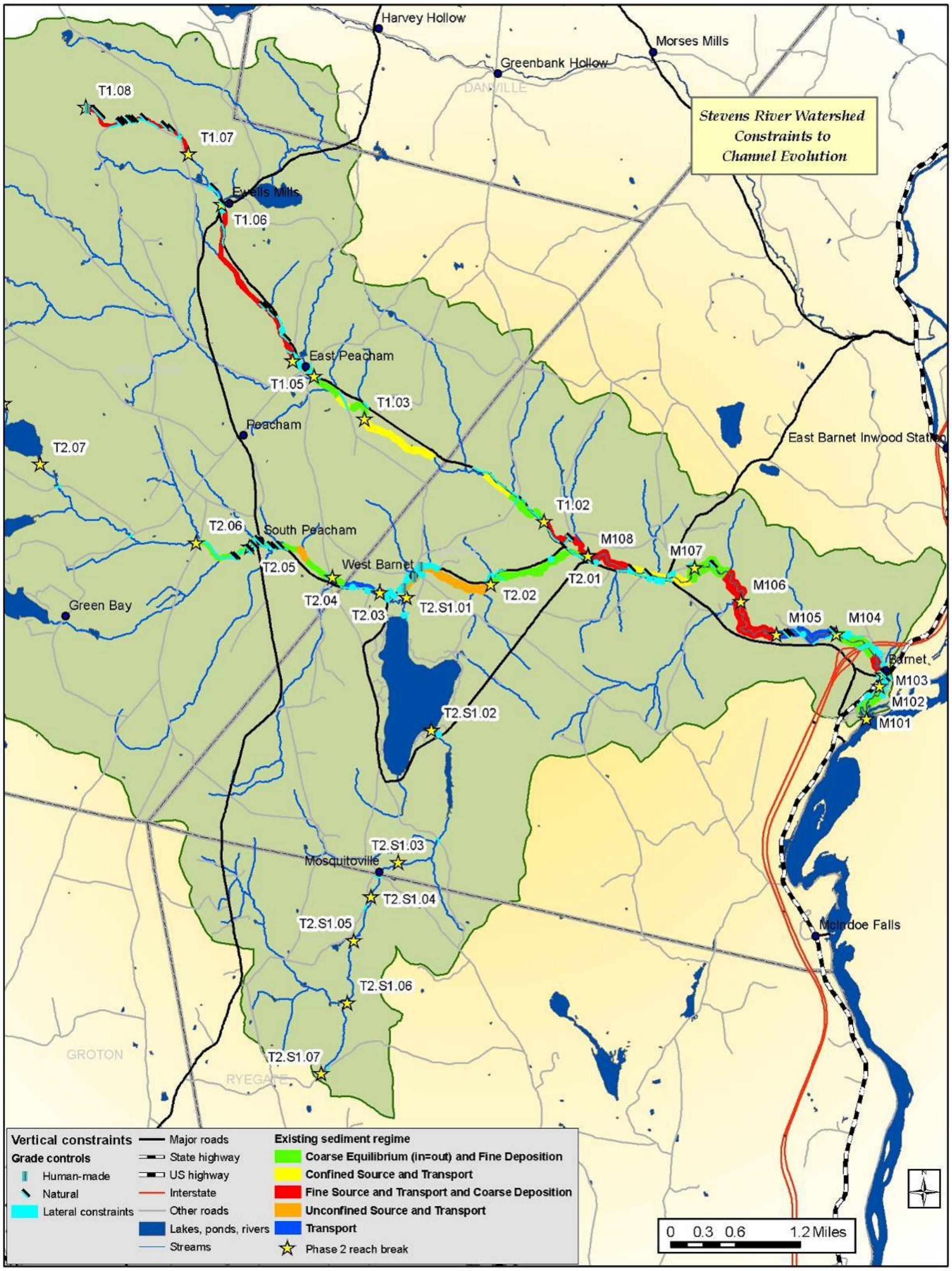

Figure 28. Map of existing sediment regime in conjunction with vertical and lateral constraints to channel evolution in the Stevens River watershed 2010 Phase 2 assessment area.

Attenuation assets

Given the significant degree of lateral constraints in the Stevens River basin, particularly frequent road encroachment (implying significant investments in maintenance of infrastructure for both municipal and state organizations), protection of existing floodplains as "attenuation assets" will play an important role in mitigating flood impacts by accommodating and diffusing high flows. These assets are widely dispersed in the Stevens River basin, but existing lateral constraints have already occupied many areas that would help fulfill these functions (Table 6).

Table 6. Departure Analysis Table for the Stevens River watershed indicating where river segments are constrained from adjustment, converted to transport streams, and/or have existing or future potential as a place to attenuate sediment load.

Stevens River basin Departure Analysis Table	**Constraints**		**Transport**		**Attenuation (storage)**		
River Segment	**Vertical**	**Lateral**	**Natural**	**Converted**	**Natural**	**Increased**	**Asset**
Stevens River mainstem							
M1.01-0		human			X	X	X
M1.02-0	natural	natural-human	X				
M1.03A	human	natural-human		X	X	X	X
M1.03B		human					X
M1.04-0	natural	human			X		X-limited
M1.05-0				X		X	X
M1.06A				X	X	X	X
M1.06B	natural	human				X	X
M1.07A		human (limited)				X	X-limited
M1.07B	natural	human		X		X	X-limited
M1.07C		human		X			

Stevens River basin Departure Analysis Table	Constraints		Transport		Attenuation (storage)		
River Segment	**Vertical**	**Lateral**	**Natural**	**Converted**	**Natural**	**Increased**	**Asset**
Peacham Hollow Brook							
T1.01A		human (limited)		X			X
T1.01B	natural	human		X			X-limited
T1.02A		human					X-limited
T1.02B		human-natural	X			X	X-limited
T1.02C		human			X	X	X
T1.02D		human		X			
T1.03A		human					X
T1.03B		human	X				
T1.03C		human			X	X	X
T1.04-0		human		X			
T1.05-0	natural	human		X		X	X
T1.06A	natural	human	X				
T1.06B	natural	human				X	X-limited
T1.06C					X	X	X
T1.07A	natural	human		X		X	X
T1.07B	natural	human		X		X	X-limited
T1.07C	natural	human		X		X	X-limited

Stevens River basin Departure Analysis Table	Constraints		Transport		Attenuation (storage)		
River Segment	**Vertical**	**Lateral**	**Natural**	**Converted**	**Natural**	**Increased**	**Asset**
South Peacham Brook							
T2.01-0		human			X	X	X
T2.02A		human		X			X
T2.02B	human	human		X	X		
T2.02C	human	human			X	X	X
T2.02D		human		X		X	
T2.03A		human		X			
T2.03B		human				X	X-limited
T2.04A		human			X	X	X
T2.04B		human (limited)		X	X	X	X
T2.04C	natural	human				X	X-limited
T2.05-0	natural	human				X	X-limited

Only four segments in the Stevens basin currently have <5% of the length of the segment with existing encroachments:

M1.05 (near Karme Cho-ling) and M1.06A (including Barnet School Forest) on the Stevens River mainstem;

T1.01A on Peacham Hollow Brook (just upstream of the confluence with the mainstem and South Peacham Brook; junction of Peacham-Barnet Rd. and East Peacham Rd.); and

T2.04B on South Peacham Brook (Roy fields upstream of Hollow Woods Rd.; Fig. 6)

While an additional six segments (Steevens mainstem M1.04; Peacham Hollow Brook T1.02D, T1.03A and B; South Peacham Brook T2.02A and T2.03B) in the basin have a limited number of encroachments, various other constraints suggest that the four listed above represent the most valuable “attenuation assets” in the assessed portions of the basin.

5.2 SENSITIVITY ANALYSIS

The preceding departure analysis identifies the watershed and reach-scale stressors that help explain current sediment regime departure in the 2010 Phase 2 assessment area of the Stevens River watershed. Designing stream corridor protection and restoration projects that are compatible with channel evolution processes, and prioritizing them at the watershed scale, also require an understanding of stream sensitivity.

Sensitivity refers to the likelihood that a stream will respond to a watershed or local disturbance or stressor, and an indication as to the potential rate of channel evolution (VT-RMP geoassesspro 2007, Phase 2, Step 7.7; VT-RMP RCPG 2010, Section 5.1.3). While every stream changes in time, a sensitivity rating indicates 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.

Only two segments (M1.04 and T1.07A) assessed in Phase in the Stevens River watershed were rated with Moderate sensitivity. All other fully assessed stream segments are Highly to Extremely sensitive to disturbance and stressors, and thus also capable of a relatively rapid response (channel evolution to reestablish equilibrium conditions) if stressors are addressed (Fig. 29). This is in part due to the selection of mostly C- and E-type streams for Phase 2 assessment, which are by nature relatively sensitive and capable of recovery to equilibrium conditions in response to restoration efforts (Rosgen 1994).

In general, the sensitivity of streams throughout the Phase 2–assessed area indicates good possibilities for success of passive geomorphic projects, which would allow the river to utilize its own energy and watershed inputs to reestablish meanders, fuller access to floodplains, and self maintaining equilibrium conditions over time. The widespread nature of this assessment indicates that the most effective approach to restoring balanced conditions along the streams of the Stevens River basin can happen through municipal approaches that would limit further encroachments along stream corridors, permitting these processes to proceed unimpeded, rather than a parcel by parcel approach.

In addition, the widespread distribution of sensitive reaches means that the design and success of downstream restoration projects will frequently be affected by discharge and sediment loads in adjoining upstream reaches. Important stretches of beaver-controlled segments exist on Peacham Hollow Brook in reaches T1.02 and 1.06, and these areas are important to protect for their role in these dynamics and generally mean that impacts upstream of these areas are deterred from passing further downstream. Beyond this, leveraging these assets involves a closer look toward the confluence of the Stevens mainstem, Peacham Hollow Brook and South Peacham Brook and reaches further downstream. A look at current vertical stream adjustments in the watershed, however, suggests that reaches on South Peacham Brook may have compelling reasons for prioritizing reaches there.

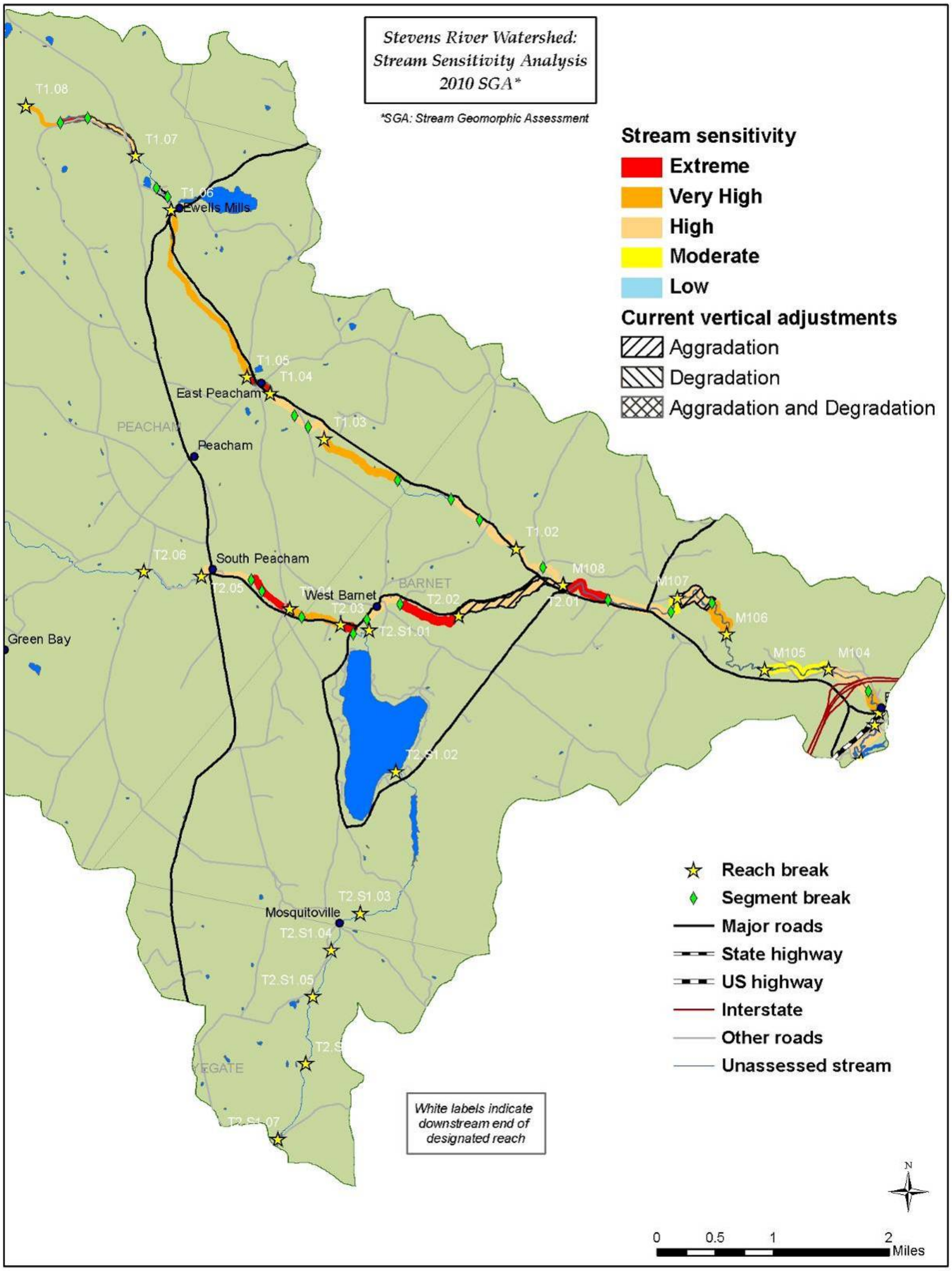

Figure 29. Stream sensitivity map for the Stevens River watershed.

Current major vertical adjustments in the Stevens River basin are limited in extent (Fig. 29), as many of the major vertical adjustments in the watershed have been primarily historical in nature, including aggradation behind the long-standing dams at Harvey's Lake (T2.02C) and Barnet Falls (M1.03A). Current aggradation was noted in M1.06 downstream of the former dam breached at Ben's Mill; T1.04 (likely in response to windrowing, as this reach in East Peacham village also showed signs of current degradation), T1.06B and T1.07B (in response to recent flash flooding) and T2.01 on South Peacham Brook. Mass failures and erosion in reach T.202 are likely contributing to the aggradation in T2.01, but it should be noted that this reach has High (rather than Very High or Extreme) sensitivity; while the reach is important as an attenuation asset, particularly in the lowest portion of the reach (a shared floodplain with reach T1.01), channel evolution responses are likely to be relatively slow (i.e., could be decades).

Recent incision or downcutting was noted in T1.04 and T1.07 on Peacham Hollow Brook; in T1.04 (East Peacham village) this appears related to extensive windrowing and armoring, likely due to bridge clean-outs following floods. Degradation in the headwaters of Peacham Hollow Brook (T1.07) appears related to a combination of recent land use changes (including encroachments, flow regulation, extensive forest cutting, and significant stream straightening) and recent impacts of microburst storms. No active headcuts were noted anywhere in the watershed.

That said, the check dams in place downstream of the Harvey's Lake dam, in segment T2.02B, indicate that this area is particularly sensitive to these processes and failure to maintain these structures could initiate changes quickly. This increases the importance of attenuation assets upstream of the dam area. With extensive encroachments present in West Barnet village and along the Peacham-Barnet Rd., the Extremely sensitive reaches in T2.04A and B (Roy fields near the Hollow Woods Rd. bridge) take on increased importance for possibilities of restoring and maintaining equilibrium conditions on South Peacham Brook. These segments also have increased value for storing sediments and floodwaters due to the unique set-up of the dam at Harvey's Lake, which allows floodwaters to back up into the lake from South Peacham Brook. In addition, recent flash flooding impacts indicate that these segments play an important role in attenuating floodwaters and sediment discharges from upstream portions of reaches T2.04 and T2.05 where these impacts are difficult to address due to extensive encroachments in South Peacham village and along Governor Mattocks Rd. (Fig. 6; Fig. 15).

On the Stevens River mainstem and portions of Peacham Hollow Brook downstream of the beaver-controlled portions of reach T1.02, Extremely sensitive segments exist in M1.05 and M1.07C. Impacts contributing to adjustment processes occurring here appear largely related to the breach of the Ben's Mill dam, and the erodible substrates present at the old dam site and in the banks of reach M1.05 are extremely sensitive to high flows in particular. These factors suggest that the management of attenuation assets present upstream at the confluence of the Stevens mainstem with the upstream tributaries, particularly segment T1.01A and its shared floodplain with the most downstream portion of reach T2.01 (near the junction of Peacham-Barnet Rd. with East Peacham Rd.) will play a large role in how adjustment processes unfold at these sites; protection of these critical assets appears warranted.

Due to the current sediment regime dynamics in the watershed (Fig. 26), it is likely that fine-grained “wash-load” sediments from reaches M1.05 (and possibly M1.07 as well) may add to historic deposition at the dam behind Barnet Falls at the base of reach M1.03. Although segment M1.03B upstream of the I-91 culvert is rated with High sensitivity, this rating is in large part due to a great deal of bank armoring and channelization; it is worth special mention that a limited amount of floodplain access off the left bank along Anderson St. is important to attenuation of impacts to the village areas of Barnet and may warrant attention despite the lower (as opposed to ‘Very High’ or ‘Extreme’) sensitivity rating.

6.0 PROJECT IDENTIFICATION

6.1 REACH DESCRIPTIONS—PRELIMINARY PROJECT IDENTIFICATION

Within the context of the overarching considerations discussed in previous sections of this report, preliminary project identification for reaches included in Stevens River watershed 2010 Phase 2 assessments is presented on a reach-by-reach basis in the following pages.

Segments T1.02C, T1.06C and T2.02C were excluded from full geomorphic assessments due to impoundment by beavers and human dams, and do not include project identification. Features that were assessed are briefly discussed for these reaches.

“Left bank” and “right bank” in the reach descriptions are referenced looking downstream. Reach maps include a “belt width corridor” drawn on either side of the stream. The width of this corridor (generally a minimum of 3-4 times the stream channel width) is based on over 30 years of research and data collected from hundreds of streams around the world, and approximates the extent of lateral adjustments likely to occur over time in a meandering stream type (VT ANR 2009 Protocols, Appendix H). “Human investments within the belt width inevitably result in structural constraints placed on the channel adjustment process to protect those investments and address associated threats to public safety. These threats will be largely avoided by recognizing the hazards created by development, incompatible with channel adjustments, within the critical belt width” (VT ANR 2009 Phase 2 Protocols, p.17). Background imagery for the reach maps is from the National Agricultural Imagery Program (NAIP), dated 2009.

6.1.1 Reach M01 – Stevens River mainstem from Connecticut River confluence to Carter St. bridge

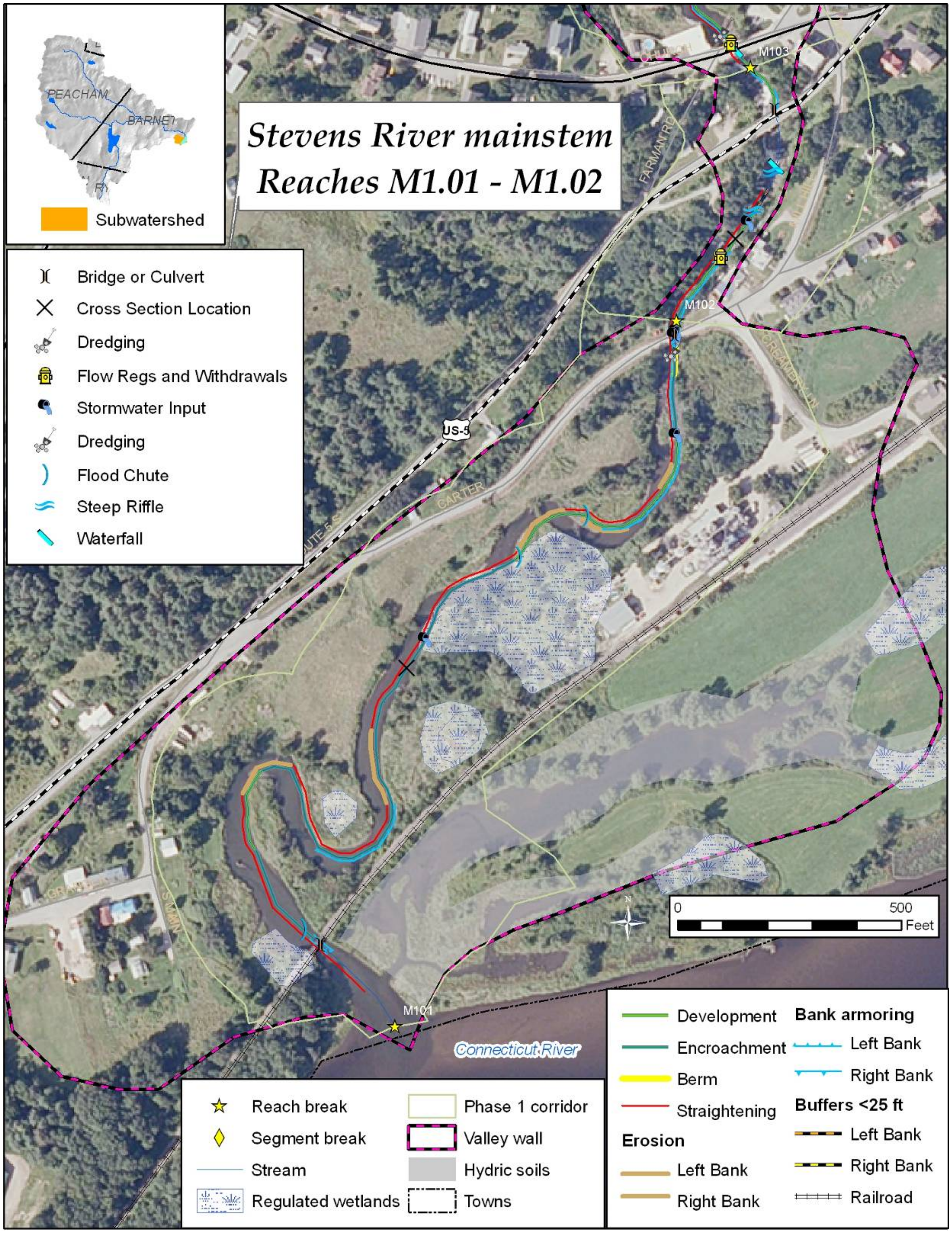

Figure 30. Reach map for Stevens River mainstem reaches M1.01 and M1.02

Reach M1.01 extends from the confluence of the Stevens River with the Connecticut River, just downstream of a trestle on the Washington County Railway, upstream to the Carter St. bridge (Fig. 30). The reach includes extensive wetlands and oxbows and represents high value wildlife habitat and important storage for floodwaters and sediment discharges; beavers are currently active in the downstream portions of the reach. Morrison Feeds dominates the left bank, and the elevated roadbed of the Canadian Pacific railway confines the reach at all but the highest flows; highest flows can access the shared floodplain with the Connecticut River near Creamery St. on the upstream end of the Morrison Feeds complex. The reach is heavily influenced by backwater influences created by impoundment of the Connecticut River at McIndoe Falls.

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
M1.01	2709	C	None	Gravel	Riffle-Pool	Very Broad

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
M1.01-0	2709	C	None	Sand	Riffle-Pool	Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	High	1.25	III	F	None

Primary Stressors:

- Straightening (>50% of segment length) primarily by virtue of extensive encroachments, both development and roads
- Confinement of valley by elevated railroad embankments at all but highest flows
- Backwater effects of impoundment on Connecticut River contributes to bank instability
- Undersized bridge at Carter St. contributing to upstream and downstream deposition
- Restriction of access to historic floodplains (incision ratio 1.25)
- Highly erodible banks (sand)
- Stormwater inputs (2 road ditches, 1 overland flow, 1 field ditch)

Table 7. Stevens River mainstem Reach M1.01 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
M1.01-0	Protect River Corridor	High	Medium	Y	Assess current protection and ordinances; much of it may lie within FEMA Special Flood Hazard Area; include encroachments in Pre-disaster Mitigation Planning
M1.01-0	Extend buffers	Medium	Medium	Y	Particularly on right bank
M1.01-0	Replace existing bridge structure	Medium	Low	Y	Upstream bridge at Carter St. has low clearance (may plug) but outflanking not a big issue; deposition has probably needed to be dredged periodically, may require less maintenance if sized larger

6.1.2 Reach M1.02 – Stevens River mainstem from Carter St. bridge to top of Barnet Falls (Church St. Bridge)

Reach M1.02 is a short reach delineated to include Barnet Falls (~80 ft high). A small run of the river dam with a sluice gate downstream of the Church St. bridge (actually at the base of reach M1.03) feeds a bypass leading to a turbine housed at the base of the Falls in M1.02, currently operated by the Barnet Hydro Company. Excluded from assessment in Phase 1, M1.02 was included for Phase 2 assessment primarily because of the section of walled-in, lower gradient stream with significant encroachments downstream of the base of the falls (~375 ft of the stream). Due to lack of a better location, cross-sectional measurements were taken close to the turbine housing and indicated reduced cross-sectional area and channel width; these measurements are qualified by a low level of confidence due to this location.

Field assessments did, however, indicate that floodwaters exiting the stream channel at the head of the reach might well utilize accessible floodplain off the right bank, head toward a house and then across Rte. 5 further downstream, presenting a risk of damage to the house and the turbine housing beneath the Falls. The current assessment did not obtain information on what kind of equipment is housed at the turbine building and how significant such risk might actually be. Further risk was indicated for encroachments at the base of the reach near Carter St, where bank armoring drops significantly in height.

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
M1.02	659	B	c (0-2 pct)	Cobble	Riffle-Pool	Semi-confined

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
M1.02-0	659	F	None	Boulder	Riffle-Pool	Narrowly Confined
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	High	1.00	III	F	B to F

Primary Stressors:

- Straightening (>50% of segment length) primarily by virtue of extensive armoring and encroachments
- Confinement of valley by extensive armoring in conjunction with intermittent bedrock walls

Table 8. Stevens River mainstem Reach M1.02 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
M1.02-0	Protect River Corridor	Medium (already largely developed)	Low	Y	Include encroachments in Pre-disaster Mitigation Planning, limit further encroachments (consider FEH development and implementation)

6.1.3 Reach M1.03 – Stevens River mainstem from top of Barnet Falls (Church St. bridge) to Anderson St. bridge

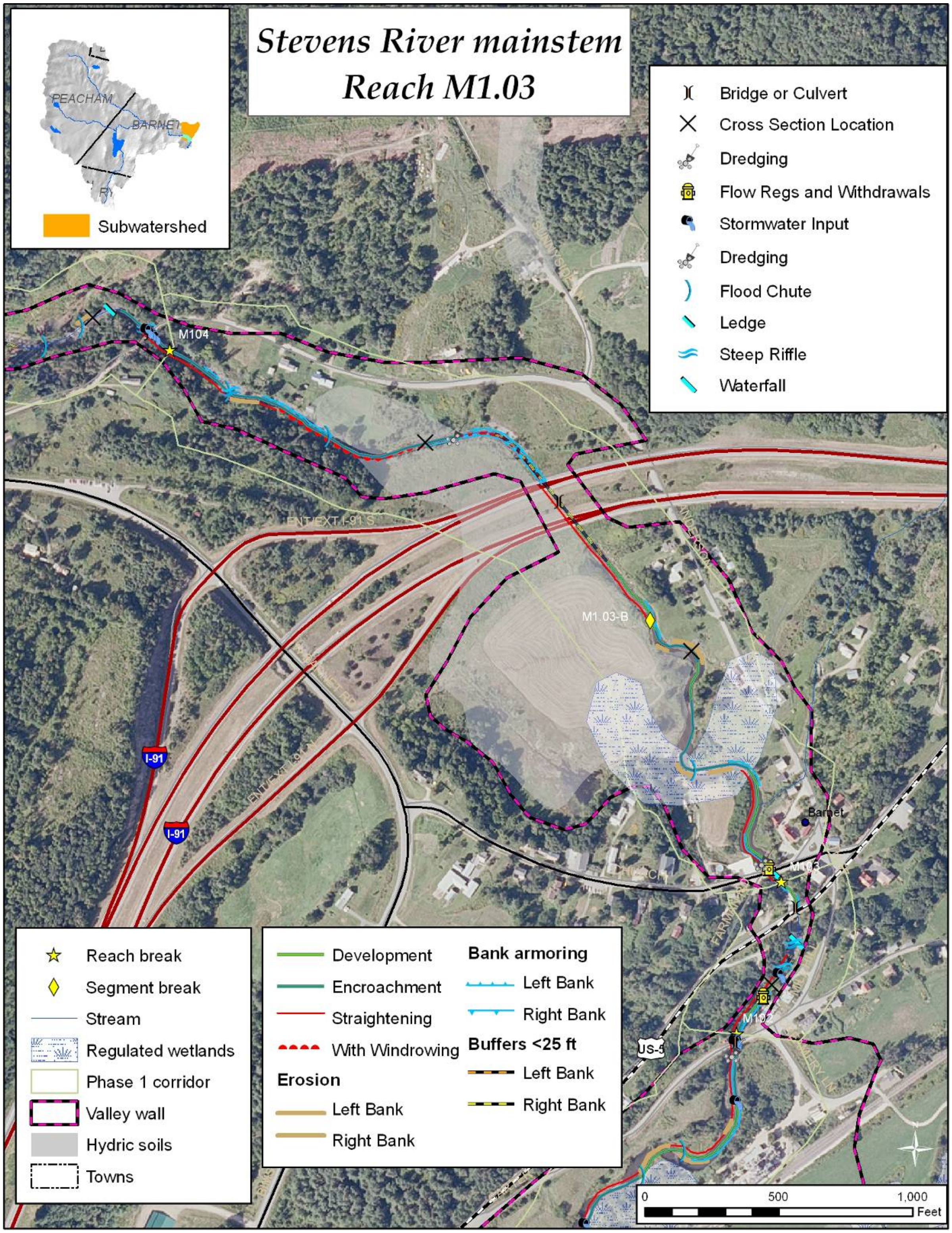

Figure 31. Reach map for Stevens River mainstem reach M1.03

Reach M1.03 was segmented during Phase 2 assessment due primarily to a human-caused change in valley width between the downstream segment M1.03A (Church St. bridge to ~350 ft. downstream of a pair of box culverts under Interstate-91) and upstream segment M1.03B (I-91 culverts to ~100 ft downstream of the Anderson St. bridge; Fig. 31). I-91 had significant blasting of ledges nearby during construction in the late 1970s and 1980s, and it appears that much of the stone was used to raise or augment the high embankments (~30 ft high) off the right bank of M1.03B and create the enormous amount of fill that supports the bridge above the box culverts that funnel the Stevens river under the interstate.

Hydric soils off the right bank of the stream intersect with the I-91 embankments and cropped agricultural lands, indicating likely significant loss of historic wetlands in the reach with attendant reduction in capacity for attenuation of floodwaters, sediment and nutrient discharges.

With considerable loss of these attenuation capacities and room to accommodate stream adjustments off the right bank in M1.03B, it is worth noting a small wetland area with floodplain access off the left bank of M1.03B just downstream of the cross-section location. In addition, comments from residents in M1.03A specifically noted an important role for the wetlands and cropland off the right bank of M1.03A in accommodating ice jam flooding on numerous occasions.

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
M1.03	3673	C	None	Gravel	Riffle-Pool	Very Broad

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
M1.03A	1414	C	None	Sand	Riffle-Pool	Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	Very High	1.30	IV	F	None
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
M1.03B	2259	C	None	Cobble	Plane Bed	Narrow
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	High	1.00	III	F	None

Primary Stressors:

M1.03A:

- Straightening (>20% but <50% of segment length) primarily by virtue of extensive bank toe armoring and encroachments (>20%); significant straightening and bank armoring upstream are also passing impacts to this segment
- Highly erodible bank materials (sand)
- Restriction of access to historic floodplains (incision ratio 1.3)
- Wooded buffers lacking on left bank
- Historic aggradation behind dam at base of reach

M1.03B:

- Straightening (>50% of segment length) with windrowing
- Wooded buffers lacking on both banks, more so on left bank
- Encroachments (>20%): development, roads, berm

Table 9. Stevens River mainstem Reach M1.03 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
M1.03A	Protect River Corridor	High	Medium	Y	Right bank important for attenuation of ice jam flooding impacts
M1.03A	Plant stream buffers	High	Medium	Y	Esp. left bank; offers additional flood protection-ice deflection; remove a very limited number of purple loosestrife at x-section location
M1.03B	Protect River Corridor	High	High	Y	Left bank wetland area is important floodplain access point; damming by I-91 and undersized culverts poses possibility of ponding upstream
M1.03B	Plant stream buffers	High	Medium	Y	Tough planting conditions; use Better Backroads designs, leverage opportunity if berm removal happens

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
M1.03B	Remove windrow/ berm	High	High	N	Needs corridor protection, then higher resolution survey details and rough cost-benefit analysis of obtainable floodplain access

Figure 32. High embankments of I-91 off the right bank of T1.03B combine with a small left bank berm, windrowing and extensive riprap on both banks to restrict floodplain access; removal of the berm in the trees at left in this photo might restore some of that access.

6.1.4 Reach M1.04 – Stevens River mainstem from Anderson St. bridge to Patenaude Rd. bridge

Reach M1.04 extends from ~100 ft. downstream of the Anderson St. bridge to ~1000 ft. upstream of the Patenaude Rd. bridge that is the entrance to Karme Cho-ling (Fig. 32). The reach is bedrock-controlled, with ledge outcrops providing grade controls at the upstream and downstream ends of the reach. The valley width alternates between more and less constricted areas, leading to evidence of “pulse” flows and signs of episodic enlargement in response to high flows. The right valley wall appeared to have a number of groundwater seeps. One fairly recent mass failure was evident off the right valley wall, and an older mass failure was evident further back from the stream on the left bank that appeared to be in the correct time range to have been a response to the breach of the Ben’s Mill dam. Two gullies appeared to have initiated beneath drainage ditches off the side of Patenaude Road, in areas where seeps were present, in more recent microburst storms (during the weeks preceding the assessment). The gullies did not appear to be contributing a lot of sediment directly to the stream, as there were low gradient areas beneath that captured much of the sediment.

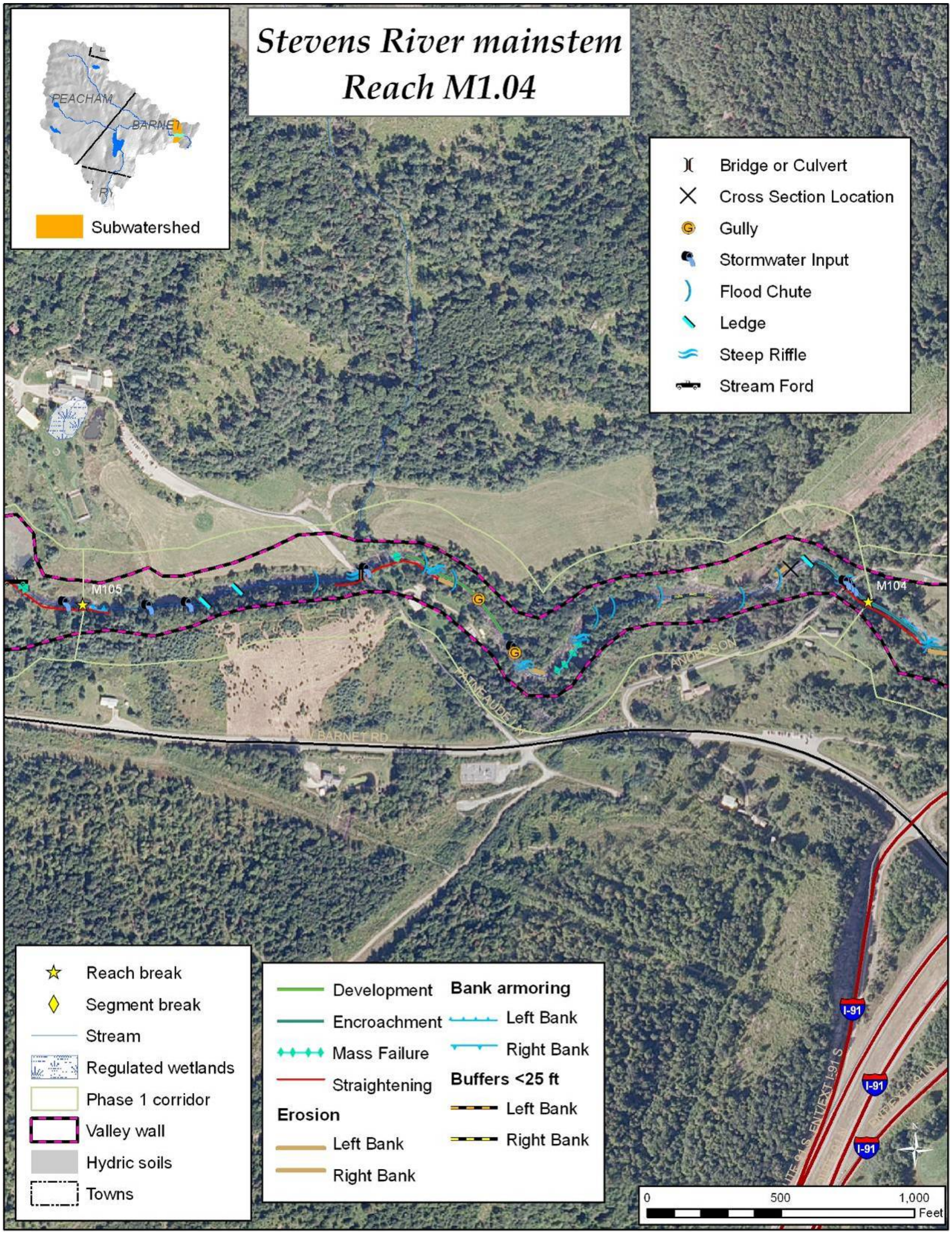

Figure 33. Reach map for Stevens River mainstem reach M1.04

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
M1.04	3396	B	c (0-2 pct)	Cobble	Step-Pool	Semi-confined

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
M1.04-0	3396	B	c	Cobble	Step-Pool	Semi-confined
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Good	Moderate	1.00	I	F	None

Primary Stressors:

- Straightening upstream (5-20% segment length in M1.04, mostly at Patenaude Rd. bridge and tire retaining wall at house just downstream of there, in upstream portion of reach; also >50% in next reach upstream)
- Stormwater inputs
- Erodible materials in valley walls

Table 10. Stevens River mainstem Reach M1.04 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
M1.04-0	Protect River Corridor	Medium	Low	Y	Right bank important for attenuation of ice jam flooding impacts
M1.04-0	Augment stream buffers	Low	Low	Y	Power line cut – need low-growing spp, but non-invasive; sumac?
M1.04-0	Stabilize undercutting at gully heads	Medium	Low	Y	Town of Barnet may want to assess risk to Patenaude Rd.; sediment was largely intercepted but might not be out of growing season

6.1.5 Reach M1.05 – Stevens River mainstem from Patenaude Rd. bridge to Cloud Brook confluence and edge of woods east of Barnet School

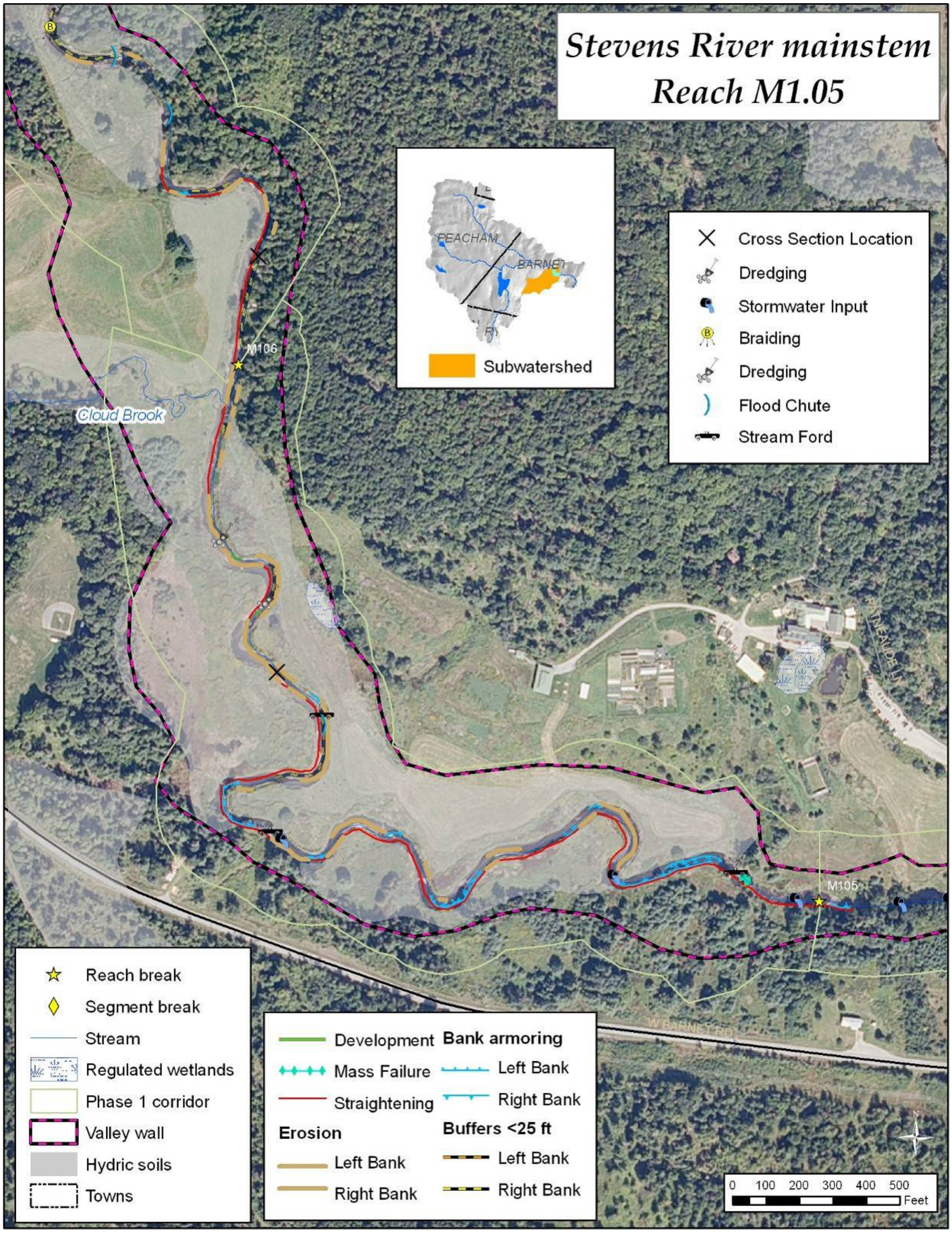

Figure 34. Reach map for Stevens River mainstem reach M1.05

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
M1.05	4187	E	None	Sand	Riffle-Pool	Broad

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
M1.05-0	4187	C	None	Gravel	Riffle-Pool	Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	Very High	1.48	III	F	E to C

Reach M1.05 extends from ~1000 ft. upstream of the Patenaude Rd. bridge that is the entrance to Karme Cho-ling to just upstream of the confluence of Cloud Brook and the Stevens River mainstem, where the Stevens River approaches the left valley wall and the left bank becomes steeper and wooded (Fig. 34). The reach is dominated by fine-grained glaciolacustrine, glaciofluvial and alluvial soils that are the legacy of its location near the upstream end of a "finger" of glacial Lake Hitchcock, and is currently dominated by active hayfields that have not been mowed as extensively in recent years, possibly due to reduced accessibility in a series of recent wet summers. Hydric soils are extensive in the reach (Fig. 34), indicating likely conversion of former wetlands to agricultural lands with attendant reduction of wetland functions including attenuation of high flows and retention of nutrients and sediments.

Buffer plantings have been set out in reach M1.05 in the past by Barnet School students and others (pers. comm. Kerry O'Brien, District Manager, CCNRCD), and many of these trees have established well. Banks are steep and highly erodible, however, and some areas would benefit from augmentation of these buffers. E to C stream type departure is due to widening and loss of planform.

Dredging was noted in the reach due to observations of exposed clay lenses in the stream bed, and there were a series of wooden structures in the mid-portions of the reach near some of these clay lenses (Fig. 35). It is not clear what these structures were, but it is possible that clay may have been excavated in the reach, contributing to some of the incision noted. Beers Atlas (1877) indicates a brick factory in the area, but it is nearly a half mile from the stream. No confirmation of clay excavation was obtained.

 

Figure 35. Exposed clay lenses in the stream bed of reach M1.05 are located close to a series of timbers that appear to have been structural at some point, leading to questions about possible clay excavation.

Primary Stressors:

- Straightening (>50% of segment length) primarily by virtue of extensive bank toe armoring
- Highly erodible bank materials (sand)
- Restriction of access to historic floodplains (incision ratio 1.5)
- Dredging (unconfirmed, but clay lenses are exposed in stream bed)
- Wooded buffers largely lacking on both banks, though some plantings have been done in the past and are getting established

Table 11. Stevens River mainstem Reach M1.05 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
M1.05-0	Protect River Corridor	High	High	Y	Much of reach may be under limited number of landowners
M1.05-0	Augment stream buffers	High	High	Y	Monitor and augment plantings done by Barnet School and others

6.1.6 Reach M1.06 – Stevens River mainstem from Cloud Brook confluence and edge of woods east of Barnet School to end of Lester Lane, ~1500 downstream of Barnet Center Road Bridge

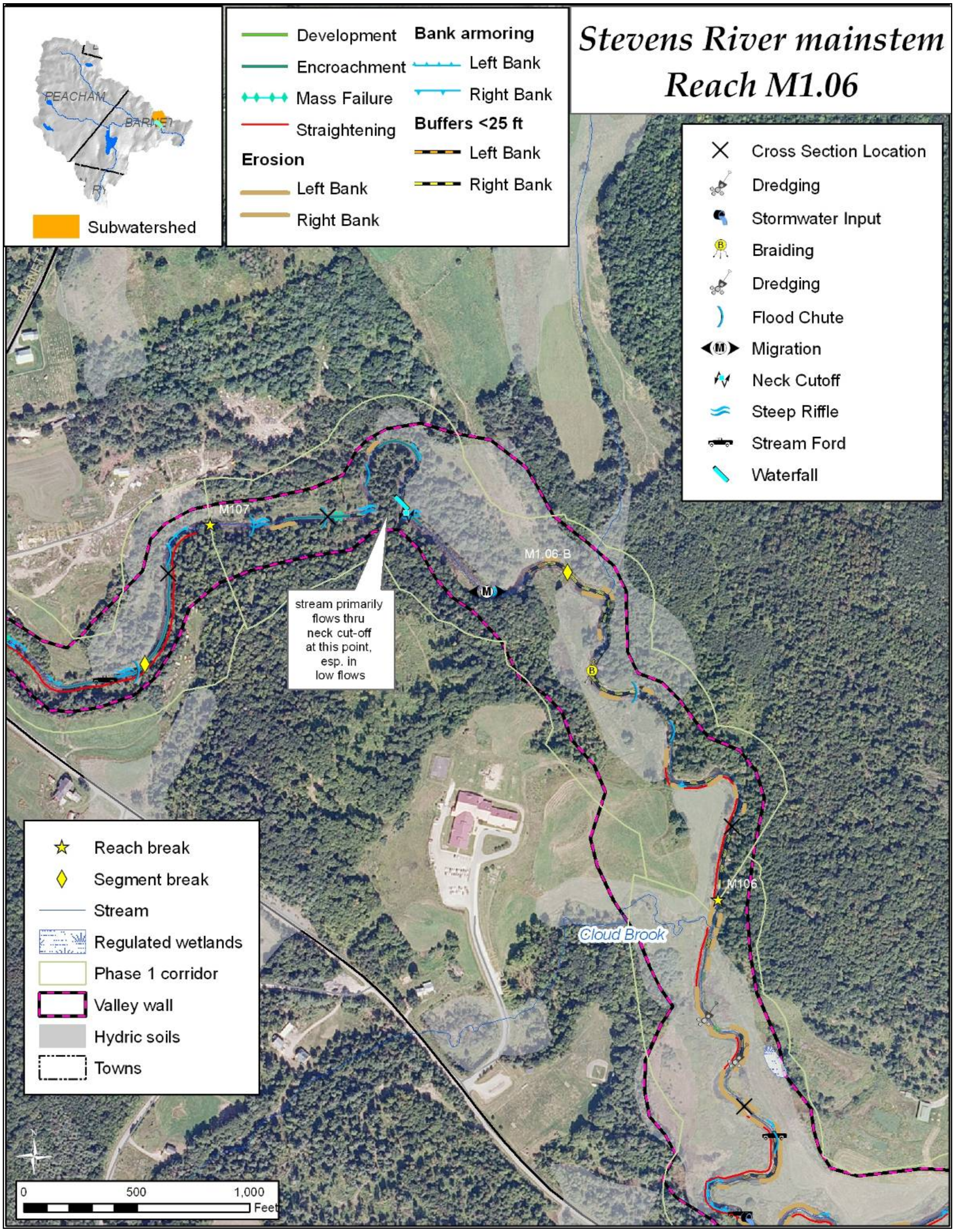

Figure 36. Reach map for Stevens River mainstem reach M1.06

Reach M1.06 was segmented during Phase 2 assessment due primarily to differences in the amount of channel evolution that has occurred since the breach of the Ben's Mill dam, which appears to have had significant impacts on the entire reach. M1.06B, located closer to the old dam, has a neck cut-off in the middle of the segment (Fig. 36) that likely occurred at the time of the breach. A mass failure on the left valley wall upstream (well back from the current location of the stream) probably contributed sediments that helped push the stream in the direction of the neck cut-off. The stream now splits around an island created by the neck cut-off at higher flows, but at lower levels it flows over a 9-ft. waterfall that was scoured to bedrock.

Information about the dam breach was lacking at the time of the M1.06 field assessment, and it is possible that depositional features may have been under-recorded in the field in segment M1.06B; large side bars have significantly re-vegetated in the 20-30 years since the breach of the dam (Fig. 37).Coarser sediments are being moved very slowly since only higher level flows are able to carry the larger sediments, so this portion of the stream is more aggraded than downstream segment M1.06A.

Figure 37. Large side and mid-channel bars have significantly re-vegetated in segment M1.06B during the 20-30 years since the breach of the Ben's Mill dam. Side bar deposited at left of this photo contributed to forcing the stream through a neck cut-off at center of photo.

In fact, M1.06A is much more similar to reach M1.05 in terms of bank and substrate materials and was originally lumped with that reach for x-sectional measurements. After reconsideration of this decision during Quality Assurance checks of the data, cross-sectional measurements for M1.06A were taken in June 2011; it should be noted that a flash flood on May 26, 2011 likely affected the channel dimensions recorded, but the stream segment still exhibited the low width/depth ratio characteristic of an E type stream (reach M1.05 was characterized as an E to C stream type departure due to widening and reduced sinuosity).

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
M1.06	4597	C	None	Cobble	Riffle-Pool	Broad

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
M1.06A	1414	E	None	Gravel	Riffle-Pool	Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	Very High	1.21	III	F	None
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
M1.06B	2443	C	None	Cobble	Riffle-Pool	Narrow
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	High	1.09	III	F	None

Primary Stressors:

M1.06A:

- Straightening (>20% but <50% of segment length) primarily by virtue of maintenance against the left valley wall over time; location at downstream end of segment means these impacts are passed to reach M1.05
- Highly erodible bank materials (sand)
- Wooded buffers lacking on right bank, and elevated levels of erosion are congruent with these areas (Fig. 36)
- Some aggradation likely from breach of Ben’s Mill dam, but also fine sediments from suspected beaver dam blow-outs on tributary that feeds into upstream end of segment
- Restriction of access to historic floodplains (incision ratio 1.2)

M1.06B:

- Aggradation from breach of Ben’s Mill dam
- Heightened stream power from steeper slopes and reduced meanders due to neck cut-off
- Some restriction of access to historic floodplain (incision ration 1.09)

Table 12. Stevens River mainstem Reach M1.06 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
M1.06A	Protect River Corridor	High	Medium	Y	Determine extent and protection status of Barnet School Forest
M1.06A	Plant stream buffers	High	Medium	Y	Right bank; erosion pressures likely to increase as downstream sediment movement drives planform changes
M1.06B	Protect River Corridor	Medium	Low	Y	Determine extent and protection status of Barnet School Forest

6.1.7 Reach M1.07 – Stevens River mainstem from end of Lester Lane, ~1500 downstream of Barnet Center Road Bridge, to confluence with Peacham Hollow and South Peacham Brooks

Reach M1.07 was broken into three different segments during Phase 2 (Fig. 38).

M1.07A is a short segment that was very similar to M1.06B, with significant aggradation from the breach of the Ben's Mill dam in the next reach upstream (including plane bed characteristics due to filling of pools and leveling of other bed features). Similarity to segment M1.06B originally led to lumping with that segment for cross-sectional measurements, but after reconsideration during Quality Assurance checks separate cross-sectional measurements for the segment were taken in June 2011; it should be noted that a flash flood on May 26, 2011 likely affected the channel dimensions recorded.

M1.07B includes the portion of the stream up to the location of the old dam at Ben's Mill, and its relative proximity to the reach, elevated levels of stream power due to a narrower valley than further downstream, and ledge and bedrock grade controls have hastened channel evolution in this area. Riffles and pools have established in many portions of the segment, and the reach appears relatively stable itself; extensive encroachment from the Peacham-Barnet Rd. and heavy bank armoring towards the Barnet Center Rd. bridge, however, are contributing to transfer of impacts to downstream reaches. Frequent scour along the streambanks, particularly in areas of ledge outcrops, indicate that the well-vegetated buffers in portions of the segment are critical to stream stability, and their removal could quickly lead to heightened levels of erosion.

M1.07C includes the head of the reach above the old dam, and is dominated by very high banks from years of aggraded sediments; rapid erosion when the dam breached has exposed distinctively banded layers of legacy sediments indicating cyclic deposition (Fig. 13). Although the high banks do not continue all the way to the head of the reach, the valley walls increase in height and present similar dynamics; development and encroachment appear to be at risk in flood situations in this area, and maintenance of existing buffers will be important to minimizing erosion.

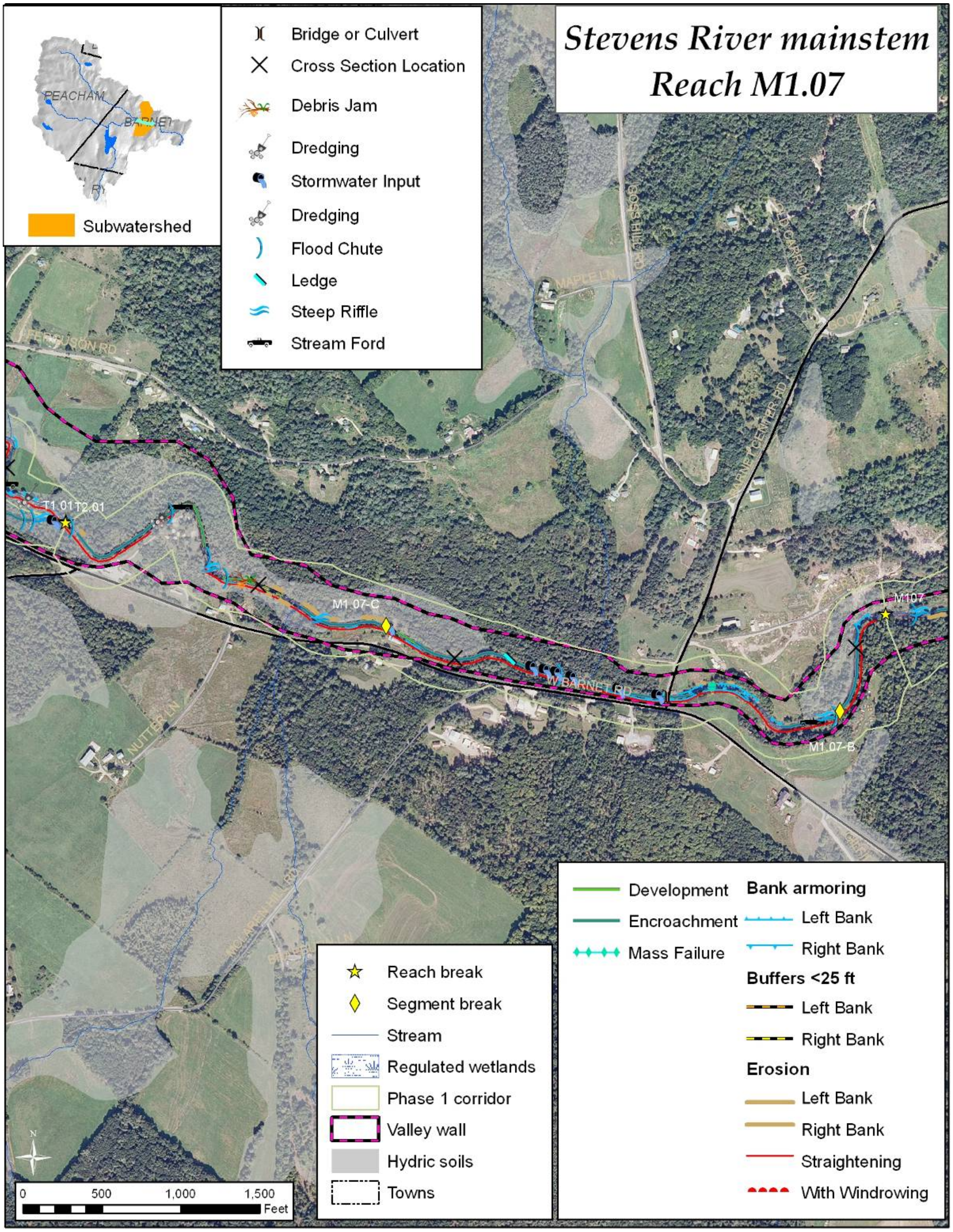

Figure 38. Reach map for Stevens River mainstem reach M1.07

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
M1.07	6505	C	None	Cobble	Riffle-Pool	Broad

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
M1.07A	762	C	None	Cobble	Riffle-Pool	Narrow
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Good	Moderate	1.37	IV	F	None
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
M1.07B	3117	C	None	Cobble	Riffle-Pool	Semi-confined
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	High	1.45	III	F	None
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
M1.07C	2627	F	None	Gravel	Riffle-Pool	Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Poor	Extreme	2.51	III	F	C to F

Primary stressors:

M1.07A:

- Straightening (>50% of segment length) primarily by virtue of maintenance against the right valley wall over time, with bank revetments on downstream end; encroachments on left bank appear to be less used at present than formerly
- Restricted access to historic floodplain (incision ration 1.37)

M1.07B: mostly elevated stream power:

- Straightening (>50% of segment length) primarily through extensive bank armoring and road encroachment

- Stormwater inputs (5 road ditches, 1 field ditch)
- Bedrock channel constriction and bridge that is a floodplain constriction (bridge appears to have been replaced – windrowing that is now part of bank armoring conceivable at that time); scour noted downstream of both
- Restricted access to historic floodplain (incision ration 1.45)

M1.07C:

- Loss of access to historic floodplain (incision ratio 2.51, stream type departure C to F)
- Straightening (>50% of segment length) primarily through extensive road encroachment, windrowing and development
- Highly erodible banks (sand), relatively uncompacted
- Elevated stream power impacts being passed from upstream due to extensive bank armoring and windrowing in T1.01 and T2.01

Table 13. Stevens River mainstem Reach M1.07 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
M1.07A	Protect River Corridor	Medium	Low	Y	Short segment has some value but should be treated with M1.06B
M1.07C (none ID'd in M1.07B)	Protect River Corridor	High	Low	Y	include encroachments in Pre-disaster Mitigation Planning (esp. campsites and truck shop on upstream end); address Japanese knotweed at Ben's Mill site (one of few invasives locations in watershed)
M1.07C	Plant stream buffers	Medium	Low	Y	Replace Japanese knotweed at Ben's Mill with trees or shrubs

6.1.8 Reach T1.01 – Peacham Hollow Brook from confluence with Stevens mainstem and South Peacham Brook to 279 East Peacham Rd.

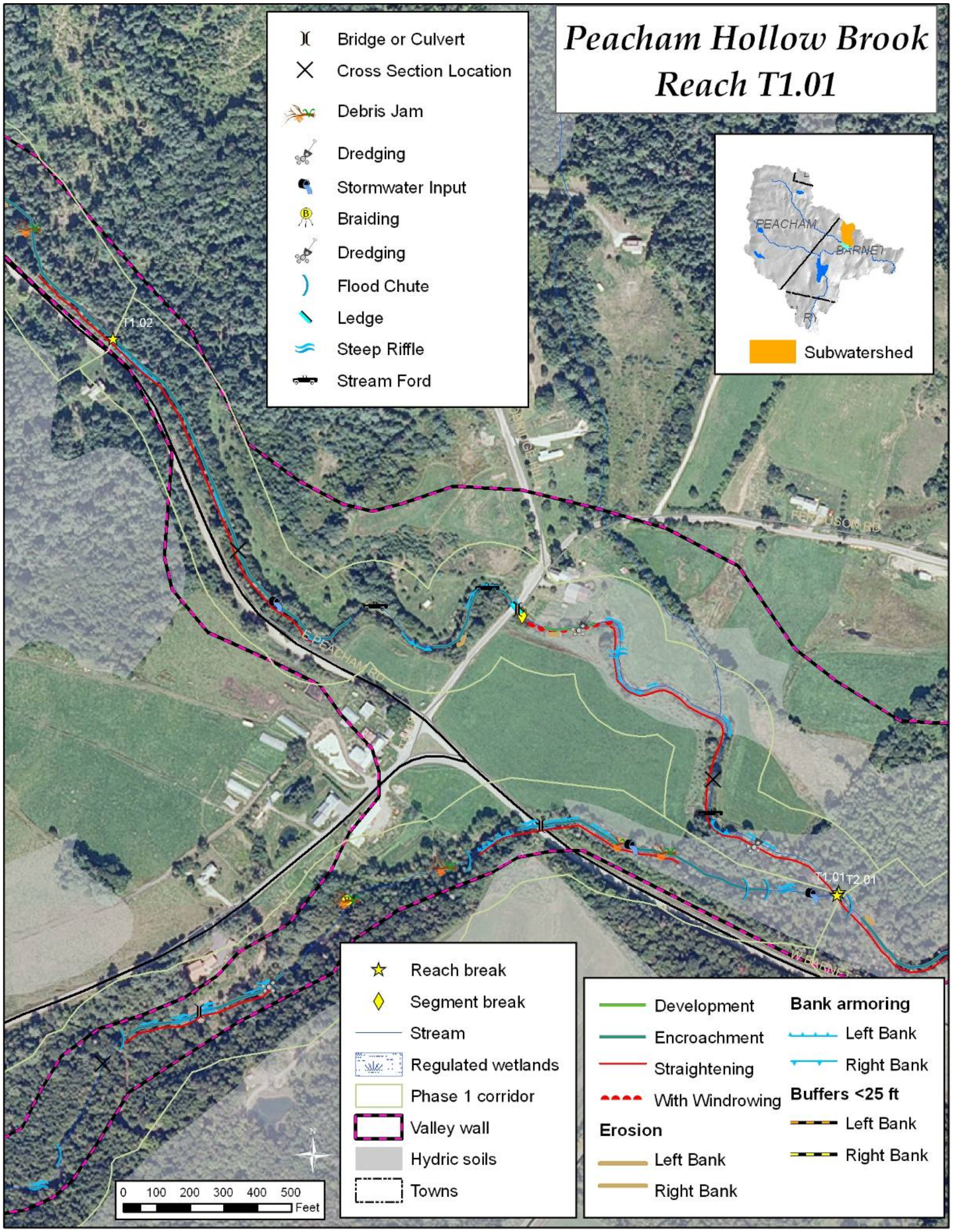

Figure 39. Reach map for Peacham Hollow Brook reach T1.01

Reach T1.01 was broken into two segments during Phase 2 assessments, with the segment break located at the Ferguson Rd. bridge (Fig. 39).

Segment T1.01A, downstream of the bridge, is located toward the upper extent of a "finger" of glacial Lake Hitchcock (Fig. 5), and glaciofluvial soils in the reach (largely sand) indicate a likely deltaic formation at the edge of the glacial lake, leaving highly erodible materials in this area. The segment appears to have been windrowed, possibly several times, so bed features are poorly formed or non-existent and the reach has long stretches of plane bed. There is also extensive bank toe armoring, some of which is failing. One landowner has worked with CCNRCD on buffer plantings in the past and appears to have added additional plantings since that time, so there are young buffers establishing on both sides of the stream. Hydric soils along the stream corridor indicate likely loss of some wetland attenuation functions due to conversion of former forested wetlands to agricultural use. It is possible that the stream should be an E type stream with a stream type departure to C, but it was classed as C type in Phase 2 primarily due to low sinuosity and a cobble substrate.

Segment T.101B, upstream of the bridge, contains ledge grade controls at the bridge but is historically incised and closely encroached by the East Peacham Road on the right bank. Good buffers (wider on the left bank) appear to have limited the extent of channel widening and further evolution, as scour and tipped up trees are common.

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
T1.01	3525	C	None	Cobble	Riffle-Pool	Very Broad

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.01A	1572	C	None	Cobble	Riffle-Pool	Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	High	1.60	III	F	None
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.01B	1954	C	None	Cobble	Riffle-Pool	Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	High	1.34	III	F	None

Primary Stressors:

T1.01A:

- Straightening (>50% of segment length) primarily through extensive bank toe armoring and windrowing
- Loss of access to historic floodplain (incision ratio 1.6)
- Loss of bedform due to repeated windrowing
- Erodible banks (sand, compacted silt loams)
- Elevated stream power impacts being passed downstream due to bank armoring and windrowing

T1.01B:

- Straightening (>50% of segment length) primarily through extensive road encroachment, bank armoring and windrowing
- Restriction of access to historic floodplain (incision ratio 1.34)
- Loss of bedform due to repeated windrowing
- Erodible banks (sand, compacted silt loams)
- Elevated stream power impacts being passed downstream due to bank armoring and windrowing

Table 14. Peacham Hollow Brook Reach T1.01 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
T1.01A	Protect River Corridor	High	High	Y	Upstream of confluence, impacts currently being passed downstream; investigate channel management easements
T1.01B	Replace existing bridge	High	High	Y	Undersized bridge at Ferguson Rd. likely contributes to need for repeated windrowing

6.1.9 Reach T1.02 – Peacham Hollow Brook from 279 East Peacham Rd. to Blanchard Hill Rd.

Reach T1.02 was divided into four segments during Phase 2 assessments.

T1.02A and B run alongside the East Peacham Road and were segmented primarily because the upstream segment B is more narrowly confined between the road and the valley wall opposite the road (Fig. 40).

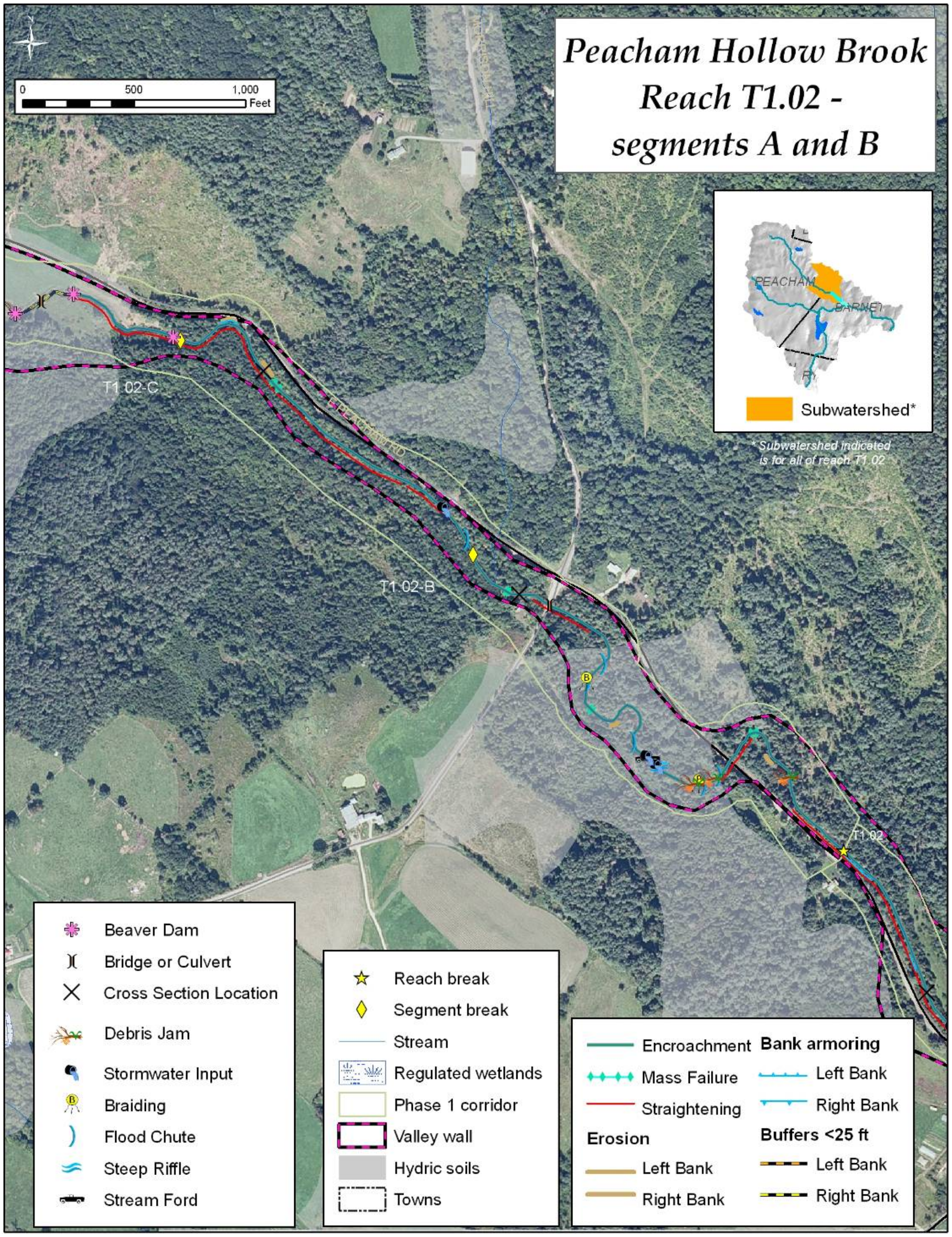

Figure 40. Reach map for Peacham Hollow Brook reach T1.02 segments A and B

T1.02C is in a Very Broad valley and is beaver-controlled, with multiple dams along the stream; this segment did not receive a full geomorphic assessment due to these influences, in accordance with the assessment protocols.

T1.02D becomes more narrowly confined again, and departs further from the side of the East Peacham Road than the downstream segments; the reach break is located along the open fields across from Blanchard Hill Rd. (Fig. 41).

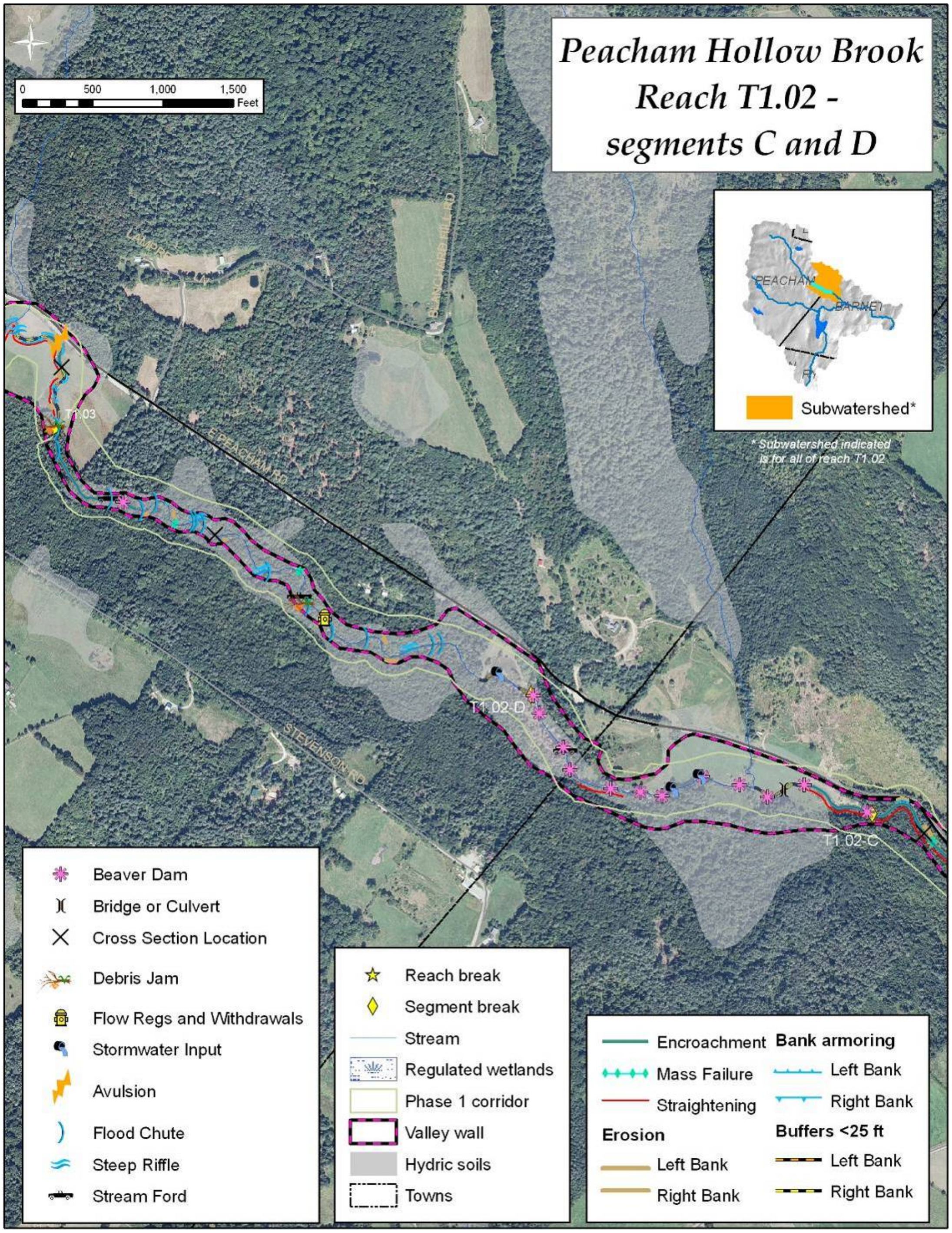

Figure 41. Reach map for Peacham Hollow Brook reach T1.02 segments C and D

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
T1.02	12570	C	None	Cobble	Riffle-Pool	Very Broad

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.02A	2963	C	None	Cobble	Riffle-Pool	Narrow
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	High	1.23	IV	F	None
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.02B	1794	B	c	Cobble	Step-Pool	Semi-confined
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	High	1.62	III	F	None
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.02C	3030	*Beaver-controlled: Not assessed*				Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Beaver-controlled: Not assessed					
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.02D	4784	C	None	Gravel	Riffle-Pool	Semi-confined
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	Very High	1.35	IV	F	None

Primary Stressors:

T1.02A:

- Straightening (>20% but <50% of segment length) primarily through road encroachment, works in tandem with naturally narrow valley to increase sensitivity of valley walls (3 mass failures)
- Peacham-Barnet Rd. bridge is undersized and misaligned with stream, contributing to upstream and downstream deposition
- Restriction of access to historic floodplain (incision ratio 1.23)
- Skid road laid out straight uphill now acting as stormwater input – indicates sensitivity to impacts on otherwise good buffers

T1.02B:

- Straightening (>50% of segment length) primarily through road encroachment, works in tandem with naturally narrow valley to increase sensitivity of valley walls (one mass failure; would likely be more except that buffers are good)
- Restriction of access to historic floodplain (incision ratio 1.62)
- Large woody debris doing good work retaining sediments and diffusing flows, but does contribute to possibilities for rapid planform change and need for extreme caution about encroachments

T1.02C:

Not assessed due to beaver influences, in accordance with assessment protocols.

It should be noted, however, that beaver streams are ephemeral by nature and are often located in areas that are Extremely sensitive to changes in watershed inputs due to silt and sand substrates; this appears to be true in T1.02C. Changes in watershed inputs are likely to accompany significant recent mortality of cedars off the right bank of this segment (Fig. 41, near the series of beaver dams in the upstream portion of the segment), which will likely allow water to enter the stream more quickly and forcefully; road and field ditches are also feeding more water directly to the stream in this segment. Blow-outs of the beaver dams or loss of floodplain access for the stream could easily cause the stream to pass the impacts of heightened stream power to downstream reaches.

T1.02D:

- Restriction of access to historic floodplain (incision ratio 1.35)
- Flash flooding impacts: evidence of high flows – multiple flood chutes
- Large woody debris doing good work retaining sediments and diffusing flows, but does contribute to possibilities for rapid planform change and need for extreme caution about encroachments

Table 15. Peacham Hollow Brook Reach T1.02 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
T1.02A	Protect River Corridor	Medium	Low	Y	Incorporate FEH zones in local planning
T1.02A	Replace existing bridge	Medium	Low	Y	Undersized and misaligned bridge at Peacham-Barnet Rd. likely to build up sediments over time, increase risk for plugging
T1.02B	Protect River Corridor	Medium	Low	Y	Incorporate FEH zones in local planning, consider road risk in Pre-disaster mitigation planning and capital budgeting
T1.02C	Protect River Corridor	High	Medium	Y	Incorporate FEH or belt-width zones in local planning (alternative width for unassessed reaches); explore WHIP project for honeysuckle control
T1.02D	Protect River Corridor	Medium	Low	Y	Incorporate FEH or belt-width zones in local planning

6.1.10 Reach T1.03 – Peacham Hollow Brook from Magness field across from Blanchard Hill Rd. to East Peacham Rd. bridge near Willow Brook confluence

Reach T1.03 was divided into three segments during Phase 2 assessments (Fig. 42).

T1.03B was broken out as a subreach due to its classification as a Cb stream type (b subslope is for 2-4 pct slope) in between two segments of E-type stream. T1.03B is situated in a peculiar geologic formation as the stream makes a bend downstream of Stevenson Rd.: terraces on both sides of the stream are very high, and the valley is a 'pinch point' naturally (further exacerbated by construction of Stevenson Rd. along the valley wall). This scenario raised speculation about a possible Lake Hitchcock/Quechee Gorge type scenario, where a glacial stream may have been impounded by sediments and then created a massive headcut when the jam let loose; no records of mill dams in this area have been located that might suggest that as an alternative explanation.

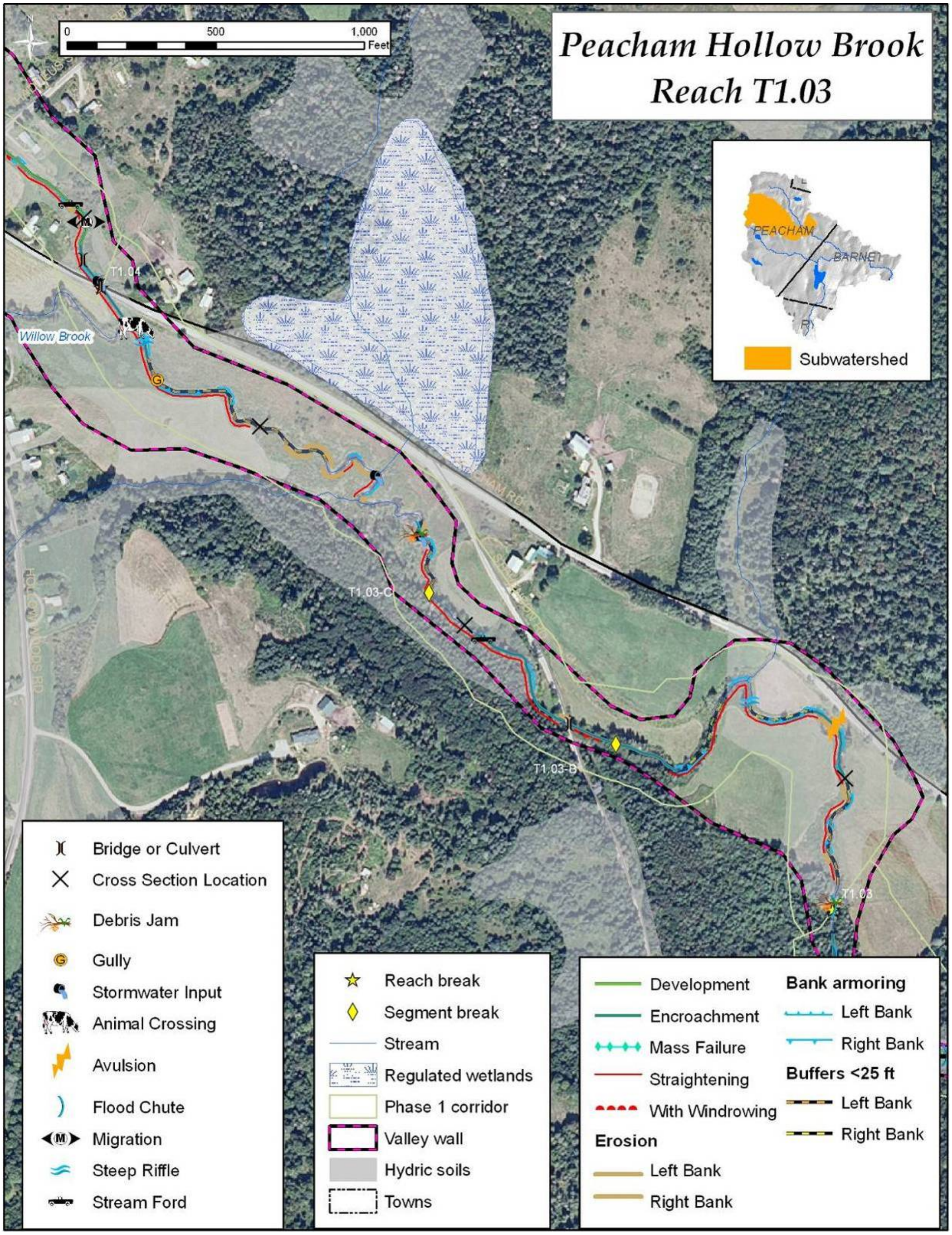

Figure 42. Reach map for Peacham Hollow Brook reach T1.03

Hydric soils are extensive throughout the reach, and agricultural use in the corridor may indicate loss of former forested wetlands with attendant reduction of wetland functions including attenuation of high flows and retention of nutrients and sediments. Agricultural use in 2010 was for hay and pasture rather than cropland.

T1.03C includes the Windsong Wildlife Sanctuary, which has an observation deck overlooking Peacham Hollow Brook and is owned and maintained by Northeast Kingdom Audubon (http://www.nekaudubon.org/stories/storyReader$7). This segment of the stream may be located on an alluvial fan (which may be of glacial origin, however). Three tributaries (including Willow Brook) feed into this section of the stream, and one more comes into T1.04 a short distance upstream. Sand substrates appear to make the banks more erodible than the bed of this segment, and the channel thus appears to go through D-model evolution (D-model evolution is briefly described in sec. 5.1.3, p. 46).

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
T1.03	4593	E	None	Gravel	Riffle-Pool	Very Broad

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.03A	1729	E	None	Gravel	Riffle-Pool	Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Good	High	1.25	IV	F	None
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.03B	860	C	b	Cobble	Step-Pool	Semi-confined
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	High	2.00	III	F	None
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.03C	2004	E	None	Gravel	Riffle-Pool	Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Good	High	1.00	IId	D	None

Primary stressors:

T1.03A:

- Straightening (>50% of segment length) primarily through extensive bank toe stabilization and riprap, which have limited planform adjustments; the East Peacham Rd. appears to be within the floodprone height of the stream
- Restriction of access to historic floodplain (incision ratio 1.25)
- Diminished buffers
- Heightened stream power being passed through valley constriction in next segment upstream; 10-20% “urban” land use in the subwatershed, >20% “urban” in corridor of the overall reach; numerous stormwater inputs upstream on Peacham Hollow Brook (see Hydrologic alterations map, p. 31)

T1.03B:

- Straightening (>50% of segment length) primarily through road encroachment, likely windrowing during arch culvert installation, and riprapping of left bank; works in tandem with incision and naturally narrow valley to pass heightened stream power downstream
- Loss of access to historic floodplain (incision ratio 2.00)
- Stevenson Rd. culvert appears to have been replaced (stream was probably windrowed during installation), is a nice bottomless arch culvert but appears to still be undersized; deposition upstream
- Heightened stream power (see T1.03A above)

T1.03C:

- Sediment loading from Willow Brook (observed during 8/2 and 8/4/2010 flash flooding in the watershed); Beers Atlas (1875) also indicates Willow Brook was dammed, but no history of the assumed breach was investigated during the assessments leading to this report
- Heightened stream power (see T1.03A above)
- Highly erodible sand banks
- Reduced buffers

Table 16. Peacham Hollow Brook Reach T1.03 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
T1.03A	Protect River Corridor	High	High	Y	Explore possibilities for channel management easements
T1.03A	Plant stream buffers, fencing	High	Medium	Y	Augment existing buffers on both banks; active pasture for sheep
T1.03B	Replace existing bridge	Low	Low	Y	Likely replaced once already; nice bottomless arch culvert but appears to still be undersized; deposition upstream
T1.03C	Protect River Corridor	High	High	Y	Wildlife sanctuary downstream of East Peacham village and Willow Brook confluence: determine corridor protection status, explore further options; consider educational signs concerning corridor protection at wildlife observation deck
T1.03C	Plant stream buffers	High	High	Y	Consider shrubs and low trees if visibility is an issue, though stream can use shade; low-cost plantings due to bank instability; reed canary grass may need to be addressed for establishment

6.1.11 Reach T1.04 – Peacham Hollow Brook in East Peacham village (aka Peacham Hollow)

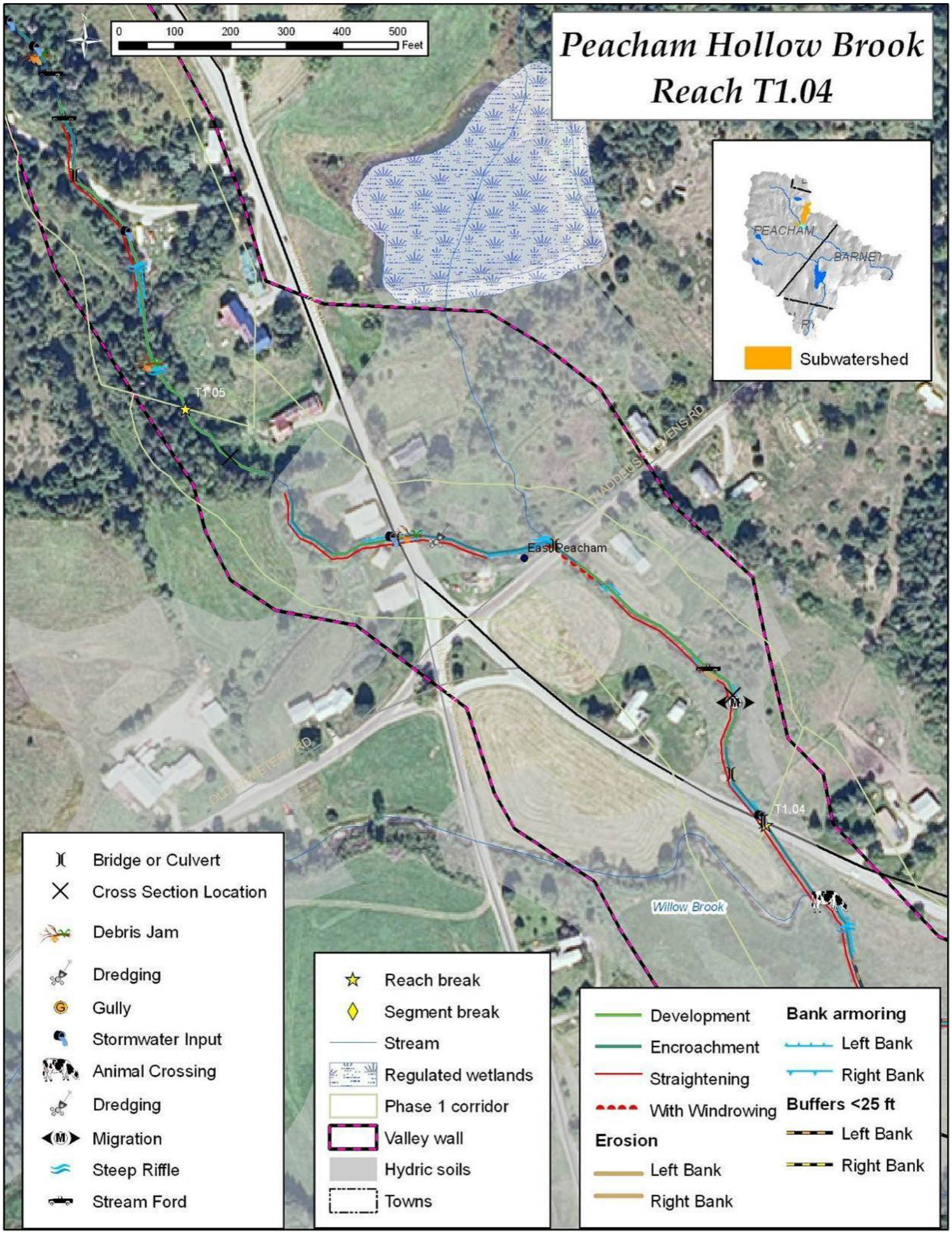

Figure 43. Reach map for Peacham Hollow Brook reach T1.04

Reach T1.04 covers the stretch of Peacham Hollow Brook running through the village of East Peacham, which appears as Peacham Hollow on older USGS maps and the Beers 1875 Atlas (Fig. 43). The reach extends from the East Peacham Rd. bridge near the Willow Brook confluence to a narrowing valley on the north side of East Peacham village, behind E911 addresses 1556 and 1594 East Peacham Road. The reach was not segmented during Phase 2 assessment.

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
T1.04	1493	E	None	Gravel	Riffle-Pool	Very Broad

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.04-0	1493	E	None	Gravel	Riffle-Pool	Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Good	High	1.25	IV	F	None

Although still classed as an E-type stream due to its low width/depth ratio, the reach lacks an E-type planform because the entire reach is straightened and extensively armored. Soil maps indicate the reach is located on dense till, but the materials are silt and fine sandy loams – highly erodible materials given sufficient stream power.

As with segment T1.03C, T1.04 may be located on an alluvial fan historically related to the confluence of Peacham Hollow Brook, a small tributary (now dammed for two small ponds) and Willow Brook (and/or located on sediments backed up behind a glacial sediment dam; see discussion in sec. 6.1.10). Soil maps indicate both alluvial and glaciofluvial soils in the shared floodplain between this reach and Willow Brook (Fig. 43). Bank soil composition is obscured in the field by extensive armoring; the reach appears relatively stable at this time but may have been repeatedly windrowed.

There are two bridges and two culverts in the segment, and all are undersized, which probably has contributed to the stream being windrowed over time. No incision was noted in the cross-section measurements however, and the channel appears to be evolving with D-model characteristics (see sec. 5.1.3. for description of D-model evolution).

One of the bridges is a wooden farm bridge that does not present a floodprone constriction, but the low clearance does make it possible to plug easily if the bridge doesn't float first in a flood; floating may plug the bridge on the East Peacham Road.

Primary stressors:

T1.04-0:

- Straightening (>50% of segment length) through extensive windrowing, riprap, hard bank armoring, and channelization through culverts and bridges
- Diminished buffers
- Undersized bridges and culverts

Table 17. Peacham Hollow Brook Reach T1.04 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
T1.04-0	Plant stream buffers	Medium	Low	Y	May be difficult to obtain CREP or other funding
T1.04-0	Replace existing bridges and culverts	High	Medium	Y	Assess risks to surrounding area for pre-disaster mitigation planning. None appear at risk of imminent failure, but plugging has likely contributed to repeated windrowing; farm bridge may float or plug, but outflanking for it or next bridge downstream would likely not cause a lot of damage

6.1.12 Reach T1.05 – Peacham Hollow Brook from East Peacham village to Ewell's Mills (Peacham-Danville Rd.)

Reach T1.05 was not segmented during Phase 2 assessment, but valley confinement varies intermittently throughout the reach. Wider portions of the valley are a reference C-type stream in an Narrow valley, while more constricted, B-type portions of the stream are interspersed at a number of historic mill sites (none are present now) and portions of the valley constricted by road encroachments (Fig 44). Sediment storage in the reach indicates "pulsing" flows, with elevated stream power in more constricted portions of the valley moving sediments through quickly, and sediment "dumps" as the stream reaches wider portions of the valley downstream of those areas.

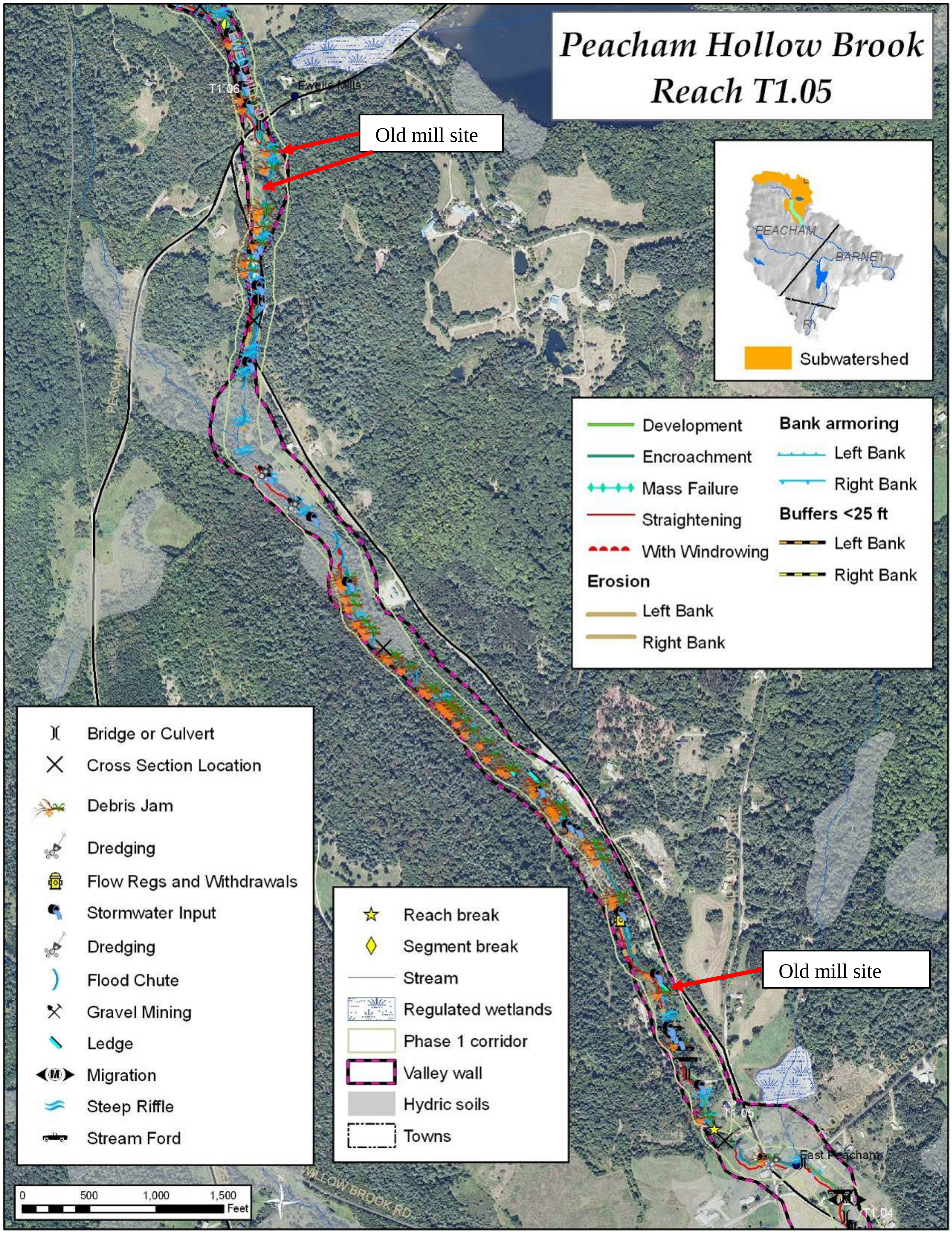

Figure 44. Reach map for Peacham Hollow Brook reach T1.05

Small-scale gravel removal is occurring in one of the broader sections of the T1.05 valley located downstream of a very confined upstream portion of the valley, and the widening at dredged areas appears to contribute to further subsequent aggradation due to the widened channel (Fig. 20). Flash flooding during 2010 may have been contributing to some of this deposition, as sediment discharge impacts from heavy rains were also evident at the Town of Peacham sandpiles located adjacent to reach T1.05. While silt fences might help retain some of the sand that made its way into Peacham Hollow Brook by the Town Garage, it appeared that large woody debris in the stream retained a large proportion of these sediments and dramatically slowed their movement downstream (and there is a beaver-controlled area a short distance downstream (no dam) that also traps many of these sediments). This appeared to be true throughout much of the reach, as buffers are in good shape and frequent debris jams were noted retaining sediment discharges and contributing to movement of the stream that helps diffuse stream power.

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
T1.05	9378	C	b (2-4 pct)	Cobble	Riffle-Pool	Very Broad

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.05-0	9378	C	b	Gravel	Riffle-Pool	Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	Very High	1.32	III	F	None

Primary stressors:

T1.05-0:

- Straightening (>20% but <50% of segment length) primarily through road encroachments (impacts amplified in naturally narrow portions of the valley) and remains of old mill buildings; combination with multiple grade controls contributes to passing of elevated stream power impacts to downstream areas
- Restriction of access to historic floodplain (incision ratio 1.32)
- Heightened stream power in constricted portions of the valley
- “Pulse flows” with elevated stream power in narrow areas and sediment slugs at wider portions of the valley
- Stormwater inputs
- Undersized culverts

Table 18. Peacham Hollow Brook Reach T1.05 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
T1.05-0	Protect River Corridor	Medium	Medium	Y	Get more info from landowner on sediment loading history in dredging areas at upstream end of reach. Assess impacts downstream; evaluate channel management options
T1.05-0	Replace existing culverts	High	Medium	Y	All three culverts are 6 ft; E. Peacham Rd. culvert by pond on upstream end may be top priority: perched and scouring, may trigger bank instability beneath pond. VHD MAPPING NOT ACCURATE FOR LOCATION OF THIS CULVERT (Fig. 46) Ewells Mills (concrete box culvert) is buried under a lot of fill and is a substantial investment to replace; concrete bottom and skirt hard for AOP passage. Assess risks to surrounding area for pre-disaster mitigation planning at Ewells Mills. Private culvert leading to 1558 E. Peacham Rd. may be lowest priority but does present full floodprone blockage; assess risks to E. Peacham village for pre-disaster mitigation planning

Figure 45. Exposed blue clay on the right bank downstream (right) of a perched culvert (left) on the East Peacham Rd., upstream portion of reach T1.05, may indicate scour that could trigger bank instability beneath a pond perched at the top of the slope above.

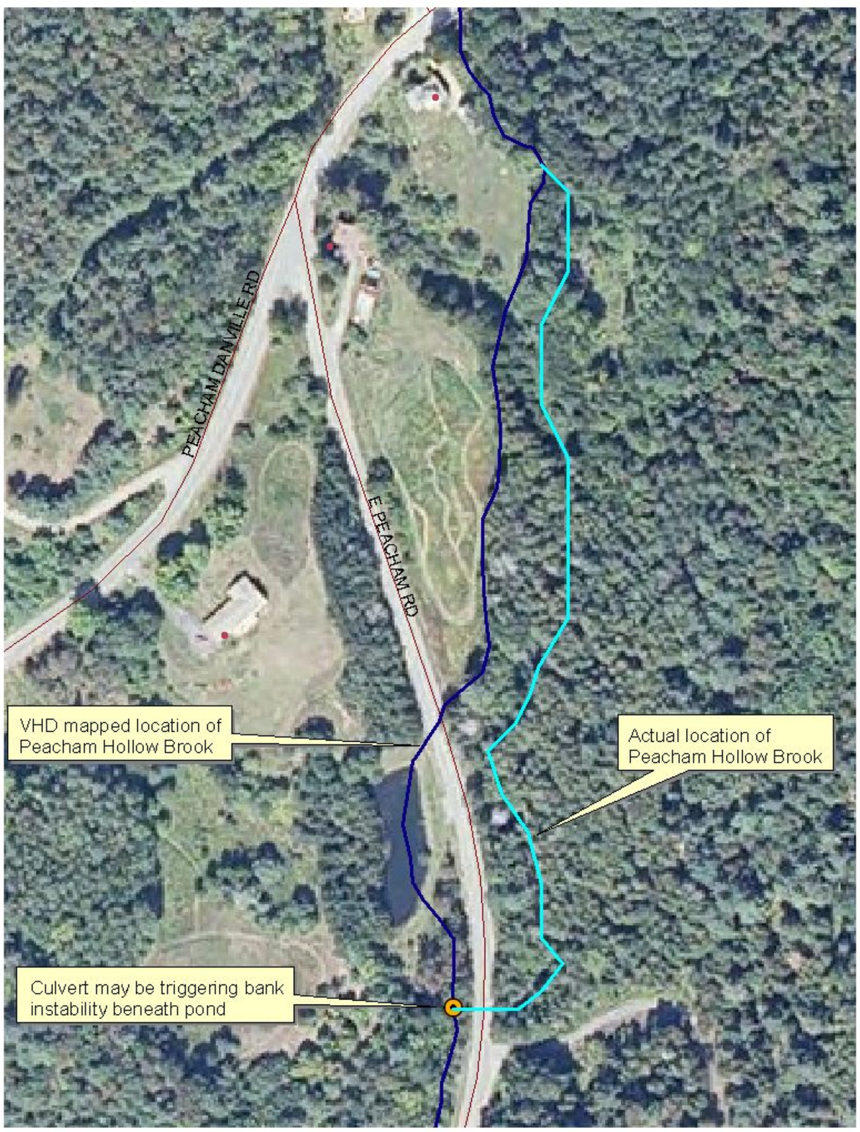

Figure 46. Map of actual location of culvert in T1.05 that may be triggering bank instability beneath a perched pond, which differs from Vermont Hydrography Dataset (VHD) mapped location.

6.1.13 Reach T1.06 – Peacham Hollow Brook from Ewell's Mills (Peacham-Danville Rd.) to junction of Bayley-Hazen Rd. and Slack St.

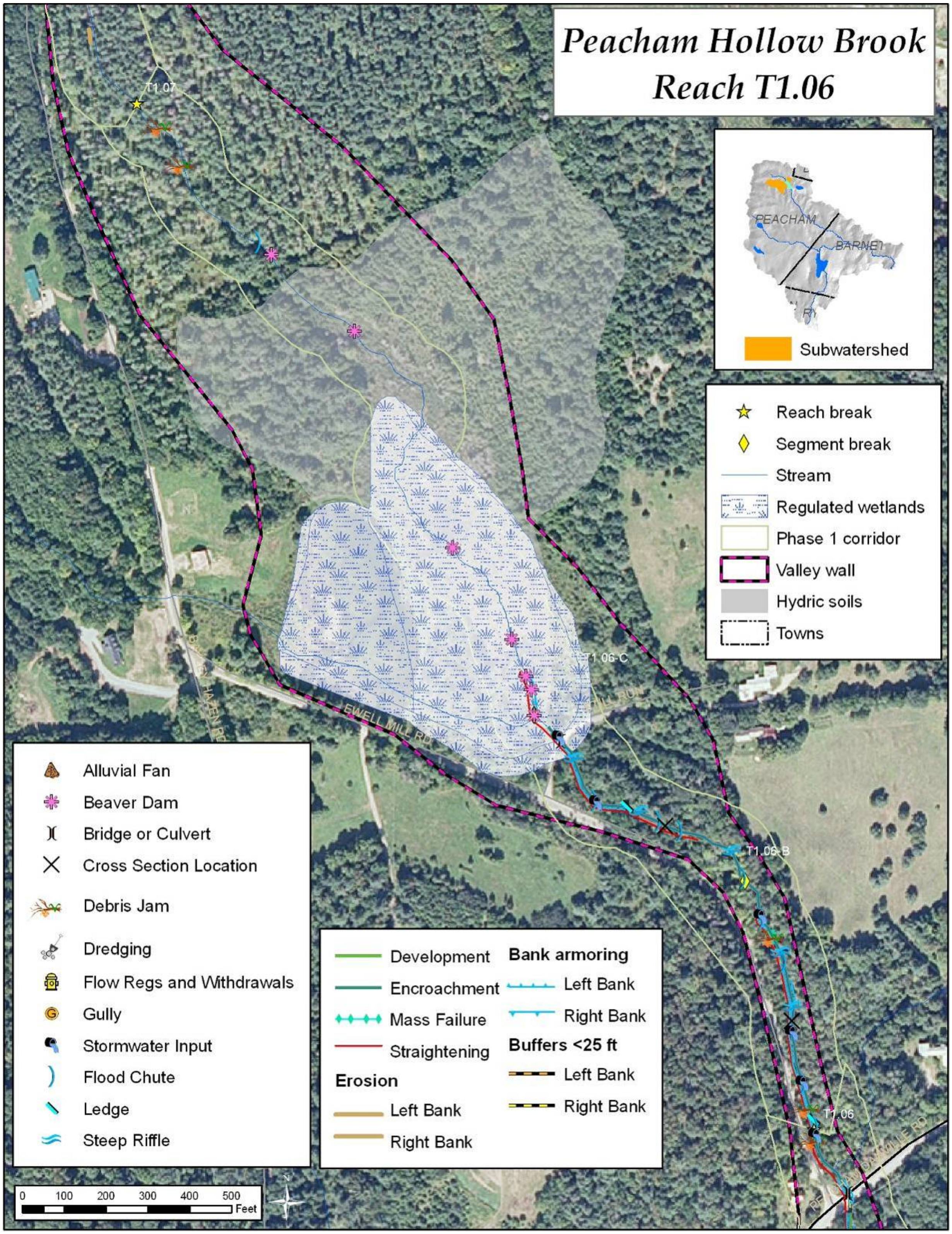

Figure 47. Reach map for Peacham Hollow Brook reach T1.06

Peacham Hollow Brook reach T1.06 was broken into three segments during Phase 2 assessment (Fig. 47).

T1.06A was designated a subreach due to its different reference type (a ~10 pct slope, bedrock-controlled A-type stream) than the upstream portions of the segment.

T1.06B and T1.06C are both likely C-type streams by reference, but with slightly steeper gradients ('b' subslope) than the classic C stream. T1.06B was assessed as a stream type departure from C to F-type.

T106C was excluded from full geomorphic assessment due to the influences of multiple beaver dams in the segment, in accordance with the geomorphic assessment protocols.

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
T1.06	3281	C	b (2-4 pct)	Gravel	Riffle-Pool	Very Broad

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.06A	632	A	None	Boulder	Cascade	Semi-confined
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Good	Moderate	1.00	I	D	None
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.06B	692	F	None	Gravel	Riffle-Pool	Narrow
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	Very High	0.00	IV	F	C to F
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.06C	1956	*Beaver-controlled: Not assessed*				Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
		Beaver-controlled: Not assessed				

T1.06A appears to be undergoing D-model evolution due to the extensive ledge present in the stream bed (see sec. 5.1.3. for description of D-model evolution). There is extensive mill history in this area, and it is likely the stream segment has had some adjustments over time, particularly when dams at Ewell's Mills downstream or Still Run (both human and beaver dam remains are present there) breached. With a naturally confined valley, and extensive ledge in the stream bed, however, these adjustments have been minimal and relatively rapid.

T1.06B is entrenched at the present time, as denoted by its C to F stream type departure. No field signs of recent incision were evident, however. A very high terrace at Still Run (>11 ft) was originally accounted as the recently abandoned floodplain, but due to difficulty determining whether this feature is actually of glacial (rather than historic) origin, the incision ratio was not calculated. It appears that the glacial history of this area may be similar to reaches T1.03 and T1.04 on Peacham Hollow Brook, with a legacy of glacial ponding followed by massive incision when sediment dams that created these impoundments let loose. The former low gradient valley would have been a Broad valley on top of the current high terrace, rather than in the current Narrow valley. Regardless, the Cb to F stream type departure is due to current entrenchment in a narrower valley, with an overwidened stream accessing flood chutes at bankfull flows; debris jams and sudden lateral migrations are common.

Primary Stressors:

T1.06A:

- Straightening (>50% of segment length) primarily through road encroachment, riprap, and mill use, which have limited planform adjustments in conjunction with the natural confinement of the valley
- Diminished buffers along Ewell's Mills Rd.
- Heightened stream power being passed downstream

T1.06B:

- Straightening (>50% of segment length) primarily through road encroachment and riprapping of right bank
- Loss of access to floodplain – unclear if this is historic or related to glacial stream incision (incision ratio > 4 if high terrace is accounted as historic rather than glacial)
- Undersized culvert at Still Run contributing to downstream deposition

T1.06C (not fully assessed due to beaver control):

- Heightened stream power being passed from T1.07 due to changes in land use and development patterns
- Highly erodible sand banks
- Recent tree mortality

- As with T1.02C, it should be noted that beaver streams are ephemeral by nature and are often located in areas that are Extremely sensitive to changes in watershed inputs due to silt and sand substrates; this appears to be true in T1.06C. Changes in watershed inputs are likely to accompany significant recent mortality of white pine and hardwoods throughout the segment, which will likely allow water to enter the stream more quickly and forcefully. Blow-outs of the beaver dams or loss of floodplain access for the stream could easily cause the stream to pass the impacts of heightened stream power to downstream reaches.

Table 19. Peacham Hollow Brook Reach T1.06 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
T1.06B	Protect River Corridor	Medium	Low	Y	Incorporate FEH zones in local planning
T1.06B	Replace existing culvert	Medium	Low	Y	Undersized culvert at Still Run building deposition upstream, and is perched – reduced AOP
T1.06C	Protect River Corridor	High	Medium	Y	Incorporate FEH zones in local planning, consider road risk in Pre-disaster mitigation planning and capital budgeting
T1.06C	Protect River Corridor	High	Medium	Y	Increasing development pressure; incorporate FEH or belt-width zones in local planning (alternative width for unassessed reaches)

6.1.14 Reach T1.07 – Peacham Hollow Brook from junction of Bayley-Hazen Rd. and Slack St. to headwaters of Peacham Hollow Brook

Reach T1.07 comprises the headwaters of Peacham Hollow Brook (Fig. 48), and although the reach was originally excluded from Phase 1 assessment it was included in Phase 2 assessments because this portion of the stream has undergone significant recent land use changes that appear to be contributing to adjustments downstream.

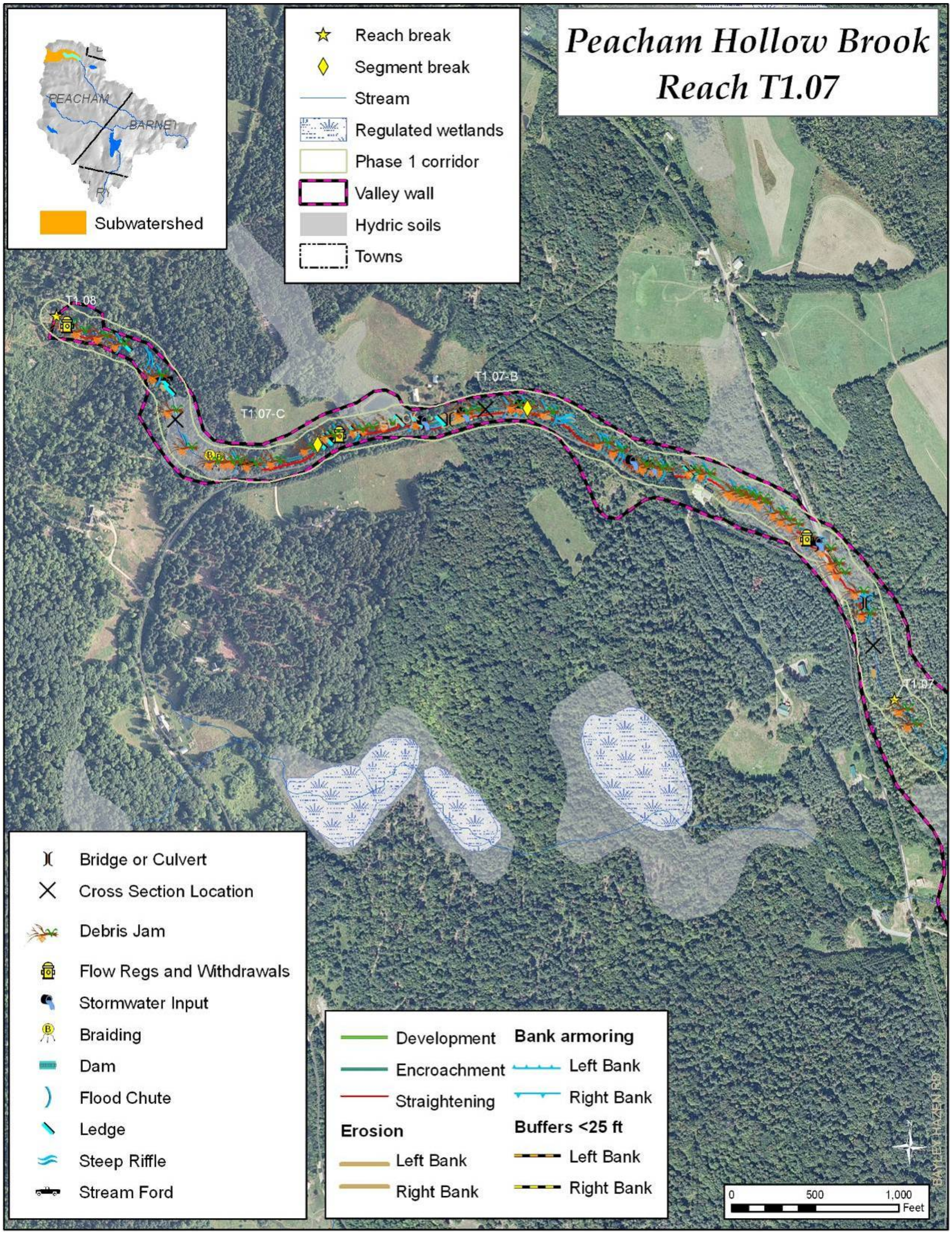

Figure 48. Reach map for Peacham Hollow Brook reach T1.07

Increasing development pressure along the reach includes: a clearcut for development being conducted along the left bank at the Bayley-Hazen Rd. junction with Slack St. during 2010 assessment; a recently built house, garage, and elevated parking areas that encroach on the right bank of the stream upstream; a for sale sign posted during 2010 assessments for a property that appears to be accessed along a logging road that runs over an undersized culvert a short distance downstream of the Bayley-Hazen Rd. junction with Slack St.; and a hilltop development with a heavy cut and new small pond installed at the head of the reach (heavy cut visible in comparison of 1998 black and white orthos and 2009 NAIP imagery).

Fieldwork on T1.07C originally tracked up an unmapped tributary (on either USGS topos or the Vermont Hydrography dataset) in the area of the heavy cut at the top of the reach, and the tributary currently appears to be larger than the mapped T1.07C. This area has multiple ledge grade controls and has been significantly channelized (Fig. 49), and erosion in recent microburst activity appeared to be passing a significant amount of stream power and sediments to T1.07 further downstream. The relationship of the recent heavy cutting and the size of this tributary is unclear, but it does appear that water may reach the stream more quickly and intensely in storms than previous to the heavy cut, which resulted in a conversion of roughly 10 acres of continuous softwood cover to regenerating hardwoods.

Figure 49. Fieldwork on T1.07C originally tracked up a small tributary that does not appear on maps; the stream has been significantly channelized and appeared to be passing heightened stream power and sediments in recent microburst activity.

Further heavy cutting occurred in T1.07C downslope at the corner of Slack St. where the road swings away from the stream (Fig. 48). A recent windstorm appeared to have blown a good deal of cedar down in this area, and a salvage log job was conducted. The stream area was corduroyed with some of the cedar for skidder passage, and the resulting numerous debris jams in this area has retained some of the sediment discharges from proceeding further downstream.

Straightening of the stream in T1.07B occurred with elimination of a former meander at the entrance drive to Butternut Hill Farm, and the portion of the stream that was channelized through a new culvert tore out both banks and scoured the bed to bedrock during recent microburst storm activity (Fig 50).

Figure 50. A microburst storm in August 2010 tore out the banks and scoured the stream bed to bedrock in T1.07B just downstream of Butternut Hill farm. The impacts pictured here occurred after a former stream meander was eliminated by routing the stream through a new culvert installed at the drive entrance.

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
T1.07	6430	C	b (2-4 pct)	Cobble	Riffle-Pool	Very Broad

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.07A	3087	C	b	Cobble	Riffle-Pool	Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	High	1.57	III	F	None
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.07B	1296	E	b	Gravel	Plane Bed	Narrow
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Poor	Extreme	1.33	III	F	Other
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T1.07C	2047	C	b	Sand	Riffle-Pool	Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	Very High	1.47	II	F	None

Primary Stressors:

T1.07A:

- Straightening (>50% of segment length) primarily through road and development encroachment
- Stormwater inputs (US RB at corner of Slack St. and Bayley-Hazen Rd. junction had recent gullying initiated in 2010 storms)
- Diminished buffers (2010 development clearcut) at downstream LB corner of Bayley-Hazen Rd. and Slack St.
- Heightened stream power being passed from upstream
- Undersized culverts
- Knotweed near center of Slack St. and Bayley-Hazen Rd. junction is relatively limited in extent, still away from the stream, and one of few infestations observed in watershed assessments

T1.07B:

- Straightening (>50% of segment length) through extensive road encroachment and recent elimination of a meander through channelization in a new culvert
- Loss of access to floodplain due to recent microburst activity; Cb to Eb stream type departure
- Undersized culvert and bridge at Butternut Hill Farm; scour downstream of culvert
- Heightened stream power being passed downstream; multiple ledge grade controls that account majority of slope

T1.07C:

- Heightened stream power being passed downstream: conversion of 10 acre softwoods to regenerating hardwoods; cedar windstorm damage salvage (removal of more softwood cover); channelization of unmapped tributary; conversion of wetlands at top of reach to small pond with focused outlet

Table 20. Peacham Hollow Brook Reach T1.07 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
T1.07A	Protect River Corridor	High	High	Y	Incorporate FEH zones in local planning; consider road risk in Pre-disaster mitigation planning; gully repair US RB of Bayley-Hazen_Slack St.; knotweed control along Bayley-Hazen
T1.07A	Augment stream buffer	Medium	Low	Y	Replace clearcut buffer at new development clearing DS of Bayley-Hazen_Slack St.
T1.07B	Replace existing culvert and bridge	High	Medium	Y	Undersized culvert at Butternut Farm - scour below, and is slightly perched – reduced AOP; bridge new, no adjustments yet
T1.07C	Protect River Corridor	High	Medium	Y	Incorporate FEH zones in local planning, consider channel management easements if not

6.1.14 Reach T2.01 – South Peacham Brook from confluence with Stevens mainstem and Peacham Hollow Brook to opening at downstream end of Choate fields (across from 3742 West Barnet Rd.)

Reach T2.01 on South Peacham Brook shares a wide floodplain at the base of the reach with segment T1.01A on Peacham Hollow Brook (Fig. 51) . Although this shared floodplain is wider than the rest of the reach, T2.01 was not segmented during Phase 2 assessment because only the most downstream section of the reach (less than 700 ft.) below the bridge under the Peacham-West Barnet Rd. has access to that floodplain, and only off the left bank. Although not apparent on topographic maps in either situation, the same is true on the upstream end of the reach where only the last 600 ft. of the stream, upstream of a private bridge at an old dam site, has access to a wider floodplain. The overall reach is thus predominantly a Narrow valley both naturally and via human constructions.

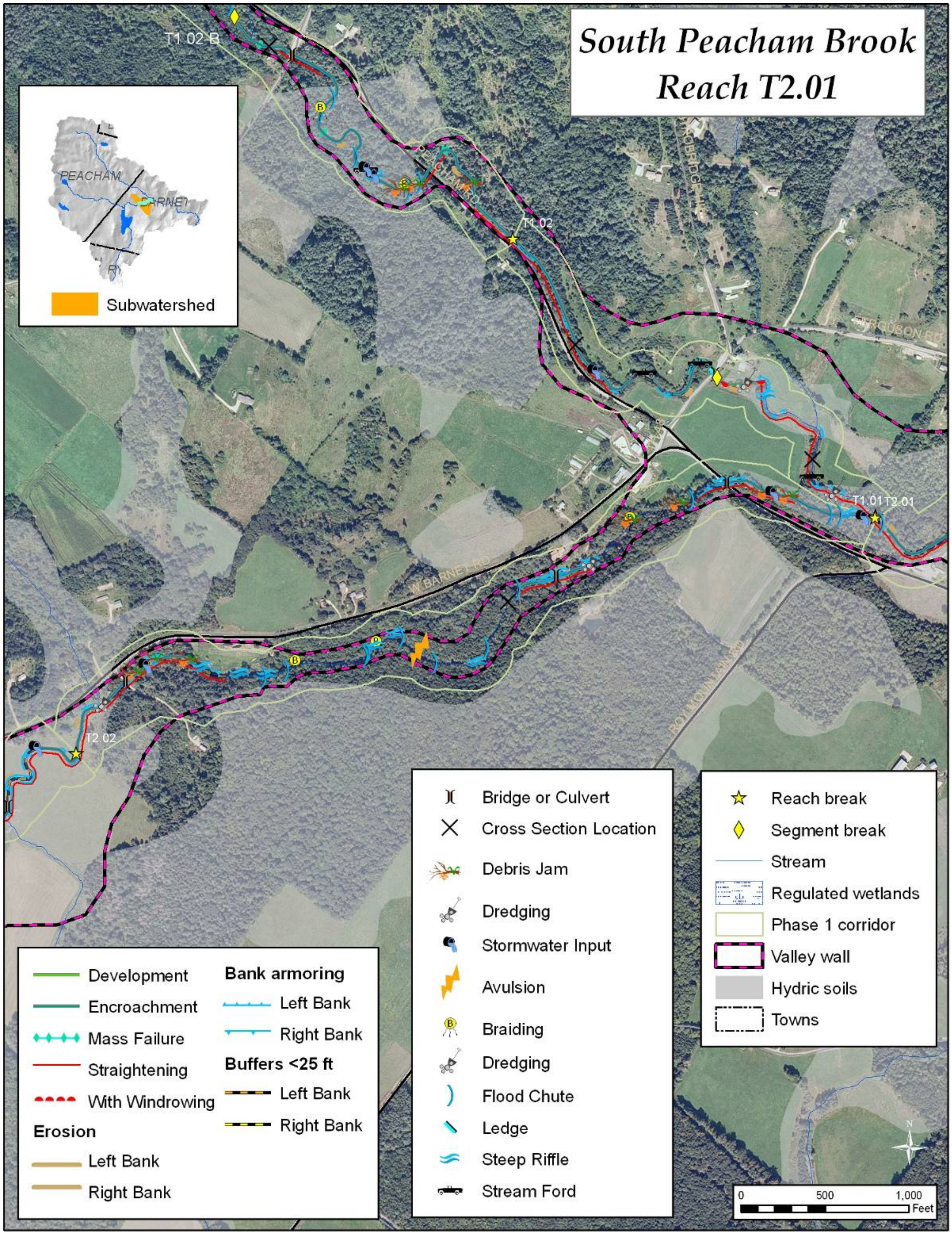

Figure 51. Reach map for South Peacham Brook reach T2.01

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
T2.01	5816	C	None	Cobble	Riffle-Pool	Narrow

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T2.01-0	5816	C	None	Cobble	Riffle-Pool	Narrow
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	High	1.25	III	F	None

Special note: Dam in Vermont Dam inventory at 3613 W. Barnet Rd. is no longer present

Primary Stressors:

T2.01-0:

- Straightening (>20% but <50% of segment length) primarily through road and development encroachment, also channelized through bridges
- Restriction of access to historic floodplain (incision ratio 1.25)
- "Pulse flows" downstream of Harvey's Lake dam; seasonal store and release (flashboard installation and removal) may contribute to heavy discharges alternating with low flows insufficient to distribute slugs more evenly; braiding evident at sediment slugs moving through stream network
- Diminished buffers upstream and downstream ends and at developed homesite in upstream third of reach
- Undersized bridges

Table 21. South Peacham Brook Reach T2.01 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
T2.01-0	Protect River Corridor	High	High	Y	Incorporate FEH zones in local planning; consider channel management easements in shared floodplain with T1.01

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
T2.01-0	Augment or plant stream buffer	Medium	Medium	Y	Upstream and downstream ends; homesite in upper third of reach may be tough to get funding
T2.01-0	Replace existing bridges	Medium	Low	Y	Downsteam bridge on Peacham-West Barnet Rd. likely highest priority; alignment reduces effective width and accessibility of floodplain

6.1.15 Reach T2.02 – South Peacham Brook from opening at downstream end of Choate fields (across from 3742 West Barnet Rd.) to upstream end of West Barnet village (upstream of 647 West Main St.)

Reach T2.02 was divided into four segments during Phase 2 assessments (Fig. 52).

T2.02A includes the wide section of the valley encompassing the Choate Farm, and the segment appears to be located on glacio-fluvial and alluvial deposits of likely glacial origin. There is an old dam site in the upstream portion of the segment, and this area was marked by multiple large (nearly continuous) debris jams and braiding through legacy sediments. The remainder of the segment appears ditched because of its depth and near-continuous pools extending throughout the segment, but there did not appear to be ditching spoils on the banks. These may have been incorporated into the adjacent fields through cultivation over time, or the pools may be related to bed degradation in the segment. The sandy banks have extensive bank toe armoring, much of which is failing.

T2.02B comprises the highly confined portions of the stream flowing through West Barnet village. Much of the segment has been filled or riprapped on the left bank, and it was difficult to determine the original height of the terrace on that side of the stream. Historical access to floodplain on that side of the stream would give a significantly higher incision ratio (~2.8), but similar features elsewhere in the watershed indicate this formation may be of glacial origin. The incision ratio was thus based on a smaller, and likely more recent, terrace on the right bank.

T2.02C includes the Harvey's lake dam, which is actually located on South Peacham Brook; high flows can back up toward the lake along the dead level stretch of Jewett's Brook in the shared floodplain with South Peacham Brook. The reach was excluded from full geomorphic assessment due to the influences of the impoundment, in accordance with assessment protocols.

T2.02D is a largely armored segment in the upstream portion of West Barnet village.

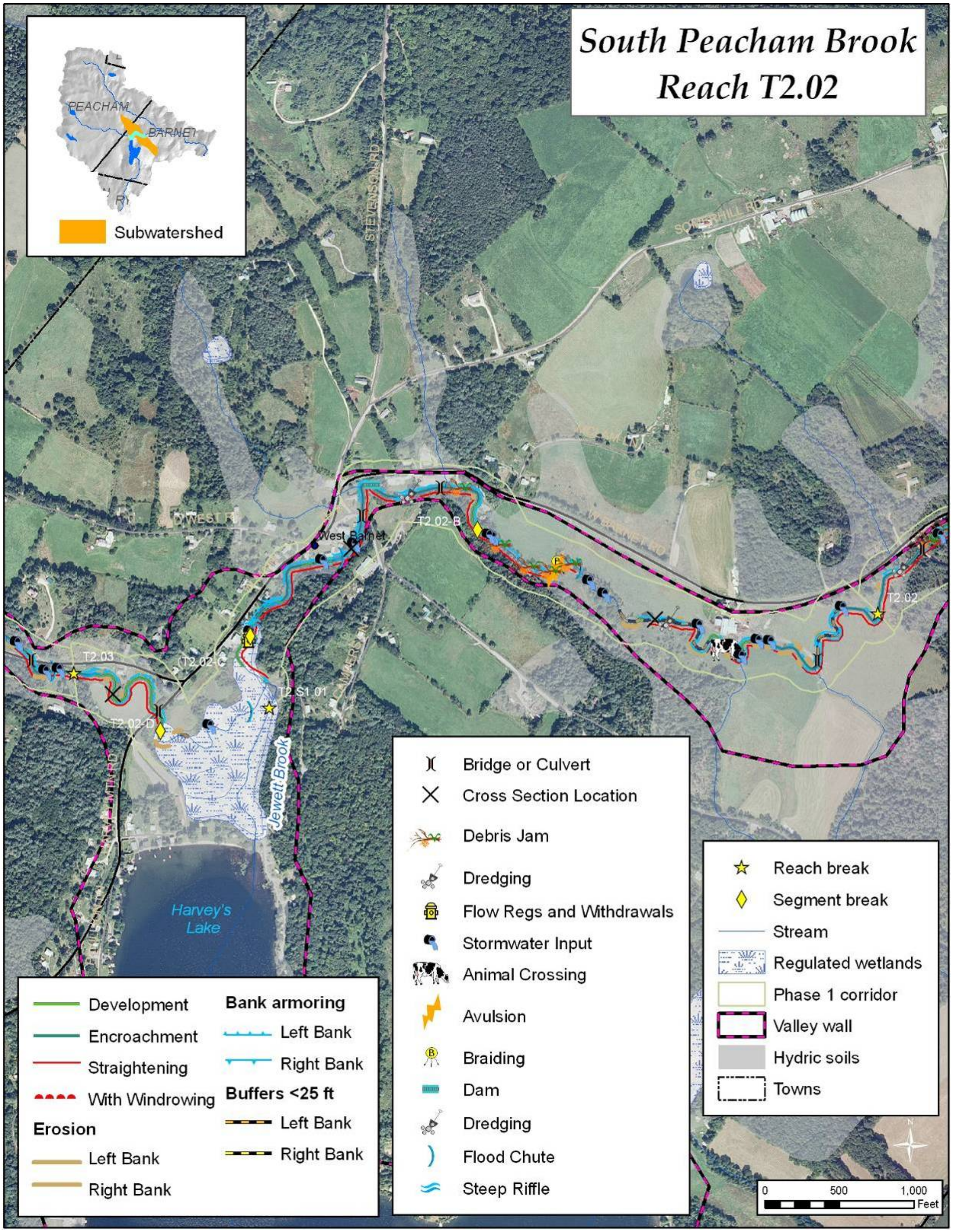

Figure 52. Reach map for South Peacham Brook reach T2.02

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
T2.02	9223	E	None	Gravel	Riffle-Pool	Very Broad

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T2.02A	3900	E	None	Gravel	Riffle-Pool	Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	Extreme	1.61	III	F	None
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T2.02B	2570	B	c	Cobble	Riffle-Pool	Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	High	1.59	III	F	C to B
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T2.02C	1616	*Impounded: Not assessed*				Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Impounded: Not assessed					
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T2.02D	1137	E	None	Gravel	Riffle-Pool	Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	Extreme	1.82	III	F	None

Special note: Dam in Vermont Dam Inventory at upstream end of Choate Farm (T2.02A) is no longer present

Primary Stressors:

T2.02A:

- Straightening (>50% of segment length) primarily through extensive bank toe armoring, much of which is starting to fail
- "Pulse flows" downstream of Harvey's Lake dam
- Restriction of access to historic floodplain (incision ratio 1.61)
- Stormwater inputs (both road ditches and field ditches, overland flow)
- Sand banks, lacking buffers

T2.02B:

- Straightening (most of segment length) through extensive fill, development and road encroachment
- Restriction of access to historic floodplain (incision ratio 1.59)
- "Pulse flows" downstream of Harvey's Lake dam; one three-step check dam in place behind West Barnet Garage, another single check dam in place behind Barnet Town Hall to prevent headcutting; these require maintenance
- Diminished buffers in developed areas
- Two undersized bridges with deposition above

T2.02C:

Not fully assessed due to impoundment, in accordance with assessment protocols.

The Harvey's Lake dam is actually located on South Peacham Brook just downstream of the confluence with Jewett Brook, with a shared floodplain between. High flows on South Peacham Brook can back up into Harvey's Lake, increasing the value of upstream assets on South Peacham Brook for attenuating high flows and sediment and nutrient discharges. Sediments from upstream have accrued behind the dam over time as well. The dam appears to influence stream dynamics both upstream and downstream due to flow regulation through seasonal installation of flashboards.

T2.02D:

- Straightening (>50% of segment length) through extensive bank toe armoring (usually only one bank at a time), some of which is starting to fail; road and development encroachments; and channelization through the Harvey Mtn. Rd. bridge
- Heavy restriction of access to historic floodplain (incision ratio 1.82)
- Erodible sand banks, elevated flows from upstream (stormwater inputs)
- Special note: Japanese butterbur (*Petasites japonicus*) is planted on the left bank at 647 West Main St.; it is not known how long this plant has been present here, but early indications in other areas are that the plant can rapidly become highly invasive, particularly along stream banks

Table 22. South Peacham Brook Reach T2.02 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
T2.02A	Protect River Corridor	High	High	Y	Consider channel management easements
T2.02A	Plant stream buffers, fencing and watering options	High	High	Y	Low-cost stock due to high erosion hazards; currently fenced with polywire; cows access stream at ford
T2.02B	Protect River Corridor	High	High	Y	Maintain check dams; incorporate FEH zones in local planning, consider flood risks and risks of headcutting in Pre-disaster mitigation planning
T2.02B	Plant stream buffers	Medium	Low	Y	Encourage private landowners; funding may be difficult
T2.02C	Protect River Corridor	Medium	High	Y	Appears to be in FEMA Special Flood Hazard Area
T2.02D	Protect River Corridor	Medium	Low	Y	Incorporate FEH or belt-width zones in local planning; consider control of Japanese butterbur
T2.02D	Plant stream buffers	Medium	Low	Y	CREP may be possible on right bank, possible left bank downstream of bridge
T2.02D	Replace existing bridge	Low	Low	Y	Undersized, scour noted below but no structural concerns at this time

6.1.16 Reach T2.03 – South Peacham Brook from upstream end of West Barnet village (upstream of 647 West Main St.) to start of fields downstream of Hollow Woods Rd.

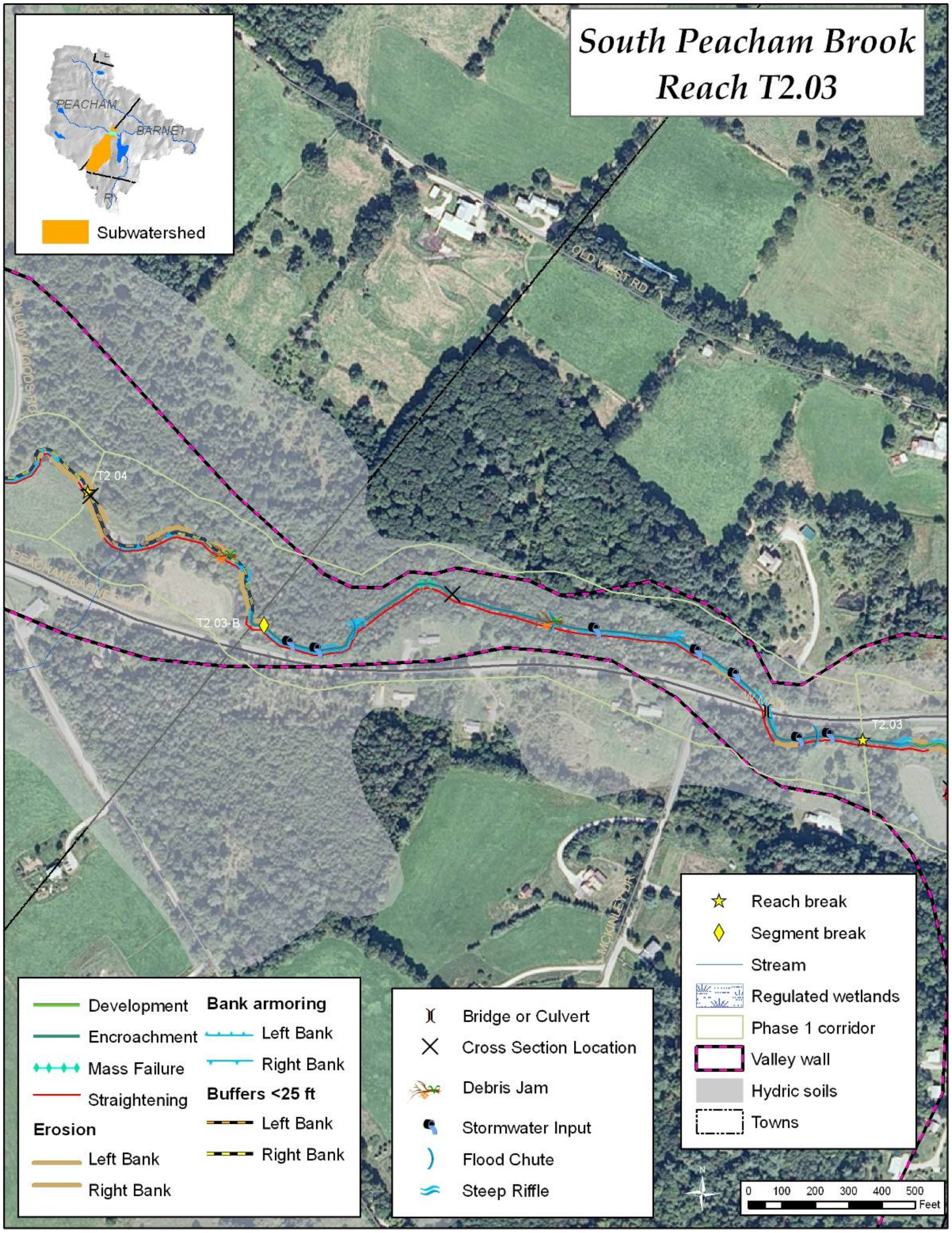

Figure 53. Reach map for South Peacham Brook reach T2.03

Reach T2.03 on South Peacham Brook was broken into two segments during phase 2 assessments, primarily due to differences in valley confinement related to a naturally narrower valley plus the contribution of extensive road encroachments in downstream segment T2.03A (Fig. 53), compared with a broader valley in segment T2.03B. T2.03B appears to be tied to the fields further upstream on either side of Hollow Woods Rd., and cows grazing in the pasture here have full access to the stream; the woods on the left bank of the stream are pastured woodlot as well. Extensive hydric soils throughout the reach indicate likely conversion of former forested wetlands to agricultural lands, with attendant loss of wetland attenuation functions.

Segment T2.03A was noted with a C to B stream type departure due to the effects of the long-standing road encroachments. Even with a reference valley width (no road encroachments), however, the valley in this portion of the stream would have bordered on being too narrow for classification as a C-type stream.

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
T2.03	2871	C	None	Cobble	Riffle-Pool	Broad

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T2.03A	2055	B	c	Gravel	Riffle-Pool	Narrow
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	Very High	1.25	III	F	C to B
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T2.03B	815	C	None	Gravel	Riffle-Pool	Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	Very High	1.27	III	F	None

Primary Stressors:

T2.03A:

- Straightening (>50% of segment length) primarily through extensive riprap and road encroachment along the right bank
- Restriction of access to historic floodplain (incision ratio 1.25)
- Stormwater inputs (mostly road ditches, also overland flow)

T2.03B:

- Straightening (>50% of segment length) primarily through bank toe armoring and a small degree of road encroachment
- Restriction of access to historic floodplain (incision ratio 1.27)
- Elevated erosion related to cattle access to stream
- Diminished buffers in upstream portions of both banks

Table 23. South Peacham Brook Reach T2.03 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
T2.03A	Replace existing bridge	Low	Low	Y	Effective width reduced by alignments, some deposition upstream and downstream but no pressing structural or flood hazard issues
T2.03B	Protect River Corridor	Medium	Medium	Y	Incorporate FEH in local planning
T2.03B	Plant stream buffers, fencing and watering options	Medium	High	Y	Affects discharges feeding into floodplain at Harvey’s Lake

6.1.17 Reach T2.04 – South Peacham Brook from start of fields downstream of Hollow Woods Rd. to South Peacham village

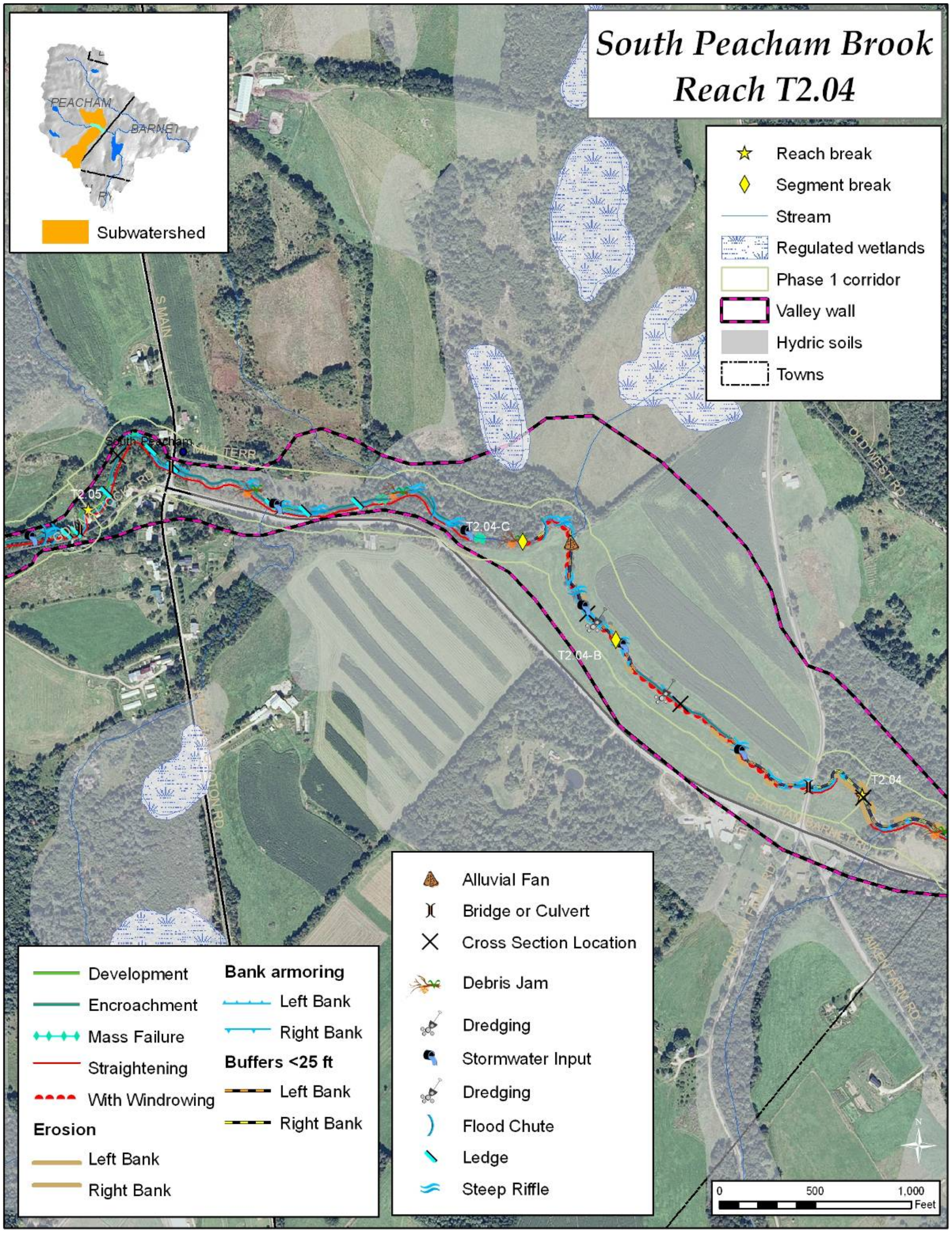

Figure 54. Reach map for South Peacham Brook reach T2.04

Reach T2.04 on South Peacham Brook comes out of a historic mill district in South Peacham and passes through an alluvial fan (may be glacial in origin, but has clearly had impacts in historic times) at the upstream end of the reach Fig. 54). Nearly all of the reach has been straightened for a combination of mill and agricultural uses. Extensive hydric soils in the reach indicate likely conversion of former forested wetlands to agricultural and developed land uses, with concomitant impairment of wetland attenuation functions.

The agricultural fields along the stream appear to have been tiled, and the stream has been windrowed (and possibly ditched historically) so that intermittent berms exist on both sides of the stream (primarily off the right bank).

T2.04 was split into three segments during Phase 2 assessment.

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
T2.04	5480	C	b (2-4 pct)	Cobble	Riffle-Pool	Very Broad

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T2.04A	1713	E	None	Gravel	Riffle-Pool	Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	Extreme	1.22	III	F	None
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T2.04B	998	G	c	Cobble	Step-Pool	Very Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	Extreme	2.49	III	F	E to G
Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T2.04C	2770	C	b	Cobble	Step-Pool	Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Fair	High	1.00	III	F	None

T2.04A comprises the bulk of the Roy fields along South Peacham Brook on either side of Hollow Woods Road.

T2.04B consists of a more entrenched portion of the stream at the upstream edge of the field towards the woods edge. An E to G stream type departure was recorded for the segment due to deep incision through sediment deposits. This segment has heavy stone lined along the steep banks, and field observations guessed there might have been bridge abutments located here at one time. No historical records or maps indicate such a structure, however, and it appears more likely that large amounts of heavy stone have deposited in this area over time and been repeatedly windrowed or otherwise removed from the stream and lined along the banks.

T2.04C is the bedrock-controlled, upstream portion of the reach along Mill Trace and into South Peacham village. Beers Atlas of 1875 indicates a grist mill, car factory, and sash and door company all located on this segment of the stream, and stone walls and building remnants are still visible at some distance back from the stream. Extensive bedrock grade controls and boulder substrates in the segment led to no observation of incision, and this segment appears to undergo D-model channel evolution (see sec 5.1.3 for description of D-model evolution.)

Primary Stressors:

T2.04A:

- Straightening (virtually all of segment length, with portion downstream of Hollow Woods Road affected by channelization through bridge), primarily through extensive windrowing and/or ditching, with small berms lining the sides of the stream
- Heavy flow and sediment discharges upstream, and passing of these impacts through straightening, armoring and encroachments
- Restriction of access to historic floodplain (incision ratio 1.22)
- Stormwater inputs (tile drains)
- Fine-grained banks, lacking buffers

T2.04B:

- Straightening (most of segment length) through extensive windrowing
- Loss of access to historic floodplain (incision ratio 2.49; E to G stream type departure)
- Diminished buffers
- Passing impacts downstream at all but highest flows, at which it might aggrade significantly

T2.04C:

- Straightening (virtually all of segment length) primarily through extensive road and development encroachments, armoring, and channelization through bridges

- Heavy flow and sediment discharges upstream, and passing of these impacts downstream through straightening, armoring and encroachments

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Table 24. South Peacham Brook Reach T2.04 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
T2.04A	Protect River Corridor	High	High	Y	Seek channel management easements, alternative watering system downstream of Hollow Woods Rd.
T2.04A	Plant stream buffers, fencing	High	High	Y	Likely eligible for CREP, EQIP
T2.04A	Remove berm	High	Unknown	Y	Need higher resolution survey to determine how much more floodplain access would be gained; berm is intermittent may have access in some areas already
T2.04A	Replace existing bridge	Medium	Low	Y	Not a floodprone contriction
T2.04B	Protect River Corridor	High	High	Y	Seek channel management easements
T2.04B	Plant stream buffers, possibly fencing	High	High	Y	Likely eligible for CREP; not sure if this area is pastured
T2.04C	Protect River Corridor	High	High	Y	FEH; ensure protection of lot next to old South Peacham store – virtual detention pond for Peacham-Groton-Danville Rd. bridge in a flood

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
T2.04C	Plant stream buffers	Medium	Medium	Y	Tough planting conditions due to road encroachments, but some opportunities; would need creative financing options
T2.04C	Replace existing bridges	Medium	Medium	Y	Neither Peacham-Groton-Danville Rd. nor Mill Trace are structurally problematic currently, but both amplify stream power and sediment discharge impacts downstream. P-G-D bridge is really buried and difficult to replace; consider road and development risks in Pre-disaster mitigation planning and eventual bridge replacements in capital budgeting

6.1.17 Reach T2.05 – South Peacham Brook from South Peacham village to County Rd.

Reach T2.05 runs along Governor Mattocks Rd. upstream from South Peacham village (Fig. 55) and includes an old starch factory site right on the stream (indicated as dammed on the 1875 Beers Atlas), as well as additional buildings close to the stream and extensive road encroachments. The reach was not segmented during phase 2 assessments.

Although the reach was in Good geomorphic condition at the time of 2010 Phase 2 assessments, showing minor adjustments despite some recent flash flooding events, the May 26, 2011 flooding in the watershed impacted this reach heavily (Fig. 15). Due to Moderate sensitivity and relatively high gradient slopes in the reach, fine sediment discharges from the 2011 flooding may be moved through the reach relatively rapidly, but coarse substrates (cobble and boulder) could well take decades before they become more evenly distributed again. Sediment slugs provide opportunities for braiding and rapid lateral migration in future flood events, increasing erosion hazards on encroachments within the stream corridor. Due to its upstream position in the watershed, there are not a lot of attenuation asset upstream of this reach, and the value of attenuation assets downstream become of greater value in being able to accommodate discharges from this area.

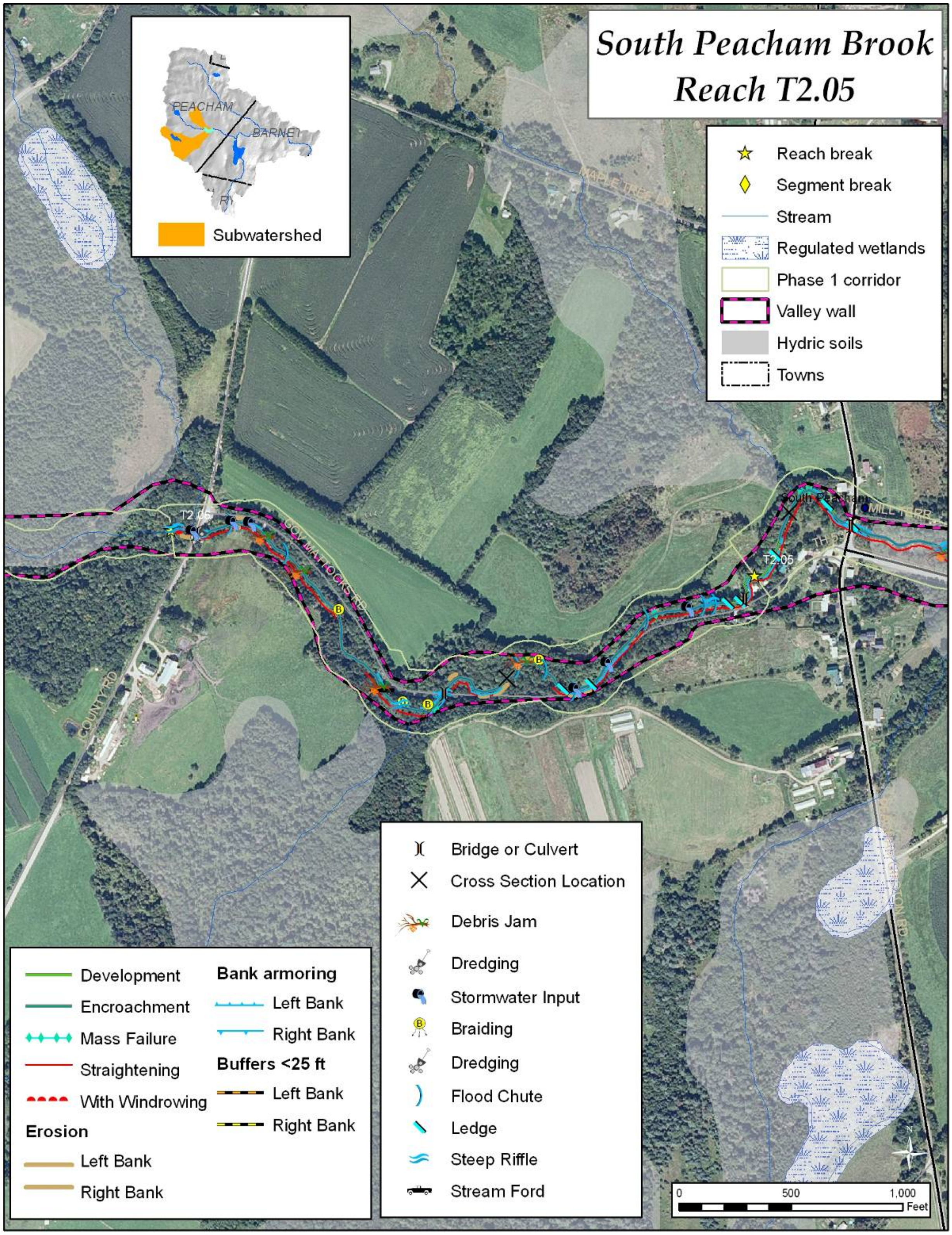

Figure 55. Reach map for South Peacham Brook reach T2.05

Phase 1

Reach ID	Channel length (ft)	Stream type (reference)	Sub-slope	Bed material	Bed-form	Valley type
T2.05	3523	C	b (2-4 pct)	Cobble	Step-Pool	Broad

Phase 2

Segment ID	Channel length (ft)	Stream type (existing)	Sub-slope	Bed material	Bed-form	Valley type
T2.05-0	3523	C	b	Cobble	Step-Pool	Broad
	Geomorphic condition	Stream sensitivity	Incision ratio	Channel evolution stage	Channel evolution model	Stream Type Departure
	Good	Moderate	1.16	III	F	None

Primary Stressors:

T2.05-0:

- Straightening (>50% of segment length), primarily through extensive development and road encroachments
- Flash flooding impacts: heavy flow and sediment discharges upstream, and passing of these impacts through straightening, armoring and encroachments
- Restriction of access to historic floodplain (incision ratio 1.16)
- Stormwater inputs (road ditches)
- Undersized culverts (Gov. Mattocks Rd. arch culvert effective width reduced by alignment, County Rd. just undersized)

Table 25. South Peacham Brook Reach T2.05 Projects and Practices Table

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
T2.05-0	Protect River Corridor	Medium	Medium	Y	Incorporate FEH zones in local planning
T2.05-0	Replace existing bridge	Medium	Low	Y	Footbridge upstream of South Peacham village has low clearance, likely to plug; outflanking may not be a big deal

6.2 PROJECT PRIORITIZATION

Current geomorphic conditions in the Stevens River watershed place the highest priority, (in terms of project prioritization) on protection of, and unrestricted access to, existing floodplains. This includes beaver-controlled areas that were not able to be fully assessed in Phase 2, as these areas contribute to the intermittent spacing of such assets in the watershed that permit a break from transfer of impacts to downstream reaches.

Flash flooding appears to be the primary driver of stream dynamics in the watershed, but important attenuation assets that can accommodate high flows and sediment and nutrient discharges are spaced intermittently along the streams of the watershed. Project prioritization generally emphasizes upstream restorations of equilibrium conditions when feasible, and encourages attenuation of impacts in the shortest possible distance downstream. In the Stevens River watershed, however, the intermittent distribution of attenuation assets means protection and restoration efforts are generally tied to upstream flow and sediment discharges within a limited distance, provided existing assets remain protected.

The widespread distribution of the important stream assets needed for protection and restoration work makes parcel by parcel corridor protection efforts challenging, but land ownership patterns within the Stevens River watershed indicate a number of larger parcels at key points within the stream network that make such an approach feasible; these receive high priority in the list at the end of this chapter. Municipal governments can achieve many of the same goals more efficiently and effectively however. This is why the top priority recommendation in this report is for the Towns of Barnet and Peacham to consider belt-width corridors or similar measures for augmentation of current development review specifications. Belt-width corridors are based on over 30 years of research and data collected from hundreds of streams around the world, and approximate the extent of lateral adjustments likely to occur over time in a meandering stream type. This is generally a minimum of 3-4 times the stream channel width on each side of the stream. The physical dictates of stream processes mean that a stream denied this room will pass elevated impacts to other areas.

It would be difficult to overemphasize the importance of the role that small streams play in a watershed such as the Stevens River basin. Recent flood damages to roads have been the most notable impacts from such streams, and the large costs associated with repair are challenging for small towns to accommodate. Since there have been few houses or structures damaged in these events, the primary exposure that most people have to these events is along localized portions of roads, and it is often not easy to see how these impacts are being amplified by loss of floodplain access or heightened streampower transferred from upstream of the impacts. Setbacks, FEH zones, or other belt-width corridors provide flood protection not only for land and structures adjacent to the stream, but accommodation of stream processes that will help break a cycle of impacts being amplified and passed to downstream reaches.

Only two stream segments in the Stevens River watershed were determined to be in Poor geomorphic condition in the 2010 assessments, M1.07C and T1.07B. Both of these stream segments had lost historic floodplain access due to relatively recent events

(M1.07C due to the breach of the Ben's Mill dam around 1990, T1.07B due to heavy impacts from microburst flooding in 2010). In each of these cases, impacts were evident in downstream reaches but adjustment processes toward a new equilibrium were clearly underway and the stream has adequate room to make these adjustments (such as lateral migration and widening without conflicts with existing development or other encroachments). The key factor to be noted is the room to make such adjustments; protecting corridors to allow the stream this room goes a long way to maintaining healthy streams and reducing costs incurred when this room is lacking.

Only six of the reaches assessed in 2010 were indicated in Good geomorphic condition, indicating minor adjustments. Twenty-eight segments were rated Fair, indicating major adjustments, largely due to the impacts of frequent flash flooding amplified by straightening (as indicated in much of this report). The large majority of reaches selected for inclusion in the Stevens River 2010 geomorphic assessments range from highly sensitive to extremely sensitive to changes in watershed inputs. Given these conditions, passive geomorphic restoration projects, which leverage water and sediment inputs and the river's own energy to facilitate a return to equilibrium conditions, are generally preferred for prioritization due to the likelihood of rapid stream evolution (this may be on a scale of decades for these streams to fully recover from a degraded state that is hard to recognize from a limited historical perspective). Lower investments in passive approaches are an added benefit, and are desirable considering an inherent degree of uncertainty in the success of engineered approaches in an active system.

With these considerations as a general backdrop, Table 30 lists potential prioritized projects with the greatest benefits in terms of restoring equilibrium conditions in the assessed portions of the Stevens River watershed, in recommended order of priority. Project prioritization should be considered preliminary and will need to be adjusted based on further information and community interest.

Table 26. Stevens River watershed 2010-2011 Prioritized Project and Strategy Summary

Stevens River watershed 2010-2011 Prioritized Project and Strategy Summary								
Project No.	*Reach/ Segment Condition Sensitivity*	*Site Description Including Stressors and Constraints*	*Project or Strategy Description*	*Technical Feasibility & Priority*	*Other Social Benefits*	*Costs*	*Land Use Conversion & Landowner Commitment*	*Potential Partner Commitments*
1	FEH: Stevens River mainstem reaches M1.01 – M1.07; Peacham Hollow Brook T1.01-T1.07; South Peacham Brook T2.01-T2.05 large majority High to Extreme sensitivity Belt-width or 100 ft. setbacks: Other streams in watershed	Heightened stream power resulting primarily from straightening, some historic loss of floodplain; development and encroachment restricts necessary room for flood hazard avoidance and mitigation, full meander development, and channel migrations	FEH corridor planning, (see discussion following this table), and 100 ft. set-backs (for smaller streams); protection of attenuation assets	Feasible, highest priority; delineation process largely developed, model regulations and recommendations exist	Flood hazard reduction, particularly in reagards to roads and other infrastructure; reduction of fine sediments (high in nutrients and organics) exported out of the watershed; prime farmland protection	Policy development and implementation; Distribution of outreach and educational materials	Depends on options chosen; see VT-RMP Municipal Guide to Fluvial Erosion Hazard Mitigation (Literature Cited section of this report)	Towns of Peacham and Barnet; Caledonia County Natural Resources Conservation District; VT-RMP
2	South Peacham Brook T2.04A and T2.04B Fair Extreme	Roy fields either side of Hollow Woods Rd. – alluvial fan coming out of South Peacham, small berm along stream; few constraints, currently cropped with no buffers	Corridor easement or other protection, buffer plantings, fencing downstream of Hollow Woods Rd.; cost-benefit analysis of berm removal	Feasible, highest priority	Flood hazard mitigation, farmland protection, nutrient attenuation upstream of Harvey's Lake (South Peacham Brook can back up into the Lake in high flows)	Easement transactions, planting stock (mixed-cost stock appears feasible)	Crop and hayland to wooded buffers	CREP, Vermont River Conservancy, VT-RMP

Stevens River watershed 2010-2011 Prioritized Project and Strategy Summary								
Project No.	*Reach/ Segment Condition Sensitivity*	*Site Description Including Stressors and Constraints*	*Project or Strategy Description*	*Technical Feasibility & Priority*	*Other Social Benefits*	*Costs*	*Land Use Conversion & Landowner Commitment*	*Potential Partner Commitments*
3	South Peacham Brook T2.02B Fair High	C to B stream type departure downstream of Harvey's Lake dam, reach essentially walled in; check dams already in place but will require maintenance; headcutting could undermine dam and initiate large-scale disequilibrium in South Peacham brook and further downstream	Maintain existing check dams; consider channel management easements or other corridor protection in segment T2.01A	Feasible, high priority	Flood hazard mitigation, recreational benefits (flow is regulated at dam for recreational benefits)	Monitoring and reinstallation of check dams when necessary; easement transactions	Not sure who maintains check dams currently; Choate Farm conversion of ag land to buffers, fencing to protect buffers, alternative watering plan to keep cows out of stream	Town of Barnet, Harvey's Lake Association, adjoining campground, CREP, CCNRCD
4	Peacham Hollow Brook T1.01 and South Peacham Brook T2.01 Fair High	Shared floodplain may be under single ownership; valuable attenuation asset currently armored (both) and windrowed (T1.01)	Corridor easement or other corridor protection, buffer augmentation	Feasible, high priority; armoring on T2.01 may be road-related (downstream of bridge)	Farmland protection, flood hazard mitigation	Easement transactions	Some open land to augmented buffers, possible loss to erosion as armoring continues to fail Landowner engaged, has worked on plantings	CREP, Vermont River Conservancy, Town of Barnet (armoring downstream of bridge)
5	Stevens River mainstem M1.03 Fair Very High	High armoring, I-91 embankments off RB; small area of critical floodplain access off LB, may be better access with berm removal	Corridor protection (appears to be mostly in FEMA Special Flood Hazard Area floodway); Cost-benefit analysis of floodplain access to be gained	Check existing FEMA maps for corridor protection; higher resolution survey needed for berm removal	Flood hazard mitigation for Barnet village	Surveying costs; berm removal (may not be that expensive – limited extent needed) Easement costs if SFHA isn't adequate	May not require conversion if in SFHA; need info on ownership	CCNRCD, VT-RMP, Town of Barnet

Stevens River watershed 2010-2011 Prioritized Project and Strategy Summary								
Project No.	*Reach/ Segment Condition Sensitivity*	*Site Description Including Stressors and Constraints*	*Project or Strategy Description*	*Technical Feasibility & Priority*	*Other Social Benefits*	*Costs*	*Land Use Conversion & Landowner Commitment*	*Potential Partner Commitments*
6	Peacham Hollow Brook T1.03 Fair High	Windsong Wildlife Sanctuary is on alluvial fan (may be glacial origin); few constraints, high erosion	Corridor protection: check existing status; buffer augmentation; explore possibilities for educational sign explaining corridor protection at wildlife observation deck	Feasible, high priority; attenuation asset downstream of Willow Brook (sediment loading) and East Peacham village	High visibility, possible educational benefits; water quality for fishing (reduction of fines)	Easement transactions, planting stock (primarily low-cost due to erosion hazards, but may need some larger trees further back due to reed canary grass)	Unsure of protection status and legal status of ownership; trees may obscure viewing; could use shrubs on near side of stream	VT River Conservancy, Northeast Kingdom Audubon
7	Peacham Hollow Brook T1.02 (near Peacham-Barnet town line) Not assessed	Beaver-controlled segment not fully assessed, but important attenuation asset with some development pressure	Corridor protection: investigate channel management easements; buffer plantings	Feasible, high-medium priority	Farmland protection, flood hazard mitigation	Easement transactions; planting stock (low-cost due to beavers; look at softwood options, particularly cedar in this area)	Open land to buffers; unsure of owner buy-in	Vermont River Conservancy, Vermont Land Trust, CREP
8	Peacham Hollow Brook T1.07 and T1.06 Fair High	Attenuation asset downstream of significant changes (development, encroachments, clearing); fix gully upstream RB by Bayley-Hazen_Slack St. intersection; Japanese knotweed control on side of Bayley-Hazen Rd. downstream of intersection with Slack St.	Corridor protection, possibly to include channel management easements, roadside repair, invasives control	Feasible; high-medium priority T1.06C beaver-controlled and not fully assessed Knotweed one of very few locations in watershed	Flood hazard mitigation, early detection and rapid response for knotweed in upstream portion of watershed network	Easement transactions, gully stabilization, knotweed control	High development pressure	CCNRCD, Town of Peacham (road), Vermont River Conservancy, Stevens River Watershed Council, Peacham Conservation Commission

Belt-width corridors approximate the extent of lateral adjustments likely to occur over time in a meandering stream, generally a minimum of 3-4 times the stream channel width on each side of the stream. The physical dictates of stream processes mean that a stream denied this room will pass elevated impacts to other areas. Fluvial Erosion Hazard zones (FEH) are a refinement of belt-width corridors and are recommended as a scientifically based method that uses the size, inherent sensitivity, and current adjustment processes of the stream to determine and map levels of risk and appropriate setbacks. The data needed to inform this process were collected for the nineteen reaches assessed in 2010, and extensive road damage in May 2011 clarified the types of risk posed in these zones.

While the information to develop scientifically backed corridors has been collected during the course of this assessment, it should also be noted that setbacks could be used to adequately accommodate stream processes on the large majority of the smaller streams in the watershed; these may be easier to administer than maintaining maps in these areas. Both Barnet and Peacham currently have some setback regulations regarding lakes and ponds (Copans 2008; Peacham 2005). Allowing a belt-width of 3 times the stream channel width would mean a 50 ft setback on streams that don't have tributaries. For comparison:

- FEH zones on Peacham Hollow Brook exceed 70 ft setbacks downstream of the Bayley-Hazen Rd. junction with Slack St., and approach or exceed 100 ft setbacks downstream of Ewells Mills.
- FEH zones on South Peacham Brook exceed 70 ft setbacks downstream of the County Rd., and exceed 100 ft setbacks downstream of South Peacham village
- All FEH zones in Barnet would well exceed 100 ft setbacks. Due to the locations and joining of tributaries above most road crossings in Barnet (see overview map in Fig. 1 on p. 5), most streams would benefit from 100 ft setbacks; only streams with no tributaries in Barnet would avoid conflicts by using a 50 ft setback.

The current delineation of Federal Emergency Management Administration Special Flood Hazard Area was developed for Barnet in 1988 and provides some protection for areas along the Stevens River mainstem and small portions of Peacham Hollow and South Peacham Brooks. These maps are based on inundation hazards (like a bathtub filling up) however, and besides being dated they do not necessarily capture erosion and mass failure hazards along valley walls. It is unlikely that these maps will be scheduled for updates in the near future, and Peacham appears to lack a floodplain ordinance or currently FEMA mapping extents for Special Flood Hazard Areas.

While such measures help limit further development and infrastructure encroachments, the Stevens River basin already has a high density of existing roads and a diffuse settlement pattern, and straightening is the most prominent impact noted in geomorphic assessments conducted within the watershed. Concentrated development and road encroachment in Barnet, West Barnet, East Peacham and South Peacham villages in particular has already restricted access to valuable floodplains and limited the amount of room available for meander development and lateral migration. The impairment of these attenuation assets increases the importance of protecting remaining assets, with an emphasis on protection of broader floodplains to attenuate upstream discharges.

Numerous bridges and culverts assessed in 2010 were undersized, with several bridges or culverts in Peacham sized at less than half of the bankfull stream width. (Bankfull flows are also known as "channel-forming flows" because this is when most sediments are moved and significant channel shape changes might occur; these high flows usually occur once every year or two). None of these structures appeared at risk of imminent failure, but it is recommended that replacement be considered in capital budgeting. Windrowing (removing sediments from the stream bed and placing them on the banks) appears to have occurred at several of these constrictions after floods, and contributes to straightening impacts.

It is important to bear in mind that restriction of stream processes in straightened areas, particularly structural measures and other practices designed to maintain streams in a fixed location, will contribute to prolonged stages of disequilibrium and the erosion and lateral migration that streams will use to balance the energy of stream power (which is elevated by straightening) and sediment loads. Bank armoring and bank toe stabilization are common along road encroachments and at stream crossing structures, and were observed to a lesser (but not uncommon) degree on undeveloped sites such as agricultural fields in the watershed. Channel straightening is a challenging issue to address at a municipal level, and may need to be addressed more often at a localized scale. Ample buffer establishment in straightened areas and downstream of them is important not only to bank and soil stabilization but also flood mitigation (diffusing stream power) and decreasing the rate and intensity of precipitation entering the stream. There are a number of cost-share options for landowners wishing to establish buffers, including the Conservation Reserve Enhancement Program (within the Natural Resources Conservation Service).

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Appendix 1. Reach Summary Statistics, Channel Geometry Data, Rapid Habitat Assessment Score Summary

Appendix 2. Phase I Reach Summary Reports

Appendix 3. Phase II Reach Summary Reports

(127 pp., not printed; please see https://anrnode.anr.state.vt.us/SGA/projects/phase2/reports.aspx?pid=6 and select 'Segment Summary Report' from the drop down list; then select 'All' or any one segment of interest)

Appendix 4. Plots of Channel Cross Sections

Appendix 5. QA/QC Reports and documentation

Appendix 6. Consolidated project identification tables (sorted by priority)

Appendix 7. Large Format (11x17) Maps

Appendix 8. Bridge and Culvert Survey Reports

Failure modes: Geomorphic incompatibility

Failure modes: Problem causes

Aquatic organism passage ratings: Passage, geomorphic compatibility, retrofit potential

Wildlife passage

(summary version printed; full version with summary of each structure,

61 pp., not printed; please see https://anrnode.anr.state.vt.us/SGA/datasets/structures/reports.aspx?did=31 and select 'Bridge and Culvert Summary Report' from the drop down list; then select 'All' or any one structure of interest)

Appendix 1. Reach Summary Statistics, Channel Geometry Data, Rapid Habitat Assessment Score Summary

Appendix 2. Phase I Reach Summary Reports

Appendix 3. Phase II Reach Summary Reports
(127 pp., digital version on CD - not printed; please see
https://anrnode.anr.state.vt.us/SGA/projects/phase2/reports.aspx?pid=6
and select 'Segment Summary Report' from the drop down list; then select 'All' or any one segment of interest)

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Appendix 8. Bridge and Culvert Survey Reports
Failure modes: Geomorphic incompatibility
Failure modes: Problem causes
Aquatic organism passage ratings: Passage, geomorphic compatibility, retrofit potential
Wildlife passage
(summary version printed; full version with summary of each structure, 61 pp., digital version on CD – not printed; please see
https://anrnode.anr.state.vt.us/SGA/datasets/structures/reports.aspx?did=31
and select 'Bridge and Culvert Summary Report' from the drop down list; then select 'All' or any one structure of interest)

- Appendix 1 -

Reach/Segment Summary Reports:
Rapid Geomorphic Assessment summary statistics
Channel geometry data
Habitat assessment scores summary

Phase 2 - Rapid Geomorphic Assessment

Stevens River

Reach	Seg-ment	Sub Rch?	Degradation Score	Degradation STD	Degradation Historic	Aggradation Score	Aggradation STD	Aggradation Historic	Widening Score	Widening Historic	Planform Score	Planform Historic	Geo Score	Geo Condition	Evol. Stage	Confin. Type	Sensitivity	QC Staff	QC Auto
M101	0	No	12	None	Yes	12	None	No	13	No	14	No	0.64	Fair	III	VB	High	P	P
M102	0	No	4	B to F	Yes	14	None	No	10	No	12	No	0.50	Fair	III	NC		P	P
M103	A	No	12	None	Yes	12	None	Yes	12	No	12	No	0.60	Fair	IV	VB	Very High	P	P
M103	B	No	8	None	Yes	12	None	No	13	No	8	No	0.51	Fair	III	NW	High	P	P
M104	0	No	15	None	No	13	None	No	15	No	13	No	0.70	Good	I	SC	Moderate	P	P
M105	0	No	10	None	Yes	12	None	No	10	No	9	No	0.51	Fair	III	VB		P	P
M106	A	Yes	12	None	Yes	12	None	No	11	No	11	No	0.58	Fair	III	BD	Very High	P	P
M106	B	No	10	None	Yes	7	None	No	10	No	10	No	0.46	Fair	III	NW	High	P	P
M107	A	No	11	None	No	13	None	No	12	No	14	No	0.63	Good	IV	NW	Moderate	P	P
M107	B	No	10	None	Yes	11	None	No	10	No	13	No	0.55	Fair	III	SC	High	P	P
M107	C	No	5	C to F	Yes	11	None	Yes	6	No	8	No	0.38	Poor	III	BD	Extreme	P	P
T1.01	A	No	10	None	Yes	12	None	No	13	No	11	No	0.58	Fair	III	VB	High	P	P
T1.01	B	No	13	None	Yes	13	None	No	12	No	12	No	0.63	Fair	III	VB	High	P	P
T1.02	A	No	11	None	Yes	13	None	No	13	No	11	No	0.60	Fair	IV	NW	High	P	P
T1.02	B	Yes	10	None	Yes	13	None	Yes	11	No	14	No	0.60	Fair	III	SC	High	P	P
T1.02	C	No											0.00			VB		P	F
T1.02	D	No	13	None	Yes	13	None	No	12	No	11	No	0.61	Fair	IV	SC	Very High	P	P
T1.03	0	No											0.00					P	F
T1.03	A	No	14	None	Yes	15	None	No	15	No	16	No	0.75	Good	IV	VB	High	P	P
T1.03	B	Yes	4	None	Yes	14	None	No	10	No	10	Yes	0.48	Fair	III	SC	High	P	P
T1.03	C	No	16	None	No	14	None	No	12	No	11	No	0.66	Good	IId	VB	High	P	P
T1.04	0	No	9	None	No	5	None	No	13	No	10	No	0.46	Fair	IIc	VB	Extreme	P	P
T1.05	0	No	10	None	Yes	11	None	No	12	No	10	No	0.54	Fair	III	BD	Very High	P	P
T1.06	A	Yes	13	None	No	13	None	No	14	No	14	No	0.68	Good	I	SC		P	P
T1.06	B	No	5	C to F	Yes	10	None	No	9	No	10	No	0.43	Fair	IV	NW		P	P
T1.06	C	No											0.00			VB		P	F
T1.07	A	No	9	None	No	11	None	No	11	No	10	No	0.51	Fair	III	VB	High	P	P

Reach	Seg-ment	Sub Rch?	Score	STD	Historic	Score	STD	Historic	Score	Historic	Score	Historic	Geo Score	Geo Condition	Evol. Stage	Confin. Type	Sensitivity	QC Staff	QC Auto
T1.07	B	No	5	Other	No	10	None	No	6	No	7	No	0.35	Poor	III	NW	Extreme	P	P
T1.07	C	No	12	None	No	13	None	No	13	No	13	No	0.64	Fair	II	VB	Very High	P	P
T2.01	0	No	11	None	No	10	None	No	11	No	10	No	0.53	Fair	III	NW	High	P	P
T2.02	A	No	8	None	Yes	11	None	No	11	No	12	No	0.53	Fair	III	VB	Extreme	P	P
T2.02	B	Yes	3	C to B	Yes	11	None	No	10	No	9	No	0.41	Fair	III	BD	High	P	P
T2.02	C	No											0.00			VB		P	F
T2.02	D	No	11	None	Yes	11	None	No	12	No	12	Yes	0.58	Fair	III	VB	Extreme	P	P
T2.03	A	No	5	C to B	Yes	12	None	No	10	No	8	No	0.44	Fair	III	NW	Very High	P	P
T2.03	B	No	13	None	Yes	13	None	No	11	No	10	No	0.59	Fair	III	VB	Very High	P	P
T2.04	A	Yes	5	None	Yes	12	None	No	12	No	12	No	0.51	Fair	III	VB	Extreme	P	P
T2.04	B	Yes	3	E to G	Yes	12	None	No	7	No	11	Yes	0.41	Fair	III	VB	Extreme	P	P
T2.04	C	No	13	None	Yes	12	None	No	13	No	11	No	0.61	Fair	III	BD	High	P	P
T2.05	0	No	14	None	Yes	13	None	No	14	No	13	No	0.68	Good	III	BD		P	P
T2.S1.06	0	No											0.00					P	F
T2.S1.06	A	No											0.00					P	F

Phase 2 - Stream Geometry Data

Stevens River

		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	Recnt Abandn Fldpln	Width Depth Ratio	Entrench-ment Ratio	Incision Ratio	Channel Evolution Stage	Channel Evolution Model	Geo Assess Condition	Hab Assess Condition	QC Staff	QC Auto
M101	0	C	Sand	Riffle-Pool	None	No	0.74		71.9	5.6	4.23	481.9	7	17.00	6.70	1.25	III	F	Fair		P	P
M102	0	F	Boulder	Riffle-Pool	None	No	11.99		44.3	4.4	3.3	48.6	4.4	13.42	1.10	1.00	III	F	Fair		P	P
M103	A	C	Sand	Riffle-Pool	None	No	1.06		71.8	6.6	3.2	973.4	8.6	22.44	13.56	1.30	IV	F	Fair		P	P
M103	B	C	Cobble	Plane Bed	None	No	1.06		62.8	5.2	3.49	360	5.2	17.99	5.73	1.00	III	F	Fair		P	P
M104	0	B	Cobble	Step-Pool	c	No	1.15		77.3	5.15	3.47	119.7	5.15	22.28	1.55	1.00	I	F	Good		P	P
M105	0	C	Gravel	Riffle-Pool	None	No	0.48		54.4	5.2	2.86	710	7.7	19.02	13.05	1.48	III	F	Fair		P	P
M106	A	E	Gravel	Riffle-Pool	None	Yes	0.85		50	5.6	4.42	302.7	6.8	11.31	6.05	1.21	III	F	Fair		P	P
M106	B	C	Cobble	Riffle-Pool	None	No	0.85		63.7	3.3	2.4	253.4	3.6	26.54	3.98	1.09	III	F	Fair		P	P
M107	A	C	Cobble	Riffle-Pool	None	No	0.91		79.8	4.35	2.96	189.95	5.95	26.96	2.38	1.37	IV	F	Good		P	P
M107	B	C	Cobble	Riffle-Pool	None	No	0.91		66.2	3.3	2.7	249.2	4.8	24.52	3.76	1.45	III	F	Fair		P	P
M107	C	F	Gravel	Riffle-Pool	None	No	0.91		54.5	3.5	2.9	58.7	8.8	18.79	1.08	2.51	III	F	Poor		P	P
T1.01	A	C	Cobble	Riffle-Pool	None	No	1.13		30.5	3.65	2.83	274.7	5.85	10.78	9.01	1.60	III	F	Fair		P	P
T1.01	B	C	Cobble	Riffle-Pool	None	No	1.13		39.5	4.1	3.17	199.5	5.5	12.46	5.05	1.34	III	F	Fair		P	P
T1.02	A	C	Cobble	Riffle-Pool	None	No	1.88		44.7	4.1	2.77	147	5.05	16.14	3.29	1.23	IV	F	Fair		P	P
T1.02	B	B	Cobble	Step-Pool	c	Yes	1.88		42.9	2.9	2.28	89.8	4.7	18.82	2.09	1.62	III	F	Fair		P	P
T1.02	C					No	1.88							0.00	0.00	0.00					P	F
T1.02	D	C	Gravel	Riffle-Pool	None	No	1.88		39.8	3.75	2.76	148.4	5.05	14.42	3.73	1.35	IV	F	Fair		P	P
T1.03	0					No	0.85							0.00	0.00	0.00					P	F
T1.03	A	E	Gravel	Riffle-Pool	None	No	0.85		24.4	3.2	2.7	454	4	9.04	18.61	1.25	IV	F	Good		P	P
T1.03	B	C	Cobble	Step-Pool	b	Yes	0.85		28.2	3.6	2.54	84.2	7.2	11.10	2.99	2.00	III	F	Fair		P	P
T1.03	C	E	Gravel	Riffle-Pool	None	No	0.85		22	3.1	2.6	392	3.1	8.46	17.82	1.00	IId	D	Good		P	P
T1.04	0	E	Gravel	Riffle-Pool	None	No	1.34		20	3.1	1.99	115.2	3.1	10.05	5.76	1.00	IIc	D	Fair		P	P
T1.05	0	C	Gravel	Riffle-Pool	b	No	1.89		33.9	3.45	2.29	113.2	4.55	14.80	3.34	1.32	III	F	Fair		P	P
T1.06	A	A	Boulder	Cascade	None	Yes	3.60		22.6	3.3	1.89	32.3	3.3	11.96	1.43	1.00	I	D	Good		P	P
T1.06	B	F	Gravel	Riffle-Pool	None	No	3.60		42.3	2.75	1.29	49.2		32.79	1.16	0.00	IV	F	Fair		P	P

Stream Geomorphic Assessment

VT DEC

Agency of Natural Resouces

Vermont.gov

August, 09 2011

Reach	Seg-ment	Stream Type	Bed Material	Bedform	Subcl. Slope	Sub Rch?	Channel Slope	Channel Width	Bankfull Width	Max Depth	Mean Depth	Floodpr Width	Recnt Abandn Fldpln	Width Depth Ratio	Entrench-ment Ratio	Incision Ratio	Channel Evolution Stage	Channel Evolution Model	Geo Assess Condition	Hab Assess Condition	QC Staff	QC Auto
T1.06	C	C	Gravel	Riffle-Pool	None	No	3.60							0.00	0.00	0.00					P	F
T1.07	A	C	Cobble	Riffle-Pool	b	No	4.28		20.2	2.55	1.01	108.2	4	20.00	5.36	1.57	III	F	Fair		P	P
T1.07	B	E	Gravel	Plane Bed	b	No	4.28		9.9	1.5	1.13	42.1	2	8.76	4.25	1.33	III	F	Poor		P	P
T1.07	C	C	Sand	Riffle-Pool	b	No	4.28		13.1	1.7	0.87	106.1	2.5	15.06	8.10	1.47	II	F	Fair		P	P
T2.01	0	C	Cobble	Riffle-Pool	None	No	2.03		43.8	3.65	2.67	157.2	4.55	16.40	3.59	1.25	III	F	Fair		P	P
T2.02	A	E	Gravel	Riffle-Pool	None	No	0.43		25.5	4.1	2.99	485.5	6.6	8.53	19.04	1.61	III	F	Fair		P	P
T2.02	B	B	Cobble	Riffle-Pool	c	Yes	0.43		34.4	3.7	2.74	56.6	5.9	12.55	1.65	1.59	III	F	Fair		P	P
T2.02	C					No	0.43							0.00	0.00	0.00					P	F
T2.02	D	E	Gravel	Riffle-Pool	None	No	0.43		20.3	3.4	2.6	543.4	6.2	7.81	26.77	1.82	III	F	Fair		P	P
T2.03	A	B	Gravel	Riffle-Pool	c	No	0.66		42.4	3.6	2.71	71.6	4.5	15.65	1.69	1.25	III	F	Fair		P	P
T2.03	B	C	Gravel	Riffle-Pool	None	No	0.66		27	3.5	2.54	397	4.45	10.63	14.70	1.27	III	F	Fair		P	P
T2.04	A	E	Gravel	Riffle-Pool	None	Yes	1.81		22.4	3.2	2.4	279.5	3.9	9.33	12.48	1.22	III	F	Fair		P	P
T2.04	B	G	Cobble	Step-Pool	c	Yes	1.81		21.9	3.55	2.21	31.2	8.85	9.91	1.42	2.49	III	F	Fair		P	P
T2.04	C	C	Cobble	Step-Pool	b	No	1.81		32.8	3.5	2.39	256.5	3.5	13.72	7.82	1.00	III	F	Fair		P	P
T2.05	0	C	Cobble	Step-Pool	b	No	3.92		30.5	3.8	2.31	180.5	4.4	13.20	5.92	1.16	III	F	Good		P	P
	0					No								0.00	0.00	0.00					P	F
	A					No								0.00	0.00	0.00					P	F

Phase 2 - Rapid Habitat Assessment Scores

Stevens River

Explanation of codes used in table header

6.1	Woody Debris Cover	**6.5**	Hydrologic Characteristics
6.2	Bed Substrate Cover	**6.6**	Connectivity
6.3	Scour and Deposition Features	**6.7**	River Banks
6.4	Channel Morphology	**6.8**	Riparian Area

Reach	Reference Stream Type	Bed-form	Habitat Departure	Reach Length	6.1	6.2	6.3	6.4	6.5	6.6	6.7 Left	6.7 Right	6.8 Left	6.8 Right	Total Score	Percent-age	Habitat Condition
M101-0	Riffle-Pool	Riffle-Pool	None	2,709	6	15	13	12	12	15	5	5	5	2	90	56	Fair (Major Departure)
M102-0	Riffle-Pool	Riffle-Pool	None	659	10	13	15	7	10	7	3	4	2	3	74	46	Fair (Major Departure)
M103-A	Riffle-Pool	Riffle-Pool	None	1,414	7	13	10	12	13	11	3	5	4	8	86	54	Fair (Major Departure)
M103-B	Riffle-Pool	Riffle-Pool	Plane Bed	2,259	5	9	5	7	11	5	3	3	2	1	51	32	Poor (Severe Departure)
M104-0	Step-Pool	Step-Pool	None	3,396	13	14	14	11	13	14	4	5	6	6	100	63	Fair (Major Departure)
M105-0	Riffle-Pool	Riffle-Pool	None	4,187	12	13	14	10	12	11	2	3	3	4	84	53	Fair (Major Departure)
M106-A	Riffle-Pool	Riffle-Pool	None	2,154	13	14	12	10	10	13	5	3	9	5	94	59	Fair (Major Departure)
M106-B	Riffle-Pool	Riffle-Pool	None	2,443	15	14	9	14	12	9	4	5	8	7	97	61	Fair (Major Departure)
M107-A	Riffle-Pool	Riffle-Pool	None	762	14	14	12	12	11	9	5	5	8	7	97	61	Fair (Major Departure)
M107-B	Riffle-Pool	Riffle-Pool	None	3,117	12	13	12	9	14	12	4	5	6	5	92	58	Fair (Major Departure)
M107-C	Riffle-Pool	Riffle-Pool	None	2,627	15	10	12	5	9	9	6	5	8	2	81	51	Fair (Major Departure)
T1.01-A	Riffle-Pool	Riffle-Pool	None	1,572	5	15	10	8	14	8	4	4	5	5	78	49	Fair (Major Departure)
T1.01-B	Riffle-Pool	Riffle-Pool	None	1,954	15	14	12	14	15	12	6	5	6	4	103	64	Fair (Major Departure)
T1.02-A	Riffle-Pool	Riffle-Pool	None	2,963	18	14	14	12	12	14	7	8	6	5	110	69	Good (Minor Departure)
T1.02-B	Step-Pool	Riffle-Pool	None	1,794	13	13	14	13	16	11	9	8	5	9	111	69	Good (Minor Departure)
T1.02-C		Riffle-Pool	None	3,030											0	0	Poor (Severe Departure)
T1.02-D	Riffle-Pool	Riffle-Pool	None	4,784	15	14	12	14	13	15	7	6	8	8	112	70	Good (Minor Departure)
T1.03-0		Riffle-Pool	None	4,593											0	0	Poor (Severe Departure)
T1.03-A	Riffle-Pool	Riffle-Pool	None	1,729	13	14	15	15	14	15	4	5	4	3	102	64	Fair (Major Departure)
T1.03-B	Step-Pool	Riffle-Pool	None	860	12	12	15	7	12	13	5	8	5	9	98	61	Fair (Major Departure)
T1.03-C	Riffle-Pool	Riffle-Pool	None	2,004	14	11	14	16	13	12	7	7	7	5	106	66	Good (Minor Departure)
T1.04-0	Riffle-Pool	Riffle-Pool	None	1,493	9	11	7	11	14	13	5	3	2	2	77	48	Fair (Major Departure)

Reach	Reference Stream Type	Bed-form	Habitat Departure	Reach Length	6.1	6.2	6.3	6.4	6.5	6.6	6.7 Left	6.7 Right	6.8 Left	6.8 Right	Total Score	Percent-age	Habitat Condition
T1.05-0	Riffle-Pool	Riffle-Pool	None	9,378	18	10	12	13	11	7	7	8			86	54	Fair (Major Departure)
T1.06-A	Step-Pool	Riffle-Pool	None	632	19	14	13	15	10	12	8	5	9	4	109	68	Good (Minor Departure)
T1.06-B	Riffle-Pool	Riffle-Pool	None	692	17	12	10	5	8	13	7	7	9	6	94	59	Fair (Major Departure)
T1.06-C		Riffle-Pool	None	1,956											0	0	Poor (Severe Departure)
T1.07-A	Riffle-Pool	Riffle-Pool	None	3,087	19	13	14	10	11	15	9	7	8	6	112	70	Good (Minor Departure)
T1.07-B	Riffle-Pool	Riffle-Pool	Plane Bed	1,296	17	10	10	9	9	12	7	7	3	2	86	54	Fair (Major Departure)
T1.07-C	Riffle-Pool	Riffle-Pool	None	2,047	19	8	10	9	11	11	7	7	9	9	100	63	Fair (Major Departure)
T2.01-0	Riffle-Pool	Riffle-Pool	None	5,816	17	14	13	11	10	10	6	5			86	54	Fair (Major Departure)
T2.02-A	Riffle-Pool	Riffle-Pool	None	3,900	15	8	7	11	13	10	2	2	3	4	75	47	Fair (Major Departure)
T2.02-B	Riffle-Pool	Riffle-Pool	None	2,570	18	11	14	8	12	8	4	6	1	7	89	56	Fair (Major Departure)
T2.02-C		Riffle-Pool	None	1,616											0	0	Poor (Severe Departure)
T2.02-D	Riffle-Pool	Riffle-Pool	None	1,137	13	9	10	7	12	9	3	3	2	3	71	44	Fair (Major Departure)
T2.03-A	Riffle-Pool	Riffle-Pool	None	2,055	14	11	11	11	14	9	6	4	8	3	91	57	Fair (Major Departure)
T2.03-B	Riffle-Pool	Riffle-Pool	None	815	14	11	15	12	12	12	5	5	7	5	98	61	Fair (Major Departure)
T2.04-A	Riffle-Pool	Riffle-Pool	None	1,713	5	11	13	6	9	11	4	4	3	3	69	43	Fair (Major Departure)
T2.04-B	Riffle-Pool	Riffle-Pool	Step-Pool	998	6	16	15	7	12	9	4	3	5	3	80	50	Fair (Major Departure)
T2.04-C	Step-Pool	Riffle-Pool	None	2,770	11	12	13	13	12	9	6	4	6	3	89	56	Fair (Major Departure)
T2.05-0	Step-Pool	Step-Pool	None	3,523	14	11	12	13	9	10	5	5	7	4	90	56	Fair (Major Departure)
T2.S1.06-0			None	4,162											0	0	Poor (Severe Departure)
T2.S1.06-A			None	4,162											0	0	Poor (Severe Departure)

- Appendix 2 -
Phase I Reach Summary Reports

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **Stevens River**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **M101**
SGAT Version: **4.56**
Date Last Edited: **June, 15 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From confluence with Connecticut River upstream to base of falls**

1.1 Reach Description:
1.2 Towns: **Barnet**
1.3 Downstream Latitude: **44.2904469113**
1.3 Downstream Longitude: **-72.053136422**

Step 2. Stream Type

2.1 Elevation Upstream: **472**
2.1 Elevation Downstream: **452**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **1,901.0** ft. **0.36** Miles
2.3 Valley Slope: **1.1**
2.4 Channel Length: **2,709.0** ft. **0.51** Miles
2.5 Channel Slope: **0.74 %**
2.6 Sinuosity: **1.43**
2.7 Watershed Area: **46.2** Square Miles
2.8 Channel Width: **70.7** feet
2.9 Valley Width: **998.0** feet
2.10 Confinement Ratio: **14.1**
2.10 Confinement Type: **Very Broad**
2.11 Reference Stream Type: **C**
Bedform: **Riffle-Pool**
Sub-Class Slope: **None**
Bed Material: **Gravel**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **None**
3.3 Dominant Geological Mat.: **Alluvial** **89.0** %
3.3 Sub-dom. Geological Mat.: **Glacial Lake**
3.4 Valley Slope Left: **Flat**
3.4 Valley Slope Right: **Hilly**
3.5 Soils
Hydrologic Group: **B** **80.0** %
Flooding: **None/Rare** **10.0** %
Water Table Deep: **6.0** **41.0** %
Water Table Shallow: **6.0** **41.0** %
Erodibility: **slight** **9.0** %
7.4 Comments:
Connecticut River is dammed just downstream of reach M1.01 and its confluence.
Changed bed form to Dun-Ripple after Phase 2 QC check.

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **62.5** %
Current Sub-Dominant Land Cover: **Field**
4.2 Corridor
Historic Land Cover:: **Field**
Current Dominant Land Cover: **Urban** **41.0** %
Current Sub-Dominant Land Cover: **Crop**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**0-25**	**0-25**
Sub-dominant:	**>100**	**>100**
Length w / less than 25 ft.:	**27.0** ft.	**997.0** ft.

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **Impoundment**
Type: **None**
Use:
5.2 Bridges and Culverts: **2** **3.3** %
5.3 Bank Armoring: **929.7** **34.3** %
Left: **620.9** ft. Right: **308.8** ft.
5.4 Channel Straightening: **2,601.7** **96.0** %
5.5 Dredging History: **Dredging**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **3,069.5** ft. **113.3**

	One Side	Both Sides
Road:	**513.9** ft.	**391.4** ft.
Railroad:	**2,103.9** ft.	**0.0** ft.
Berm:	**60.4** ft.	**0.0** ft.
Improved Path:	**0.0** ft.	**0.0** ft.
6.2 Development:	**755.4** ft.	**0.0** ft.

6.3 Channel Bars: **Point**
6.4 Meander Migration: **Flood Chute**
6.5 Meander Width: **345 ft.** Rato: **4.9**
6.6 Wavelength: **578 ft.** Ratio: **8.2**

Step 7. Windshield Survey

7.1 Bank Erosion: **583.9** ft
7.2 Bank Height: **4** ft
7.3 Ice/Debris Jam Potential: **Bridge**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**2 High**	**0 N.S.**	**0 N.S.**	**2 High**	**2 High**	**2 High**	**2 High**	**2 High**	**1 Low**	**0 N.S.**	**1 Low**	**0 N.S.**	**2 High**	**2 High**	**22**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **Stevens River**
Topo Maps:
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **M102**
SGAT Version: **4.56**
Date Last Edited: **June, 15 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From base of falls in Barnet (at Rte 5) upstream to top of falls**

1.1 Reach Description:
1.2 Towns: **Barnet**
1.3 Downstream Latitude: **44.2947771965**
1.3 Downstream Longitude: **-72.0506886548**

Step 2. Stream Type

2.1 Elevation Upstream: **551**
2.1 Elevation Downstream: **472**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **619.0** ft. **0.12** Miles
2.3 Valley Slope: **12.8**
2.4 Channel Length: **659.0** ft. **0.12** Miles
2.5 Channel Slope: **11.99 %**
2.6 Sinuosity: **1.06**
2.7 Watershed Area: **45.9** Square Miles
2.8 Channel Width: **70.5** feet
2.9 Valley Width: **170.0** feet
2.10 Confinement Ratio: **2.4**
2.10 Confinement Type: **Semi-confined**
2.11 Reference Stream Type: **B**
Bedform: **Riffle-Pool**
Sub-Class Slope: **c**
Bed Material: **Cobble**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **Waterfall**
3.3 Dominant Geological Mat.: **Glacial Lake** **98.0** %
3.3 Sub-dom. Geological Mat.: **Alluvial**
3.4 Valley Slope Left: **Steep**
3.4 Valley Slope Right: **Very Steep**
3.5 Soils
Hydrologic Group: **D** **64.0** %
Flooding: **None/Rare** **98.0** %
Water Table Deep: **1.5** **64.0** %
Water Table Shallow: **0.5** **64.0** %
Erodibility: **Very Severe** **98.0** %
7.4 Comments:

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **63.7** %
Current Sub-Dominant Land Cover: **Field**
4.2 Corridor
Historic Land Cover:: **Residential**
Current Dominant Land Cover: **Urban** **80.6** %
Current Sub-Dominant Land Cover:

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**0-25**	**0-25**
Sub-dominant:	**51-100**	**51-100**
Length w / less than 25 ft.:	**360.0** ft.	**0.0** ft.

4.4 Ground Water Inputs: **None**

Step 5. Instream Channel Modifications
5.1 Flow Regulation - (old):
Type: **Small Bypass**
Use: **Hydro-electric**
5.2 Bridges and Culverts: **1** **3.8** %
5.3 Bank Armoring: **298.0** **45.2** %
Left: **231.4** ft. Right: **66.7** ft.
5.4 Channel Straightening: **353.1** **53.6** %
5.5 Dredging History: **None**

Step 6. Floodplain Modifications
6.1 Berms & Roads - old: **213.4** ft. **32.4**

	One Side	Both Sides
Road:	**213.4** ft.	**0.0** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**0.0** ft.	**0.0** ft.
Improved Path:	**0.0** ft.	**0.0** ft.

6.2 Development: **113.3** ft. **255.1** ft.
6.3 Channel Bars: **None**
6.4 Meander Migration: **None**
6.5 Meander Width: **ft.** Rato: **0.0**
6.6 Wavelength: **ft.** Ratio: **0.0**

Step 7. Windshield Survey
7.1 Bank Erosion: **0** ft
7.2 Bank Height: **No Data** ft
7.3 Ice/Debris Jam Potential: **Bridge**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2** High	**2** High	**1** Low	**0** N.S.	**2** High	**2** High	**0** N.S.	**2** High	**2** High	**0** N.S.	**1** Low	**0** N.D.	**0** N.D.	**0** N.S.	**1** Low	**17**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **Stevens River**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **M103**
SGAT Version: **4.56**
Date Last Edited: **June, 15 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From top of falls at Rte 5 in Barnet, upstream to first bridge west of Interstate 91**

1.1 Reach Description:
1.2 Towns: **Barnet**
1.3 Downstream Latitude: **44.2963314498**
1.3 Downstream Longitude: **-72.0500413629**

Step 2. Stream Type

2.1 Elevation Upstream: **590**
2.1 Elevation Downstream: **551**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **3,438.0** ft. **0.65** Miles
2.3 Valley Slope: **1.1**
2.4 Channel Length: **3,673.0** ft. **0.70** Miles
2.5 Channel Slope: **1.06 %**
2.6 Sinuosity: **1.07**
2.7 Watershed Area: **45.9** Square Miles
2.8 Channel Width: **70.5** feet
2.9 Valley Width: **788.0** feet
2.10 Confinement Ratio: **11.2**
2.10 Confinement Type: **Very Broad**
2.11 Reference Stream Type: **C**
Bedform: **Riffle-Pool**
Sub-Class Slope: **None**
Bed Material: **Gravel**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **Waterfall**
3.3 Dominant Geological Mat.: **Glacial Lake** **65.0** %
3.3 Sub-dom. Geological Mat.: **Alluvial**
3.4 Valley Slope Left: **Steep**
3.4 Valley Slope Right: **Very Steep**
3.5 Soils
Hydrologic Group: **B** **53.0** %
Flooding: **None/Rare** **65.0** %
Water Table Deep: **2.5** **39.0** %
Water Table Shallow: **0.0** **29.0** %
Erodibility: **Severe** **64.0** %
7.4 Comments:
Reach flows under Interstate 91

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **63.9** %
Current Sub-Dominant Land Cover: **Field**
4.2 Corridor
Historic Land Cover:: **Field**
Current Dominant Land Cover: **Urban** **27.4** %
Current Sub-Dominant Land Cover: **Crop**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**0-25**	**0-25**
Sub-dominant:	**51-100**	**>100**
Length w / less than 25 ft.:	**1,788.0** ft.	**415.0** ft.

4.4 Ground Water Inputs: **None**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):
Type: **Small Bypass**
Use: **Hydro-electric**
5.2 Bridges and Culverts: **1** **16.3** %
5.3 Bank Armoring: **1,680.8** **45.8** %
Left: **1,007.6** ft. Right: **673.2** ft.
5.4 Channel Straightening: **2,692.5** **73.3** %
5.5 Dredging History: **Dredging**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **3,302.8** ft. **89.9**

	One Side	Both Sides
Road:	**2,825.6** ft.	**0.0** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**477.2** ft.	**0.0** ft.
Improved Path:	**0.0** ft.	**0.0** ft.
6.2 Development:	**785.0** ft.	**415.3** ft.

6.3 Channel Bars: **Multiple**
6.4 Meander Migration: **Flood Chute**
6.5 Meander Width: **70 ft.** Rato: **1.0**
6.6 Wavelength: **70 ft.** Ratio: **1.0**

Step 7. Windshield Survey

7.1 Bank Erosion: **375.28** ft
7.2 Bank Height: **4** ft
7.3 Ice/Debris Jam Potential: **Bridge**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**2 High**	**1 Low**	**1 Low**	**2 High**	**2 High**	**2 High**	**2 High**	**2 High**	**1 Low**	**0 N.S.**	**2 High**	**2 High**	**1 Low**	**1 Low**	**25**

Stevens River

Phase 1 - Reach Summary Report

Basin:	**Waits, Ompompanosuc, Stevens, Wells**
Stream Name:	**Stevens River**
Topo Maps:	**Saint Johnsbury**
Watershed:	**Waits River**
Sub-watershed:	**Connecticut River -- Ammonoosuc River to Waits River**

Reach ID:	**M104**
SGAT Version:	**4.56**
Date Last Edited:	**June, 15 2011**
QA Status:	**Step 2 done**
Is Reach An Impoundment?:	**No**

Step 1. Reach Location **At first bridge west of Interstate 91, upstream to top of step pools due south of Karme Choling facility**

1.1 Reach Description:

1.2 Towns: **Barnet**

1.3 Downstream Latitude: **44.3018146793**

1.3 Downstream Longitude: **-72.0587176555**

Step 2. Stream Type

2.1 Elevation Upstream: **629**

2.1 Elevation Downstream: **590**

2.1 Is Gradient Gentle?: **No**

2.2 Valley Length: **3,046.0** ft. **0.58** Miles

2.3 Valley Slope: **1.3**

2.4 Channel Length: **3,396.0** ft. **0.64** Miles

2.5 Channel Slope: **1.15 %**

2.6 Sinuosity: **1.11**

2.7 Watershed Area: **45.0** Square Miles

2.8 Channel Width: **69.9** feet

2.9 Valley Width: **160.0** feet

2.10 Confinement Ratio: **2.3**

2.10 Confinement Type: **Semi-confined**

2.11 Reference Stream Type: **B**

Bedform: **Step-Pool**

Sub-Class Slope: **c**

Bed Material: **Cobble**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**

3.2 Grade Control: **Ledge**

3.3 Dominant Geological Mat.: **Glacial Lake** **59.0** %

3.3 Sub-dom. Geological Mat.: **Till**

3.4 Valley Slope Left: **Very Steep**

3.4 Valley Slope Right: **Very Steep**

3.5 Soils

Hydrologic Group:	**B**	**59.0** %
Flooding:	**None/Rare**	**100.0** %
Water Table Deep:	**6.0**	**98.0** %
Water Table Shallow:	**6.0**	**98.0** %
Erodibility:	**Very Severe**	**99.0** %

7.4 Comments:

Original phase 1 assessment of B-type stream was reaffirmed by 2010 phase 2 fieldwork.

Step 4. Land Cover - Reach Hydrology

4.1 Watershed

Historic Land Cover: **Forest**

Current Dominant Land Cover: **Forest** **63.4** %

Current Sub-Dominant Land Cover: **Field**

4.2 Corridor

Historic Land Cover:: **Forest**

Current Dominant Land Cover: **Urban** **25.8** %

Current Sub-Dominant Land Cover: **Forest**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**>100**	**0-25**
Sub-dominant:	**51-100**	**>100**
Length w / less than 25 ft.:	**146.0** ft.	**153.0** ft.

4.4 Ground Water Inputs: **None**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):

Type: **None**

Use:

5.2 Bridges and Culverts: **2** **3.7** %

5.3 Bank Armoring: **83.1** **2.4** %

Left: **0.0** ft. Right: **83.1** ft.

5.4 Channel Straightening: **689.6** **20.3** %

5.5 Dredging History: **None**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **242.6** ft. **7.1**

	One Side	Both Sides
Road:	**242.6** ft.	**0.0** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**0.0** ft.	**0.0** ft.
Improved Path:	**0.0** ft.	**0.0** ft.
6.2 Development:	**479.2** ft.	**0.0** ft.

6.3 Channel Bars: **None**

6.4 Meander Migration: **Flood Chute**

6.5 Meander Width: **ft.** Rato: **0.0**

6.6 Wavelength: **ft.** Ratio: **0.0**

Step 7. Windshield Survey

7.1 Bank Erosion: **142.12** ft

7.2 Bank Height: **4** ft

7.3 Ice/Debris Jam Potential: **Bridge**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**1 Low**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**2 High**	**0 N.S.**	**1 Low**	**1 Low**	**0 N.S.**	**0 N.S.**	**0 N.D.**	**0 N.D.**	**0 N.S.**	**1 Low**	**10**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **Stevens River**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **M105**
SGAT Version: **4.56**
Date Last Edited: **June, 15 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From top of step pools due south of Karme Choling facility, upstream to edge of woods east of Barnet School**

1.1 Reach Description:
1.2 Towns: **Barnet**
1.3 Downstream Latitude: **44.3018245125**
1.3 Downstream Longitude: **-72.0699227691**

Step 2. Stream Type

2.1 Elevation Upstream: **649**
2.1 Elevation Downstream: **629**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **2,989.0** ft. **0.57** Miles
2.3 Valley Slope: **0.7**
2.4 Channel Length: **4,187.0** ft. **0.79** Miles
2.5 Channel Slope: **0.48 %**
2.6 Sinuosity: **1.40**
2.7 Watershed Area: **44.3** Square Miles
2.8 Channel Width: **69.4** feet
2.9 Valley Width: **650.0** feet
2.10 Confinement Ratio: **9.4**
2.10 Confinement Type: **Broad**
2.11 Reference Stream Type: **E**
Bedform: **Riffle-Pool**
Sub-Class Slope: **None**
Bed Material: **Sand**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **None**
3.3 Dominant Geological Mat.: **Alluvial** **59.0** %
3.3 Sub-dom. Geological Mat.: **Glacial Lake**
3.4 Valley Slope Left: **Ext. Steep**
3.4 Valley Slope Right: **Very Steep**
3.5 Soils
Hydrologic Group: **C** **63.0** %
Flooding: **Frequent** **59.0** %
Water Table Deep: **1.0** **59.0** %
Water Table Shallow: **0.0** **59.0** %
Erodibility: **Moderate** **39.0** %
7.4 Comments:

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **61.5** %
Current Sub-Dominant Land Cover: **Field**
4.2 Corridor
Historic Land Cover:: **Field**
Current Dominant Land Cover: **Crop** **31.8** %
Current Sub-Dominant Land Cover: **Forest**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**0-25**	**0-25**
Sub-dominant:	**>100**	**>100**
Length w / less than 25 ft.:	**501.0** ft.	**30.0** ft.

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications
5.1 Flow Regulation - (old):
Type: **None**
Use:
5.2 Bridges and Culverts: **0** **0.0** %
5.3 Bank Armoring: **1,093.0** **26.1** %
Left: **273.6** ft. Right: **819.4** ft.
5.4 Channel Straightening: **4,187.2** **100.0** %
5.5 Dredging History: **Dredging**

Step 6. Floodplain Modifications
6.1 Berms & Roads - old: **0.0** ft. **0.0**

	One Side	Both Sides
Road:	**0.0** ft.	**0.0** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**0.0** ft.	**0.0** ft.
Improved Path:	**0.0** ft.	**0.0** ft.
6.2 Development:	**68.7** ft.	**0.0** ft.

6.3 Channel Bars: **Multiple**
6.4 Meander Migration: **Flood Chute**
6.5 Meander Width: **427 ft.** Rato: **6.1**
6.6 Wavelength: **512 ft.** Ratio: **7.4**

Step 7. Windshield Survey
7.1 Bank Erosion: **2354.36** ft
7.2 Bank Height: **4** ft
7.3 Ice/Debris Jam Potential: **None**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**1 Low**	**0 N.S.**	**0 N.S.**	**2 High**	**2 High**	**2 High**	**0 N.S.**	**0 N.S.**	**2 High**	**1 Low**	**0 N.S.**	**1 Low**	**2 High**	**0 N.S.**	**17**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **Stevens River**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **M106**
SGAT Version: **4.56**
Date Last Edited: **June, 29 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From edge of woods east of Barnet School, upstream to S-turn 1100' west of Barnet Center Road**

1.1 Reach Description:
1.2 Towns: **Barnet**
1.3 Downstream Latitude: **44.3062513013**
1.3 Downstream Longitude: **-72.0765219612**

Step 2. Stream Type

2.1 Elevation Upstream: **688**
2.1 Elevation Downstream: **649**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **3,053.0** ft. **0.58** Miles
2.3 Valley Slope: **1.3**
2.4 Channel Length: **4,597.0** ft. **0.87** Miles
2.5 Channel Slope: **0.85 %**
2.6 Sinuosity: **1.51**
2.7 Watershed Area: **42.3** Square Miles
2.8 Channel Width: **68.1** feet
2.9 Valley Width: **600.0** feet
2.10 Confinement Ratio: **8.8**
2.10 Confinement Type: **Broad**
2.11 Reference Stream Type: **C**
Bedform: **Riffle-Pool**
Sub-Class Slope: **None**
Bed Material: **Cobble**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **None**
3.3 Dominant Geological Mat.: **Till** **61.0** %
3.3 Sub-dom. Geological Mat.: **Alluvial**
3.4 Valley Slope Left: **Very Steep**
3.4 Valley Slope Right: **Very Steep**
3.5 Soils
Hydrologic Group: **C** **67.0** %
Flooding: **None/Rare** **71.0** %
Water Table Deep: **2.0** **41.0** %
Water Table Shallow: **1.0** **38.0** %
Erodibility: **Severe** **68.0** %
7.4 Comments:

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **57.9** %
Current Sub-Dominant Land Cover: **Field**
4.2 Corridor
Historic Land Cover:: **Forest**
Current Dominant Land Cover: **Forest** **47.6** %
Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**>100**	**>100**
Sub-dominant:	**51-100**	**0-25**
Length w / less than 25 ft.:	**0.0** ft.	**1,051.0** ft.

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):
Type: **None**
Use:
5.2 Bridges and Culverts: **0** **0.0** %
5.3 Bank Armoring: **37.4** **0.8** %
Left: **0.0** ft. Right: **37.4** ft.
5.4 Channel Straightening: **924.2** **20.1** %
5.5 Dredging History: **None**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **0.0** ft. **0.0**

	One Side	Both Sides
Road:	**0.0** ft.	**0.0** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**0.0** ft.	**0.0** ft.
Improved Path:	**0.0** ft.	**0.0** ft.
6.2 Development:	**0.0** ft.	**0.0** ft.

6.3 Channel Bars: **Multiple**
6.4 Meander Migration: **Multiple**
6.5 Meander Width: **225 ft.** Rato: **3.3**
6.6 Wavelength: **586 ft.** Ratio: **8.6**

Step 7. Windshield Survey

7.1 Bank Erosion: **509.42** ft
7.2 Bank Height: **3** ft
7.3 Ice/Debris Jam Potential: **None**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**2 High**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**2 High**	**0 N.S.**	**0 Unk.**	**0 N.S.**	**1 Low**	**0 N.S.**	**1 Low**	**0 N.S.**	**1 Low**	**0 N.S.**	**11**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **Stevens River**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **M107**
SGAT Version: **4.56**
Date Last Edited: **June, 29 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location

1.1 Reach Description: **From S-turn 1100' east of Barnet Center Road, upstream to confluence with Peacham Hollow and South Peacham Brooks**

1.2 Towns: **Barnet**

1.3 Downstream Latitude: **44.310852333**

1.3 Downstream Longitude: **-72.085094975**

Step 2. Stream Type

2.1 Elevation Upstream: **747**
2.1 Elevation Downstream: **688**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **5,509.0** ft. **1.04** Miles
2.3 Valley Slope: **1.1**
2.4 Channel Length: **6,505.0** ft. **1.23** Miles
2.5 Channel Slope: **0.91 %**
2.6 Sinuosity: **1.18**
2.7 Watershed Area: **41.7** Square Miles
2.8 Channel Width: **67.6** feet
2.9 Valley Width: **528.0** feet
2.10 Confinement Ratio: **7.8**
2.10 Confinement Type: **Broad**
2.11 Reference Stream Type: **C**
Bedform: **Riffle-Pool**
Sub-Class Slope: **None**
Bed Material: **Cobble**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **None**
3.3 Dominant Geological Mat.: **Till** **85.0** %
3.3 Sub-dom. Geological Mat.: **Glacial Lake**
3.4 Valley Slope Left: **Very Steep**
3.4 Valley Slope Right: **Steep**
3.5 Soils
Hydrologic Group: **D** **49.0** %
Flooding: **None/Rare** **100.0** %
Water Table Deep: **1.5** **49.0** %
Water Table Shallow: **1.0** **42.0** %
Erodibility: **Very Severe** **98.0** %
7.4 Comments:

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **56.9** %
Current Sub-Dominant Land Cover: **Field**
4.2 Corridor
Historic Land Cover:: **Forest**
Current Dominant Land Cover: **Forest** **45.4** %
Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**>100**	**26-50**
Sub-dominant:	**0-25**	**0-25**
Length w / less than 25 ft.:	**0.0** ft.	**0.0** ft.

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):
Type: **None**
Use:
5.2 Bridges and Culverts: **0** **0.0** %
5.3 Bank Armoring: **100.4** **1.5** %
Left: **100.4** ft. Right: **0.0** ft.
5.4 Channel Straightening: **687.6** **10.6** %
5.5 Dredging History: **Dredging**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **486.2** ft. **7.5**

	One Side	Both Sides
Road:	**0.0** ft.	**0.0** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**0.0** ft.	**0.0** ft.
Improved Path:	**486.2** ft.	**0.0** ft.
6.2 Development:	**0.0** ft.	**0.0** ft.

6.3 Channel Bars: **Multiple**
6.4 Meander Migration: **Flood Chute**
6.5 Meander Width: **ft.** Rato: **0.0**
6.6 Wavelength: **ft.** Ratio: **0.0**

Step 7. Windshield Survey

7.1 Bank Erosion: **0** ft
7.2 Bank Height: **No Data** ft
7.3 Ice/Debris Jam Potential: **Bridge**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**1 Low**	**2 High**	**1 Low**	**0 N.S.**	**1 Low**	**1 Low**	**0 N.D.**	**0 N.D.**	**1 Low**	**1 Low**	**12**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **Peacham Hollow Brook**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **T1.01**
SGAT Version: **4.56**
Date Last Edited: **June, 15 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From confluence of Stevens River, upstream to just downstream fo bridge on Barnet-Peacham Road**

1.1 Reach Description:
1.2 Towns: **Barnet**
1.3 Downstream Latitude: **44.3125351349**
1.3 Downstream Longitude: **-72.1049761462**

Step 2. Stream Type

2.1 Elevation Upstream: **787**
2.1 Elevation Downstream: **747**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **2,514.0** ft. **0.48** Miles
2.3 Valley Slope: **1.6**
2.4 Channel Length: **3,525.0** ft. **0.67** Miles
2.5 Channel Slope: **1.13 %**
2.6 Sinuosity: **1.40**
2.7 Watershed Area: **17.1** Square Miles
2.8 Channel Width: **45.7** feet
2.9 Valley Width: **1,085.0** feet
2.10 Confinement Ratio: **23.7**
2.10 Confinement Type: **Very Broad**
2.11 Reference Stream Type: **C**
Bedform: **Riffle-Pool**
Sub-Class Slope: **None**
Bed Material: **Cobble**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **Ledge**
3.3 Dominant Geological Mat.: **Till** **76.0** %
3.3 Sub-dom. Geological Mat.: **Ice-Contact**
3.4 Valley Slope Left: **Hilly**
3.4 Valley Slope Right: **Steep**
3.5 Soils
Hydrologic Group: **C** **51.0** %
Flooding: **None/Rare** **100.0** %
Water Table Deep: **2.0** **51.0** %
Water Table Shallow: **1.0** **51.0** %
Erodibility: **Very Severe** **99.0** %
7.4 Comments:
bedrock ledges frequent

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **73.3** %
Current Sub-Dominant Land Cover: **Urban**
4.2 Corridor
Historic Land Cover:: **Forest**
Current Dominant Land Cover: **Forest** **30.3** %
Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**0-25**	**0-25**
Sub-dominant:	**26-50**	**>100**
Length w / less than 25 ft.:	**0.0** ft.	**89.0** ft.

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):
Type: **None**
Use:
5.2 Bridges and Culverts: **1** **9.9** %
5.3 Bank Armoring: **1,077.3** **30.6** %
Left: **412.7** ft. Right: **664.6** ft.
5.4 Channel Straightening: **2,688.8** **76.3** %
5.5 Dredging History: **Dredging**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **1,593.9** ft. **45.2**

	One Side	Both Sides
Road:	**1,593.9** ft.	**0.0** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**0.0** ft.	**0.0** ft.
Improved Path:	**0.0** ft.	**0.0** ft.
6.2 Development:	**155.6** ft.	**0.0** ft.

6.3 Channel Bars: **Multiple**
6.4 Meander Migration: **Migration**
6.5 Meander Width: **143 ft.** Rato: **3.1**
6.6 Wavelength: **368 ft.** Ratio: **8.1**

Step 7. Windshield Survey

7.1 Bank Erosion: **52.25** ft
7.2 Bank Height: **4** ft
7.3 Ice/Debris Jam Potential: **Bridge**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**0 N.S.**	**0 N.S.**	**1 Low**	**2 High**	**2 High**	**2 High**	**2 High**	**0 N.S.**	**0 N.S.**	**1 Low**	**1 Low**	**0 N.S.**	**0 N.S.**	**1 Low**	**16**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **Peacham Hollow Brook**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **T1.02**
SGAT Version: **4.56**
Date Last Edited: **June, 15 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From just downstream of bridge on Barnet-Peacham road, upstream to opening at Magness' field**

1.1 Reach Description:
1.2 Towns: **Barnet, Peacham**
1.3 Downstream Latitude: **44.3171065663**
1.3 Downstream Longitude: **-72.1132287032**

Step 2. Stream Type

2.1 Elevation Upstream: **1,023**
2.1 Elevation Downstream: **787**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **10,466.0** ft. **1.98** Miles
2.3 Valley Slope: **2.3**
2.4 Channel Length: **12,570.0** ft. **2.38** Miles
2.5 Channel Slope: **1.88 %**
2.6 Sinuosity: **1.20**
2.7 Watershed Area: **16.1** Square Miles
2.8 Channel Width: **44.5** feet
2.9 Valley Width: **628.0** feet
2.10 Confinement Ratio: **14.1**
2.10 Confinement Type: **Very Broad**
2.11 Reference Stream Type: **C**
Bedform: **Riffle-Pool**
Sub-Class Slope: **None**
Bed Material: **Cobble**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **None**
3.3 Dominant Geological Mat.: **Till** **87.0** %
3.3 Sub-dom. Geological Mat.: **Alluvial**
3.4 Valley Slope Left: **Very Steep**
3.4 Valley Slope Right: **Very Steep**
3.5 Soils
Hydrologic Group: **C** **48.0** %
Flooding: **None/Rare** **88.0** %
Water Table Deep: **1.5** **40.0** %
Water Table Shallow: **0.0** **52.0** %
Erodibility: **Very Severe** **88.0** %

7.4 Comments:
River slow moving with no visible bed material through open fields, rest of the reach cobble C-type stream

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **73.4** %
Current Sub-Dominant Land Cover: **Urban**
4.2 Corridor
Historic Land Cover:: **Forest**
Current Dominant Land Cover: **Forest** **51.3** %
Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**>100**	**>100**
Sub-dominant:	**0-25**	**0-25**
Length w / less than 25 ft.:	**922.0** ft.	**526.0** ft.

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **Multiple**
Type: **Small Bypass**
Use: **Hydro-electric**
5.2 Bridges and Culverts: **2** **1.2** %
5.3 Bank Armoring: **105.7** **0.8** %
Left: **105.7** ft. Right: **0.0** ft.
5.4 Channel Straightening: **3,242.4** **25.8** %
5.5 Dredging History: **None**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **6,142.2** ft. **48.9**

	One Side	Both Sides
Road:	**4,774.1** ft.	**528.6** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**0.0** ft.	**0.0** ft.
Improved Path:	**839.6** ft.	**0.0** ft.
6.2 Development:	**0.0** ft.	**0.0** ft.

6.3 Channel Bars: **Point**
6.4 Meander Migration: **Multiple**
6.5 Meander Width: **144 ft.** Rato: **3.2**
6.6 Wavelength: **636 ft.** Ratio: **14.3**

Step 7. Windshield Survey

7.1 Bank Erosion: **323.47** ft
7.2 Bank Height: **3** ft
7.3 Ice/Debris Jam Potential: **Bridge**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**1 Low**	**1 Low**	**0 N.S.**	**0 N.S.**	**2 High**	**0 N.S.**	**2 High**	**0 N.S.**	**1 Low**	**1 Low**	**1 Low**	**1 Low**	**0 N.S.**	**1 Low**	**15**

Stevens River

Phase 1 - Reach Summary Report

Basin:	Waits, Ompompanosuc, Stevens, Wells	Reach ID:	T1.03
Stream Name:	Peacham Hollow Brook	SGAT Version:	4.56
Topo Maps:	Saint Johnsbury	Date Last Edited:	June, 15 2011
Watershed:	Waits River	QA Status:	Step 2 done
Sub-watershed:	Connecticut River -- Ammonoosuc River to Waits River	Is Reach An Impoundment?:	No

Step 1. Reach Location **From opening at Magness' field, upstream to bridge on Barnet-Peacham Road and tributary**

1.1 Reach Description:

1.2 Towns: **Peacham**

1.3 Downstream Latitude: **44.3309814855**

1.3 Downstream Longitude: **-72.1466832026**

Step 2. Stream Type

2.1 Elevation Upstream: **1,062**
2.1 Elevation Downstream: **1,023**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **3,460.0** ft. **0.66** Miles
2.3 Valley Slope: **1.1**
2.4 Channel Length: **4,593.0** ft. **0.87** Miles
2.5 Channel Slope: **0.85 %**
2.6 Sinuosity: **1.33**
2.7 Watershed Area: **12.9** Square Miles
2.8 Channel Width: **40.4** feet
2.9 Valley Width: **624.0** feet
2.10 Confinement Ratio: **15.5**
2.10 Confinement Type: **Very Broad**
2.11 Reference Stream Type: **E**
Bedform: **Riffle-Pool**
Sub-Class Slope: **None**
Bed Material: **Gravel**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **None**
3.3 Dominant Geological Mat.: **Till** **58.0** %
3.3 Sub-dom. Geological Mat.: **Alluvial**
3.4 Valley Slope Left: **Steep**
3.4 Valley Slope Right: **Very Steep**
3.5 Soils
Hydrologic Group: **C** **42.0** %
Flooding: **None/Rare** **59.0** %
Water Table Deep: **1.0** **40.0** %
Water Table Shallow: **0.0** **70.0** %
Erodibility: **Severe** **58.0** %

7.4 Comments:
stream is slow moving through fields with no visible bed material

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **74.9** %
Current Sub-Dominant Land Cover: **Urban**
4.2 Corridor
Historic Land Cover:: **Field**
Current Dominant Land Cover: **Urban** **52.0** %
Current Sub-Dominant Land Cover: **Forest**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**0-25**	**0-25**
Sub-dominant:	**>100**	**>100**
Length w / less than 25 ft.:	**1,974.0** ft.	**1,620.0** ft.

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):
Type: **None**
Use:
5.2 Bridges and Culverts: **1** **2.2** %
5.3 Bank Armoring: **1,210.9** **26.4** %
Left: **737.1** ft. Right: **473.8** ft.
5.4 Channel Straightening: **3,399.0** **74.0** %
5.5 Dredging History: **None**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **1,412.5** ft. **30.8**

	One Side	Both Sides
Road:	**1,013.7** ft.	**0.0** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**0.0** ft.	**0.0** ft.
Improved Path:	**398.8** ft.	**0.0** ft.
6.2 Development:	**0.0** ft.	**0.0** ft.

6.3 Channel Bars: **Multiple**
6.4 Meander Migration: **Multiple**
6.5 Meander Width: **100 ft.** Rato: **2.5**
6.6 Wavelength: **135 ft.** Ratio: **3.3**

Step 7. Windshield Survey

7.1 Bank Erosion: **568.38** ft
7.2 Bank Height: **3** ft
7.3 Ice/Debris Jam Potential: **Bridge**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**2 High**	**0 N.S.**	**0 N.S.**	**2 High**	**2 High**	**0 N.S.**	**2 High**	**0 N.S.**	**1 Low**	**1 Low**	**2 High**	**2 High**	**1 Low**	**1 Low**	**20**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **Peacham Hollow Brook**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **T1.04**
SGAT Version: **4.56**
Date Last Edited: **June, 15 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location — **From bridge on Barnet-Peacham road, east of East Peacham village, upstream to NW edge of woods**

1.1 Reach Description:
1.2 Towns: **Peacham**
1.3 Downstream Latitude: **44.3367426426**
1.3 Downstream Longitude: **-72.1560516041**

Step 2. Stream Type

2.1 Elevation Upstream: **1,082**
2.1 Elevation Downstream: **1,062**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **1,206.0** ft. **0.23** Miles
2.3 Valley Slope: **1.7**
2.4 Channel Length: **1,493.0** ft. **0.28** Miles
2.5 Channel Slope: **1.34 %**
2.6 Sinuosity: **1.24**
2.7 Watershed Area: **6.7** Square Miles
2.8 Channel Width: **30.3** feet
2.9 Valley Width: **635.0** feet
2.10 Confinement Ratio: **21.0**
2.10 Confinement Type: **Very Broad**
2.11 Reference Stream Type: **E**
Bedform: **Riffle-Pool**
Sub-Class Slope: **None**
Bed Material: **Gravel**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **None**
3.3 Dominant Geological Mat.: **Till** **79.0** %
3.3 Sub-dom. Geological Mat.: **Ice-Contact**
3.4 Valley Slope Left: **Steep**
3.4 Valley Slope Right: **Very Steep**
3.5 Soils
Hydrologic Group: **D** **60.0** %
Flooding: **None/Rare** **93.0** %
Water Table Deep: **1.5** **60.0** %
Water Table Shallow: **0.0** **66.0** %
Erodibility: **Very Severe** **80.0** %
7.4 Comments:

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **76.7** %
Current Sub-Dominant Land Cover: **Crop**
4.2 Corridor
Historic Land Cover:: **Residential**
Current Dominant Land Cover: **Urban** **60.9** %
Current Sub-Dominant Land Cover:

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**0-25**	**0-25**
Sub-dominant:	**>100**	**>100**
Length w / less than 25 ft.:	**36.0** ft.	**1,231.0** ft.

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):
Type: **None**
Use:
5.2 Bridges and Culverts: **4** **28.8** %
5.3 Bank Armoring: **496.2** **33.2** %
Left: **204.5** ft. Right: **291.6** ft.
5.4 Channel Straightening: **1,204.6** **80.7** %
5.5 Dredging History: **Dredging**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **776.0** ft. **52.0**

	One Side	Both Sides
Road:	**776.0** ft.	**0.0** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**0.0** ft.	**0.0** ft.
Improved Path:	**0.0** ft.	**0.0** ft.

6.2 Development: **192.0** ft. **638.8** ft.
6.3 Channel Bars: **Point**
6.4 Meander Migration: **Migration**
6.5 Meander Width: **113 ft.** Rato: **3.7**
6.6 Wavelength: **404 ft.** Ratio: **13.3**

Step 7. Windshield Survey

7.1 Bank Erosion: **19.15** ft
7.2 Bank Height: **2** ft
7.3 Ice/Debris Jam Potential: **Bridge**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**2 High**	**0 N.S.**	**2 High**	**2 High**	**2 High**	**2 High**	**2 High**	**2 High**	**1 Low**	**0 N.S.**	**1 Low**	**0 N.S.**	**0 N.S.**	**2 High**	**22**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **Peacham Hollow Brook**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **T1.05**
SGAT Version: **4.56**
Date Last Edited: **June, 15 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From edge of woods NW of East Peacham village, upstream to Ewells Mills and Groton-Danville road**

1.1 Reach Description:
1.2 Towns: **Peacham**
1.3 Downstream Latitude: **44.3388009038**
1.3 Downstream Longitude: **-72.1600133336**

Step 2. Stream Type

2.1 Elevation Upstream: **1,259**
2.1 Elevation Downstream: **1,082**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **8,875.0** ft. **1.68** Miles
2.3 Valley Slope: **2.0**
2.4 Channel Length: **9,378.0** ft. **1.78** Miles
2.5 Channel Slope: **1.89 %**
2.6 Sinuosity: **1.06**
2.7 Watershed Area: **6.2** Square Miles
2.8 Channel Width: **29.2** feet
2.9 Valley Width: **350.0** feet
2.10 Confinement Ratio: **12.0**
2.10 Confinement Type: **Very Broad**
2.11 Reference Stream Type: **C**
Bedform: **Riffle-Pool**
Sub-Class Slope: **b**
Bed Material: **Cobble**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **Ledge**
3.3 Dominant Geological Mat.: **Till** **99.0** %
3.3 Sub-dom. Geological Mat.: **Alluvial**
3.4 Valley Slope Left: **Ext. Steep**
3.4 Valley Slope Right: **Ext. Steep**
3.5 Soils
Hydrologic Group: **C** **56.0** %
Flooding: **None/Rare** **100.0** %
Water Table Deep: **2.0** **56.0** %
Water Table Shallow: **1.0** **56.0** %
Erodibility: **Very Severe** **99.0** %
7.4 Comments:

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **78.4** %
Current Sub-Dominant Land Cover: **Crop**
4.2 Corridor
Historic Land Cover:: **Forest**
Current Dominant Land Cover: **Forest** **35.4** %
Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**>100**	**>100**
Sub-dominant:	**26-50**	**51-100**
Length w / less than 25 ft.:	**123.0** ft.	**324.0** ft.

4.4 Ground Water Inputs: **None**

Step 5. Instream Channel Modifications
5.1 Flow Regulation - (old):
Type: **Small Withdrawal**
Use: **Other**
5.2 Bridges and Culverts: **4** **4.3** %
5.3 Bank Armoring: **1,178.5** **12.6** %
Left: **855.2** ft. Right: **323.3** ft.
5.4 Channel Straightening: **4,256.6** **45.4** %
5.5 Dredging History: **Gravel Mining**

Step 6. Floodplain Modifications
6.1 Berms & Roads - old: **2,653.6** ft. **28.3**

	One Side	Both Sides
Road:	**2,542.2** ft.	**0.0** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**73.3** ft.	**0.0** ft.
Improved Path:	**38.2** ft.	**0.0** ft.
6.2 Development:	**2,126.5** ft.	**0.0** ft.

6.3 Channel Bars: **None**
6.4 Meander Migration: **Flood Chute**
6.5 Meander Width: **ft.** Rato: **0.0**
6.6 Wavelength: **ft.** Ratio: **0.0**

Step 7. Windshield Survey
7.1 Bank Erosion: **332.45** ft
7.2 Bank Height: **3** ft
7.3 Ice/Debris Jam Potential: **Bridge**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**0 N.S.**	**1 Low**	**0 N.S.**	**1 Low**	**2 High**	**1 Low**	**2 High**	**2 High**	**0 N.S.**	**0 N.S.**	**0 N.D.**	**0 N.D.**	**0 N.S.**	**1 Low**	**14**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **Peacham Hollow Brook**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **T1.06**
SGAT Version: **4.56**
Date Last Edited: **June, 15 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From Ewells Mills/Groton-Danville road, upstream to Joe's Pond Road**

1.1 Reach Description:
1.2 Towns: **Peacham**
1.3 Downstream Latitude: **44.3598402172**
1.3 Downstream Longitude: **-72.1732264362**

Step 2. Stream Type

2.1 Elevation Upstream: **1,377**
2.1 Elevation Downstream: **1,259**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **2,982.0** ft. **0.56** Miles
2.3 Valley Slope: **4.0**
2.4 Channel Length: **3,281.0** ft. **0.62** Miles
2.5 Channel Slope: **3.60 %**
2.6 Sinuosity: **1.10**
2.7 Watershed Area: **2.0** Square Miles
2.8 Channel Width: **17.6** feet
2.9 Valley Width: **447.0** feet
2.10 Confinement Ratio: **25.4**
2.10 Confinement Type: **Very Broad**
2.11 Reference Stream Type: **C**
Bedform: **Riffle-Pool**
Sub-Class Slope: **b**
Bed Material: **Gravel**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **Ledge**
3.3 Dominant Geological Mat.: **Till** **76.0** %
3.3 Sub-dom. Geological Mat.: **Other**
3.4 Valley Slope Left: **Hilly**
3.4 Valley Slope Right: **Very Steep**
3.5 Soils
Hydrologic Group: **D** **40.0** %
Flooding: **None/Rare** **100.0** %
Water Table Deep: **2.0** **31.0** %
Water Table Shallow: **1.0** **31.0** %
Erodibility: **Very Severe** **76.0** %

7.4 Comments:
Reach also includes E and A-type reaches and will be segmented in Phase 2.

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **85.7** %
Current Sub-Dominant Land Cover: **Crop**
4.2 Corridor
Historic Land Cover:: **Forest**
Current Dominant Land Cover: **Forest** **48.7** %
Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**>100**	**>100**
Sub-dominant:	**26-50**	**26-50**
Length w / less than 25 ft.:	**0.0** ft.	**32.0** ft.

4.4 Ground Water Inputs: **Abundant**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):
Type: **None**
Use:
5.2 Bridges and Culverts: **1** **7.6** %
5.3 Bank Armoring: **911.2** **27.8** %
Left: **174.7** ft. Right: **736.4** ft.
5.4 Channel Straightening: **1,196.2** **36.5** %
5.5 Dredging History: **None**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **1,421.3** ft. **43.3**

	One Side	Both Sides
Road:	**1,280.5** ft.	**0.0** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**0.0** ft.	**0.0** ft.
Improved Path:	**140.8** ft.	**0.0** ft.
6.2 Development:	**0.0** ft.	**0.0** ft.

6.3 Channel Bars: **None**
6.4 Meander Migration: **Flood Chute**
6.5 Meander Width: **ft.** Rato: **0.0**
6.6 Wavelength: **ft.** Ratio: **0.0**

Step 7. Windshield Survey

7.1 Bank Erosion: **0** ft
7.2 Bank Height: **No Data** ft
7.3 Ice/Debris Jam Potential: **None**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**0 N.S.**	**0 N.S.**	**1 Low**	**2 High**	**2 High**	**0 N.S.**	**2 High**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**0 N.D.**	**0 N.D.**	**0 N.S.**	**0 N.S.**	**11**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **Peacham Hollow Brook**
Topo Maps: **Barnet_1114**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **T1.07**
SGAT Version: **4.56**
Date Last Edited: **June, 15 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From ~1000 ft DS of Slack St_Bayley-Hazen Rd jct to headwaters N of Slack St midpoint**

1.1 Reach Description:
1.2 Towns: **Peacham**
1.3 Downstream Latitude: **44.3665817912**
1.3 Downstream Longitude: **-72.1793858375**

Step 2. Stream Type

2.1 Elevation Upstream: **1,653**
2.1 Elevation Downstream: **1,378**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **6,087.0** ft. **1.15** Miles
2.3 Valley Slope: **4.5**
2.4 Channel Length: **6,430.0** ft. **1.22** Miles
2.5 Channel Slope: **4.28 %**
2.6 Sinuosity: **1.06**
2.7 Watershed Area: **1.2** Square Miles
2.8 Channel Width: **14.1** feet
2.9 Valley Width: **200.0** feet
2.10 Confinement Ratio: **14.2**
2.10 Confinement Type: **Very Broad**
2.11 Reference Stream Type: **C**
Bedform: **Riffle-Pool**
Sub-Class Slope: **b**
Bed Material: **Cobble**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **Multiple**
3.3 Dominant Geological Mat.: **Till** **99.0** %
3.3 Sub-dom. Geological Mat.: **Alluvial**
3.4 Valley Slope Left:
3.4 Valley Slope Right:
3.5 Soils
Hydrologic Group: **C** **70.0** %
Flooding: **None/Rare** **100.0** %
Water Table Deep: **2.0** **51.0** %
Water Table Shallow: **1.0** **51.0** %
Erodibility: **Very Severe** **99.0** %

7.4 Comments:

Excluded in original Phase 1; 2010 Phase 2 assessment indicated significant recent land use changes, and reach was assessed as 3 segments:

T1.07A_3087.2 ft (0.58 mi), ~ 3.6 pct slope, ref Cb3 riffle-pool; T1.07B_1295.6 ft (0.25 mi), ~ 5.6 pct slope with multiple grade controls, ref B3 step-pool; T1.07C_2047.4 ft (0.39 mi), ~4.6 pct slope with multiple grade

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover:
Current Dominant Land Cover: **Forest** **86.5** %
Current Sub-Dominant Land Cover: **Urban**
4.2 Corridor
Historic Land Cover::
Current Dominant Land Cover: **Forest** **55.8** %
Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:		
Sub-dominant:		
Length w / less than 25 ft.:	**233.0** ft.	**29.0** ft.

4.4 Ground Water Inputs:

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):
Type: **Small Withdrawal**
Use: **Other**
5.2 Bridges and Culverts: **4** **8.1** %
5.3 Bank Armoring: **328.6** **5.1** %
Left: **93.3** ft. Right: **235.3** ft.
5.4 Channel Straightening: **3,349.9** **52.1** %
5.5 Dredging History: **None**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **3,024.2** ft. **47.0**

	One Side	Both Sides
Road:	**2,624.8** ft.	**147.6** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**251.8** ft.	**0.0** ft.
Improved Path:	**0.0** ft.	**0.0** ft.
6.2 Development:	**203.5** ft.	**0.0** ft.

6.3 Channel Bars:
6.4 Meander Migration: **Multiple**
6.5 Meander Width: **ft.** Rato: **0.0**
6.6 Wavelength: **ft.** Ratio: **0.0**

Step 7. Windshield Survey

7.1 Bank Erosion: **488.69** ft
7.2 Bank Height: **3** ft
7.3 Ice/Debris Jam Potential:

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**0 N.S.**	**1 Low**	**1 Low**	**1 Low**	**2 High**	**0 N.S.**	**2 High**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**0 N.D.**	**0 N.D.**	**1 Low**	**0 N.S.**	**12**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **South Peacham Brook**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **T2.01**
SGAT Version: **4.56**
Date Last Edited: **June, 15 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From confluence with Stevens River, upstream to opening at Choate's field**

1.1 Reach Description:
1.2 Towns: **Barnet**
1.3 Downstream Latitude: **44.3125114288**
1.3 Downstream Longitude: **-72.1049931479**

Step 2. Stream Type

2.1 Elevation Upstream: **865**
2.1 Elevation Downstream: **747**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **4,702.0** ft. **0.89** Miles
2.3 Valley Slope: **2.5**
2.4 Channel Length: **5,816.0** ft. **1.10** Miles
2.5 Channel Slope: **2.03 %**
2.6 Sinuosity: **1.24**
2.7 Watershed Area: **23.0** Square Miles
2.8 Channel Width: **52.0** feet
2.9 Valley Width: **220.0** feet
2.10 Confinement Ratio: **4.2**
2.10 Confinement Type: **Narrow**
2.11 Reference Stream Type: **C**
Bedform: **Riffle-Pool**
Sub-Class Slope: **None**
Bed Material: **Cobble**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **None**
3.3 Dominant Geological Mat.: **Till** **90.0** %
3.3 Sub-dom. Geological Mat.: **Alluvial**
3.4 Valley Slope Left: **Steep**
3.4 Valley Slope Right: **Steep**
3.5 Soils
Hydrologic Group: **C** **76.0** %
Flooding: **None/Rare** **95.0** %
Water Table Deep: **2.0** **66.0** %
Water Table Shallow: **1.0** **66.0** %
Erodibility: **Very Severe** **94.0** %
7.4 Comments:
stream dammed at driveway with cobbles (swimming hole)

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **66.9** %
Current Sub-Dominant Land Cover: **Field**
4.2 Corridor
Historic Land Cover:: **Forest**
Current Dominant Land Cover: **Forest** **50.4** %
Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**>100**	**>100**
Sub-dominant:	**51-100**	**26-50**
Length w / less than 25 ft.:	**400.0** ft.	**390.0** ft.

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):
Type: **None**
Use:
5.2 Bridges and Culverts: **3** **8.3** %
5.3 Bank Armoring: **898.9** **15.5** %
Left: **524.0** ft. Right: **375.0** ft.
5.4 Channel Straightening: **2,387.0** **41.0** %
5.5 Dredging History: **Dredging**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **2,346.0** ft. **40.3**

	One Side	Both Sides
Road:	**2,346.0** ft.	**0.0** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**0.0** ft.	**0.0** ft.
Improved Path:	**0.0** ft.	**0.0** ft.
6.2 Development:	**174.1** ft.	**0.0** ft.

6.3 Channel Bars: **None**
6.4 Meander Migration: **Multiple**
6.5 Meander Width: **ft.** Rato: **0.0**
6.6 Wavelength: **ft.** Ratio: **0.0**

Step 7. Windshield Survey

7.1 Bank Erosion: **59.11** ft
7.2 Bank Height: **2** ft
7.3 Ice/Debris Jam Potential: **Bridge**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**1 Low**	**0 N.S.**	**1 Low**	**1 Low**	**2 High**	**2 High**	**2 High**	**0 N.S.**	**1 Low**	**0 N.S.**	**0 N.D.**	**0 N.D.**	**0 N.S.**	**1 Low**	**15**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **South Peacham Brook**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **T2.02**
SGAT Version: **4.56**
Date Last Edited: **June, 15 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From east end of Choate's fields, upstream to edge of woods west of West Barnet Village**

1.1 Reach Description:
1.2 Towns: **Barnet**
1.3 Downstream Latitude: **44.3087089849**
1.3 Downstream Longitude: **-72.1232527362**

Step 2. Stream Type

2.1 Elevation Upstream: **905**
2.1 Elevation Downstream: **865**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **6,448.0** ft. **1.22** Miles
2.3 Valley Slope: **0.6**
2.4 Channel Length: **9,223.0** ft. **1.75** Miles
2.5 Channel Slope: **0.43 %**
2.6 Sinuosity: **1.43**
2.7 Watershed Area: **22.2** Square Miles
2.8 Channel Width: **51.2** feet
2.9 Valley Width: **600.0** feet
2.10 Confinement Ratio: **11.7**
2.10 Confinement Type: **Very Broad**
2.11 Reference Stream Type: **E**
Bedform: **Riffle-Pool**
Sub-Class Slope: **None**
Bed Material: **Gravel**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **Dam**
3.3 Dominant Geological Mat.: **Alluvial** **59.0** %
3.3 Sub-dom. Geological Mat.: **Till**
3.4 Valley Slope Left: **Steep**
3.4 Valley Slope Right: **Steep**
3.5 Soils
Hydrologic Group: **C** **66.0** %
Flooding: **Frequent** **59.0** %
Water Table Deep: **1.0** **49.0** %
Water Table Shallow: **0.0** **66.0** %
Erodibility: **Moderate** **39.0** %

7.4 Comments:
beaver activity high at dam
Changed reference stream type from C to E after field observation

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **67.4** %
Current Sub-Dominant Land Cover: **Field**
4.2 Corridor
Historic Land Cover:: **Field**
Current Dominant Land Cover: **Forest** **30.1** %
Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**0-25**	**0-25**
Sub-dominant:	**26-50**	**26-50**
Length w / less than 25 ft.:	**3,668.0** ft.	**3,160.0** ft.

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **Impoundment**
Type: **Large Store and Release**
Use: **Recreation**
5.2 Bridges and Culverts: **4** **6.2** %
5.3 Bank Armoring: **4,931.0** **53.5** %
Left: **3,552.9** ft. Right: **1,378.2** ft.
5.4 Channel Straightening: **7,270.1** **78.8** %
5.5 Dredging History: **Dredging**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **4,650.8** ft. **50.4**

	One Side	Both Sides
Road:	**3,785.8** ft.	**272.2** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**0.0** ft.	**0.0** ft.
Improved Path:	**592.8** ft.	**0.0** ft.
6.2 Development:	**3,304.9** ft.	**92.5** ft.

6.3 Channel Bars: **Point**
6.4 Meander Migration: **Multiple**
6.5 Meander Width: **347 ft.** Rato: **6.8**
6.6 Wavelength: **296 ft.** Ratio: **5.8**

Step 7. Windshield Survey

7.1 Bank Erosion: **1016.35** ft
7.2 Bank Height: **3** ft
7.3 Ice/Debris Jam Potential: **Bridge**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**2 High**	**2 High**	**1 Low**	**2 High**	**2 High**	**2 High**	**2 High**	**2 High**	**1 Low**	**1 Low**	**0 N.S.**	**2 High**	**1 Low**	**1 Low**	**25**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **South Peacham Brook**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **T2.03**
SGAT Version: **4.56**
Date Last Edited: **June, 15 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From edge of woods west of West Barnet village, upstream to bridge at Hollow Woods road**

1.1 Reach Description:
1.2 Towns: **Barnet, Peacham**
1.3 Downstream Latitude: **44.3076800436**
1.3 Downstream Longitude: **-72.1439034102**

Step 2. Stream Type

2.1 Elevation Upstream: **924**
2.1 Elevation Downstream: **905**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **2,473.0** ft. **0.47** Miles
2.3 Valley Slope: **0.8**
2.4 Channel Length: **2,871.0** ft. **0.54** Miles
2.5 Channel Slope: **0.66 %**
2.6 Sinuosity: **1.16**
2.7 Watershed Area: **12.0** Square Miles
2.8 Channel Width: **39.1** feet
2.9 Valley Width: **325.0** feet
2.10 Confinement Ratio: **8.3**
2.10 Confinement Type: **Broad**
2.11 Reference Stream Type: **C**
Bedform: **Riffle-Pool**
Sub-Class Slope: **None**
Bed Material: **Cobble**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **None**
3.3 Dominant Geological Mat.: **Till** **67.0** %
3.3 Sub-dom. Geological Mat.: **Alluvial**
3.4 Valley Slope Left: **Steep**
3.4 Valley Slope Right: **Steep**
3.5 Soils
Hydrologic Group: **D** **63.0** %
Flooding: **None/Rare** **68.0** %
Water Table Deep: **1.5** **64.0** %
Water Table Shallow: **0.0** **96.0** %
Erodibility: **Severe** **66.0** %
7.4 Comments:

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **67.6** %
Current Sub-Dominant Land Cover: **Field**
4.2 Corridor
Historic Land Cover:: **Field**
Current Dominant Land Cover: **Forest** **50.8** %
Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**>100**	**26-50**
Sub-dominant:	**26-50**	**0-25**
Length w / less than 25 ft.:	**266.0** ft.	**768.0** ft.

4.4 Ground Water Inputs: **None**

Step 5. Instream Channel Modifications
5.1 Flow Regulation - (old):
Type: **None**
Use:
5.2 Bridges and Culverts: **1** **5.2** %
5.3 Bank Armoring: **1,299.8** **45.3** %
Left: **198.5** ft. Right: **1,101.3** ft.
5.4 Channel Straightening: **2,870.8** **100.0** %
5.5 Dredging History: **None**

Step 6. Floodplain Modifications
6.1 Berms & Roads - old: **2,104.6** ft. **73.3**

	One Side	Both Sides
Road:	**1,988.0** ft.	**116.6** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**0.0** ft.	**0.0** ft.
Improved Path:	**0.0** ft.	**0.0** ft.
6.2 Development:	**237.1** ft.	**0.0** ft.

6.3 Channel Bars: **None**
6.4 Meander Migration: **Flood Chute**
6.5 Meander Width: **273 ft.** Rato: **7.0**
6.6 Wavelength: **742 ft.** Ratio: **19.0**

Step 7. Windshield Survey
7.1 Bank Erosion: **609.96** ft
7.2 Bank Height: **2** ft
7.3 Ice/Debris Jam Potential: **Bridge**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**2 High**	**0 N.S.**	**1 Low**	**2 High**	**2 High**	**0 N.S.**	**2 High**	**1 Low**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**2 High**	**2 High**	**1 Low**	**19**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **South Peacham Brook**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **T2.04**
SGAT Version: **4.56**
Date Last Edited: **June, 23 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From bridge at Hollow Woods road, upstream to Danville-Groton road in South Peacham**

1.1 Reach Description:
1.2 Towns: **Peacham**
1.3 Downstream Latitude: **44.3097450387**
1.3 Downstream Longitude: **-72.1527393824**

Step 2. Stream Type

2.1 Elevation Upstream: **1,023**
2.1 Elevation Downstream: **924**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **4,621.0** ft. **0.88** Miles
2.3 Valley Slope: **2.1**
2.4 Channel Length: **5,480.0** ft. **1.04** Miles
2.5 Channel Slope: **1.81 %**
2.6 Sinuosity: **1.19**
2.7 Watershed Area: **9.8** Square Miles
2.8 Channel Width: **35.8** feet
2.9 Valley Width: **637.0** feet
2.10 Confinement Ratio: **17.8**
2.10 Confinement Type: **Very Broad**
2.11 Reference Stream Type: **C**
Bedform: **Riffle-Pool**
Sub-Class Slope: **b**
Bed Material: **Cobble**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **Yes**
3.2 Grade Control: **None**
3.3 Dominant Geological Mat.: **Till** **47.0** %
3.3 Sub-dom. Geological Mat.: **Alluvial**
3.4 Valley Slope Left: **Steep**
3.4 Valley Slope Right: **Steep**
3.5 Soils
Hydrologic Group: **C** **67.0** %
Flooding: **None/Rare** **62.0** %
Water Table Deep: **1.5** **46.0** %
Water Table Shallow: **0.0** **83.0** %
Erodibility: **Moderate** **48.0** %

7.4 Comments:
Stream straightened through field and is undercutting banks on both sides. Low bank through field and higher banks in woods. Old bridge abuttment evidence at NW end of field where stream comes out of woods. Culverts at bridges

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **69.5** %
Current Sub-Dominant Land Cover: **Field**
4.2 Corridor
Historic Land Cover:: **Field**
Current Dominant Land Cover: **Urban** **24.1** %
Current Sub-Dominant Land Cover: **Field**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**0-25**	**0-25**
Sub-dominant:	**>100**	**26-50**
Length w / less than 25 ft.:	**614.0** ft.	**730.0** ft.

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old):
Type: **None**
Use:
5.2 Bridges and Culverts: **0** **0.0** %
5.3 Bank Armoring: **839.0** **15.3** %
Left: **511.2** ft. Right: **327.8** ft.
5.4 Channel Straightening: **914.4** **16.7** %
5.5 Dredging History: **Dredging**

Step 6. Floodplain Modifications

6.1 Berms & Roads - old: **0.0** ft. **0.0**

	One Side	Both Sides
Road:	**0.0** ft.	**0.0** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**0.0** ft.	**0.0** ft.
Improved Path:	**0.0** ft.	**0.0** ft.
6.2 Development:	**0.0** ft.	**0.0** ft.

6.3 Channel Bars: **Point**
6.4 Meander Migration: **Flood Chute**
6.5 Meander Width: **200 ft.** Rato: **5.6**
6.6 Wavelength: **900 ft.** Ratio: **25.1**

Step 7. Windshield Survey

7.1 Bank Erosion: **61.21** ft
7.2 Bank Height: **2** ft
7.3 Ice/Debris Jam Potential: **Bridge**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**2 High**	**0 N.S.**	**0 N.S.**	**1 Low**	**1 Low**	**2 High**	**0 Unk.**	**0 N.S.**	**1 Low**	**0 N.S.**	**0 N.S.**	**2 High**	**0 N.S.**	**2 High**	**15**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **South Peacham Brook**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **T2.05**
SGAT Version: **4.56**
Date Last Edited: **June, 15 2011**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From just West of South Peacham village, upstream to bridge at Green Bay Road**

1.1 Reach Description:
1.2 Towns: **Peacham**
1.3 Downstream Latitude: **44.313890755**
1.3 Downstream Longitude: **-72.168185609**

Step 2. Stream Type

2.1 Elevation Upstream: **1,161**
2.1 Elevation Downstream: **1,023**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **3,048.0** ft. **0.58** Miles
2.3 Valley Slope: **4.5**
2.4 Channel Length: **3,523.0** ft. **0.67** Miles
2.5 Channel Slope: **3.92 %**
2.6 Sinuosity: **1.16**
2.7 Watershed Area: **6.4** Square Miles
2.8 Channel Width: **29.7** feet
2.9 Valley Width: **200.0** feet
2.10 Confinement Ratio: **6.7**
2.10 Confinement Type: **Broad**
2.11 Reference Stream Type: **C**
Bedform: **Step-Pool**
Sub-Class Slope: **b**
Bed Material: **Cobble**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **Ledge**
3.3 Dominant Geological Mat.: **Till** **99.0** %
3.3 Sub-dom. Geological Mat.: **Alluvial**
3.4 Valley Slope Left: **Hilly**
3.4 Valley Slope Right: **Hilly**
3.5 Soils
Hydrologic Group: **B** **64.0** %
Flooding: **None/Rare** **100.0** %
Water Table Deep: **6.0** **64.0** %
Water Table Shallow: **6.0** **64.0** %
Erodibility: **Very Severe** **99.0** %

7.4 Comments:
Confined reach, fast flowing, and bedrock exposed. Snowmobile bridge on downstream end.

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **75.8** %
Current Sub-Dominant Land Cover: **Urban**
4.2 Corridor
Historic Land Cover:: **Field**
Current Dominant Land Cover: **Urban** **44.1** %
Current Sub-Dominant Land Cover: **Forest**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**>100**	**26-50**
Sub-dominant:	**26-50**	**>100**
Length w / less than 25 ft.:	**29.0** ft.	**196.0** ft.

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications
5.1 Flow Regulation - (old):
Type: **None**
Use:
5.2 Bridges and Culverts: **3** **7.8** %
5.3 Bank Armoring: **1,089.2** **30.9** %
Left: **326.1** ft. Right: **763.1** ft.
5.4 Channel Straightening: **2,818.6** **80.0** %
5.5 Dredging History: **Dredging**

Step 6. Floodplain Modifications
6.1 Berms & Roads - old: **3,400.4** ft. **96.5**

	One Side	Both Sides
Road:	**3,400.4** ft.	**0.0** ft.
Railroad:	**0.0** ft.	**0.0** ft.
Berm:	**0.0** ft.	**0.0** ft.
Improved Path:	**0.0** ft.	**0.0** ft.
6.2 Development:	**244.3** ft.	**0.0** ft.

6.3 Channel Bars: **None**
6.4 Meander Migration: **Multiple**
6.5 Meander Width: **ft.** Rato: **0.0**
6.6 Wavelength: **ft.** Ratio: **0.0**

Step 7. Windshield Survey
7.1 Bank Erosion: **275.22** ft
7.2 Bank Height: **4** ft
7.3 Ice/Debris Jam Potential: **Bridge**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**1 Low**	**0 N.S.**	**1 Low**	**2 High**	**2 High**	**2 High**	**2 High**	**1 Low**	**0 N.S.**	**1 Low**	**0 N.D.**	**0 N.D.**	**1 Low**	**1 Low**	**18**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **South Peacham Brook**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **T2.06**
SGAT Version: **4.56**
Date Last Edited: **January, 05 2010**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From just west of Green Bay road, upstream to Fosters Pond**

1.1 Reach Description:
1.2 Towns: **Peacham**
1.3 Downstream Latitude: **44.3144723322**
1.3 Downstream Longitude: **-72.1781712333**

Step 2. Stream Type

2.1 Elevation Upstream: **1,515**
2.1 Elevation Downstream: **1,161**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **9,497.0** ft. **1.80** Miles
2.3 Valley Slope: **3.7**
2.4 Channel Length: **10,566.0** ft. **2.00** Miles
2.5 Channel Slope: **3.35 %**
2.6 Sinuosity: **1.11**
2.7 Watershed Area: **3.0** Square Miles
2.8 Channel Width: **21.1** feet
2.9 Valley Width: feet
2.10 Confinement Ratio: **0.0**
2.10 Confinement Type: **Semi-confined**
2.11 Reference Stream Type: **A**
Bedform: **Step-Pool**
Sub-Class Slope: **None**
Bed Material: **Cobble**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **Ledge**
3.3 Dominant Geological Mat.: **Till** **69.0** %
3.3 Sub-dom. Geological Mat.: **Other**
3.4 Valley Slope Left: **Very Steep**
3.4 Valley Slope Right: **Steep**
3.5 Soils
Hydrologic Group: **D** **84.0** %
Flooding: **None/Rare** **100.0** %
Water Table Deep: **1.5** **59.0** %
Water Table Shallow: **0.0** **59.0** %
Erodibility: **Severe** **69.0** %
7.4 Comments:

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **83.2** %
Current Sub-Dominant Land Cover: **Urban**
4.2 Corridor
Historic Land Cover:: **Forest**
Current Dominant Land Cover: **Forest** **71.3** %
Current Sub-Dominant Land Cover: **Wetland**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**>100**	**>100**
Sub-dominant:	**51-100**	**51-100**
Length w / less than 25 ft.:	**0.0** ft.	**0.0** ft.

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications
5.1 Flow Regulation - (old):
Type: **None**
Use:
5.2 Bridges and Culverts: **2** **0.0** %
5.3 Bank Armoring: **0.0** %
Left: ft. Right: ft.
5.4 Channel Straightening: **0.0** %
5.5 Dredging History: **None**

Step 6. Floodplain Modifications
6.1 Berms & Roads - old: **0.0** ft. **0.0**

	One Side	Both Sides
Road:	ft.	ft.
Railroad:	ft.	ft.
Berm:	ft.	ft.
Improved Path:	ft.	ft.
6.2 Development:	**0.0** ft.	**0.0** ft.

6.3 Channel Bars: **None**
6.4 Meander Migration: **None**
6.5 Meander Width: **ft.** Rato: **0.0**
6.6 Wavelength: **ft.** Ratio: **0.0**

Step 7. Windshield Survey
7.1 Bank Erosion: ft
7.2 Bank Height: **Low** ft
7.3 Ice/Debris Jam Potential: **None**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
1 Low	**0** N.S.	**0** N.S.	**0** N.S.	**0** N.S.	**0** Unk.	**0** Unk.	**0** N.S.	**0** N.S.	**0** N.S.	**1** Low	**1** Low	**0** N.D.	**0** N.D.	**0** N.S.	**0** N.S.	**3**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **Jewett Brook**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **T2.S1.02**
SGAT Version: **4.56**
Date Last Edited: **January, 05 2010**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From inlet of Harvey's Lake, upstream to opening NE of Mosquitoville Road**

1.1 Reach Description:
1.2 Towns: **Barnet**
1.3 Downstream Latitude: **44.2892510126**
1.3 Downstream Longitude: **-72.134354855**

Step 2. Stream Type

2.1 Elevation Upstream: **944**
2.1 Elevation Downstream: **905**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **8,219.0** ft. **1.56** Miles
2.3 Valley Slope: **0.5**
2.4 Channel Length: **9,187.0** ft. **1.74** Miles
2.5 Channel Slope: **0.42 %**
2.6 Sinuosity: **1.12**
2.7 Watershed Area: **6.0** Square Miles
2.8 Channel Width: **28.8** feet
2.9 Valley Width: **775.0** feet
2.10 Confinement Ratio: **26.9**
2.10 Confinement Type: **Very Broad**
2.11 Reference Stream Type: **E**
Bedform: **Dune-Ripple**
Sub-Class Slope: **None**
Bed Material: **Sand**

Step 3. Basin Charateristicts

3.1 Alluvial Fan:
3.2 Grade Control: **None**
3.3 Dominant Geological Mat.: **Other** **68.0** %
3.3 Sub-dom. Geological Mat.: **Till**
3.4 Valley Slope Left: **Very Steep**
3.4 Valley Slope Right: **Ext. Steep**
3.5 Soils
Hydrologic Group: **D** **87.0** %
Flooding: **None/Rare** **96.0** %
Water Table Deep: **0.5** **68.0** %
Water Table Shallow: **-1.0** **68.0** %
Erodibility: **slight** **9.0** %
7.4 Comments:
swampy, many groundwater inputs, beaver activity

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **76.9** %
Current Sub-Dominant Land Cover: **Crop**
4.2 Corridor
Historic Land Cover:: **Forest**
Current Dominant Land Cover: **Forest** **67.9** %
Current Sub-Dominant Land Cover: **Wetland**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**>100**	**>100**
Sub-dominant:	**51-100**	**51-100**
Length w / less than 25 ft.:	**0.0** ft.	**0.0** ft.

4.4 Ground Water Inputs: **Abundant**

Step 5. Instream Channel Modifications
5.1 Flow Regulation - (old):
Type: **None**
Use:
5.2 Bridges and Culverts: **1** **2.0** %
5.3 Bank Armoring: **0.0** %
Left: ft. Right: ft.
5.4 Channel Straightening: **0.0** %
5.5 Dredging History: **None**

Step 6. Floodplain Modifications
6.1 Berms & Roads - old: **0.0** ft. **0.0**

	One Side	Both Sides
Road:	ft.	ft.
Railroad:	ft.	ft.
Berm:	ft.	ft.
Improved Path:	ft.	ft.

6.2 Development: **0.0** ft. **0.0** ft.
6.3 Channel Bars: **None**
6.4 Meander Migration: **None**
6.5 Meander Width: **ft.** Rato: **0.0**
6.6 Wavelength: **ft.** Ratio: **0.0**

Step 7. Windshield Survey
7.1 Bank Erosion: ft
7.2 Bank Height: **Low** ft
7.3 Ice/Debris Jam Potential: **None**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**1 Low**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**0 Unk.**	**0 Unk.**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**1 Low**	**0 N.D.**	**0 N.D.**	**0 N.S.**	**0 N.S.**	**4**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **Jewett Brook**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **T2.S1.03**
SGAT Version: **4.56**
Date Last Edited: **January, 05 2010**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From opening NE of Mosquitoville Road, upstream to woods edge south of road**

1.1 Reach Description:
1.2 Towns: **Barnet, Ryegate**
1.3 Downstream Latitude: **44.2715096305**
1.3 Downstream Longitude: **-72.1406646767**

Step 2. Stream Type

2.1 Elevation Upstream: **1,033**
2.1 Elevation Downstream: **944**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **2,292.0** ft. **0.43** Miles
2.3 Valley Slope: **3.9**
2.4 Channel Length: **2,629.0** ft. **0.50** Miles
2.5 Channel Slope: **3.39 %**
2.6 Sinuosity: **1.15**
2.7 Watershed Area: **3.2** Square Miles
2.8 Channel Width: **22.0** feet
2.9 Valley Width: feet
2.10 Confinement Ratio: **0.0**
2.10 Confinement Type: **Semi-confined**
2.11 Reference Stream Type: **B**
Bedform: **Plane Bed**
Sub-Class Slope: **None**
Bed Material: **Gravel**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **None**
3.3 Dominant Geological Mat.: **Till** **60.0** %
3.3 Sub-dom. Geological Mat.: **Alluvial**
3.4 Valley Slope Left: **Very Steep**
3.4 Valley Slope Right: **Hilly**
3.5 Soils
Hydrologic Group: **C** **60.0** %
Flooding: **None/Rare** **60.0** %
Water Table Deep: **1.0** **38.0** %
Water Table Shallow: **0.0** **39.0** %
Erodibility: **Severe** **60.0** %
7.4 Comments:
stream flows under barn

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **71.3** %
Current Sub-Dominant Land Cover: **Crop**
4.2 Corridor
Historic Land Cover:: **Forest**
Current Dominant Land Cover: **Forest** **44.7** %
Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**>100**	**>100**
Sub-dominant:	**0-25**	**0-25**
Length w / less than 25 ft.:	**1,183.0** ft.	**920.0** ft.

4.4 Ground Water Inputs: **Abundant**

Step 5. Instream Channel Modifications
5.1 Flow Regulation - (old):
Type: **None**
Use:
5.2 Bridges and Culverts: **1** **5.0** %
5.3 Bank Armoring: **30.0** **1.1** %
Left: ft. Right: ft.
5.4 Channel Straightening: **512.0** **19.5** %
5.5 Dredging History: **None**

Step 6. Floodplain Modifications
6.1 Berms & Roads - old: **0.0** ft. **0.0**

	One Side	Both Sides
Road:	ft.	ft.
Railroad:	ft.	ft.
Berm:	ft.	ft.
Improved Path:	ft.	ft.

6.2 Development: **0.0** ft. **394.0** ft.
6.3 Channel Bars: **None**
6.4 Meander Migration: **Multiple**
6.5 Meander Width: **ft.** Rato: **0.0**
6.6 Wavelength: **ft.** Ratio: **0.0**

Step 7. Windshield Survey
7.1 Bank Erosion: ft
7.2 Bank Height: **Low** ft
7.3 Ice/Debris Jam Potential: **Bridge**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**1 Low**	**2 High**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**1 Low**	**0 N.S.**	**0 N.S.**	**1 Low**	**0 N.S.**	**0 N.S.**	**0 N.D.**	**0 N.D.**	**1 Low**	**1 Low**	**9**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **Jewett Brook**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **T2.S1.04**
SGAT Version: **4.56**
Date Last Edited: **January, 05 2010**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From woods edge south of Mosquitoville Road, upstream to south end of next field opening**

1.1 Reach Description:
1.2 Towns: **Ryegate**
1.3 Downstream Latitude: **44.2669265687**
1.3 Downstream Longitude: **-72.1457934502**

Step 2. Stream Type

2.1 Elevation Upstream: **1,121**
2.1 Elevation Downstream: **1,033**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **2,338.0** ft. **0.44** Miles
2.3 Valley Slope: **3.8**
2.4 Channel Length: **2,616.0** ft. **0.50** Miles
2.5 Channel Slope: **3.36 %**
2.6 Sinuosity: **1.12**
2.7 Watershed Area: **2.9** Square Miles
2.8 Channel Width: **20.9** feet
2.9 Valley Width: feet
2.10 Confinement Ratio: **0.0**
2.10 Confinement Type: **Semi-confined**
2.11 Reference Stream Type: **B**
Bedform: **Plane Bed**
Sub-Class Slope: **None**
Bed Material: **Cobble**

Step 3. Basin Charateristicts

3.1 Alluvial Fan: **None**
3.2 Grade Control: **None**
3.3 Dominant Geological Mat.: **Till** **77.0** %
3.3 Sub-dom. Geological Mat.: **Alluvial**
3.4 Valley Slope Left: **Very Steep**
3.4 Valley Slope Right: **Very Steep**
3.5 Soils
Hydrologic Group: **C** **85.0** %
Flooding: **None/Rare** **78.0** %
Water Table Deep: **2.0** **61.0** %
Water Table Shallow: **1.0** **61.0** %
Erodibility: **Very Severe** **78.0** %
7.4 Comments:

Step 4. Land Cover - Reach Hydrology

4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **69.8** %
Current Sub-Dominant Land Cover: **Crop**
4.2 Corridor
Historic Land Cover:: **Forest**
Current Dominant Land Cover: **Forest** **48.1** %
Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**>100**	**>100**
Sub-dominant:	**0-25**	**0-25**
Length w / less than 25 ft.:	**523.0** ft.	**392.0** ft.

4.4 Ground Water Inputs: **Minimal**

Step 5. Instream Channel Modifications
5.1 Flow Regulation - (old):
Type: **None**
Use:
5.2 Bridges and Culverts: **0** **0.0** %
5.3 Bank Armoring: **0.0** %
Left: ft. Right: ft.
5.4 Channel Straightening: **0.0** %
5.5 Dredging History: **None**

Step 6. Floodplain Modifications
6.1 Berms & Roads - old: **321.0** ft. **12.3**

	One Side	Both Sides
Road:	ft.	ft.
Railroad:	ft.	ft.
Berm:	ft.	ft.
Improved Path:	ft.	ft.

6.2 Development: **0.0** ft. **0.0** ft.
6.3 Channel Bars: **None**
6.4 Meander Migration: **None**
6.5 Meander Width: **ft.** Rato: **0.0**
6.6 Wavelength: **ft.** Ratio: **0.0**

Step 7. Windshield Survey
7.1 Bank Erosion: ft
7.2 Bank Height: **Low** ft
7.3 Ice/Debris Jam Potential: **None**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**2 High**	**0 N.S.**	**0 N.S.**	**0 Unk.**	**0 Unk.**	**0 N.S.**	**1 Low**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**0 N.D.**	**0 N.D.**	**1 Low**	**0 N.S.**	**8**

Stevens River

Phase 1 - Reach Summary Report

Basin: **Waits, Ompompanosuc, Stevens, Wells**
Stream Name: **Jewett Brook**
Topo Maps: **Saint Johnsbury**
Watershed: **Waits River**
Sub-watershed: **Connecticut River -- Ammonoosuc River to Waits River**

Reach ID: **T2.S1.05**
SGAT Version: **4.56**
Date Last Edited: **January, 05 2010**
QA Status: **Step 2 done**
Is Reach An Impoundment?: **No**

Step 1. Reach Location **From woods edge, upstream to wetlands**
1.1 Reach Description:
1.2 Towns: **Ryegate**
1.3 Downstream Latitude: **44.261076105**
1.3 Downstream Longitude: **-72.1490688376**

Step 2. Stream Type
2.1 Elevation Upstream: **1,200**
2.1 Elevation Downstream: **1,121**
2.1 Is Gradient Gentle?: **No**
2.2 Valley Length: **3,124.0** ft. **0.59** Miles
2.3 Valley Slope: **2.5**
2.4 Channel Length: **3,636.0** ft. **0.69** Miles
2.5 Channel Slope: **2.17 %**
2.6 Sinuosity: **1.16**
2.7 Watershed Area: **2.5** Square Miles
2.8 Channel Width: **19.7** feet
2.9 Valley Width: feet
2.10 Confinement Ratio: **0.0**
2.10 Confinement Type: **Narrow**
2.11 Reference Stream Type: **E**
Bedform: **Dune-Ripple**
Sub-Class Slope: **None**
Bed Material: **Gravel**

Step 3. Basin Charateristicts
3.1 Alluvial Fan: **None**
3.2 Grade Control: **None**
3.3 Dominant Geological Mat.: **Alluvial** **74.0** %
3.3 Sub-dom. Geological Mat.: **Till**
3.4 Valley Slope Left: **Steep**
3.4 Valley Slope Right: **Very Steep**
3.5 Soils
Hydrologic Group: **C** **85.0** %
Flooding: **Frequent** **74.0** %
Water Table Deep: **1.0** **69.0** %
Water Table Shallow: **0.0** **78.0** %
Erodibility: **slight** **24.0** %
7.4 Comments:
swampy, wetlands, beaver activity

Step 4. Land Cover - Reach Hydrology
4.1 Watershed
Historic Land Cover: **Forest**
Current Dominant Land Cover: **Forest** **68.7** %
Current Sub-Dominant Land Cover: **Crop**
4.2 Corridor
Historic Land Cover:: **Forest**
Current Dominant Land Cover: **Forest** **53.5** %
Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer	Left Bank	Right Bank
Dominant:	**>100**	**>100**
Sub-dominant:	**0-25**	**51-100**
Length w / less than 25 ft.:	**727.0** ft.	**0.0** ft.

4.4 Ground Water Inputs: **Abundant**

Step 5. Instream Channel Modifications
5.1 Flow Regulation - (old):
Type: **None**
Use:
5.2 Bridges and Culverts: **0** **0.0** %
5.3 Bank Armoring: **0.0** **0.0** %
Left: ft. Right: ft.
5.4 Channel Straightening: **0.0** %
5.5 Dredging History: **No Data**

Step 6. Floodplain Modifications
6.1 Berms & Roads - old: **0.0** ft. **0.0**

	One Side	Both Sides
Road:	ft.	ft.
Railroad:	ft.	ft.
Berm:	ft.	ft.
Improved Path:	ft.	ft.

6.2 Development: **0.0** ft. **0.0** ft.
6.3 Channel Bars: **None**
6.4 Meander Migration: **None**
6.5 Meander Width: **ft.** Rato: **0.0**
6.6 Wavelength: **ft.** Ratio: **0.0**

Step 7. Windshield Survey
7.1 Bank Erosion: ft
7.2 Bank Height: **Low** ft
7.3 Ice/Debris Jam Potential: **No Data**

4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.1	7.3	Total
2 High	**2 High**	**1 Low**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**0 N.S.**	**0 N.D.**	**0 N.D.**	**0 N.S.**	**0 N.S.**	**5**

- Appendix 3 -
Phase II Reach Summary Reports

Phase 2 Segment Summary Report Stevens River

Stream: **Stevens River**
Reach: **M101-0**
Segment Length(ft): **2,709**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, E McLane**
Completion Date: **10/13/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **From confluence with Connecticut River upstream to base of falls**

Step 5 - Notes: **Reach is affected by impoundment of Connecticut River, and water levels fluctuate rapidly in conjunction with store and release of dams there; assessment was able to be conducted at low water during an apparent release but water was rising again when return to mid-reach was made for x-section.**

No dredging or bar scalping was noted, but reach is accessible from portions of either bank and unknown dredging history should not be ruled out.

RR embankment confines reach at all but high flows – but high flows are likely to go to CT River floodplain at Carter/Creamery St , US of Morrison Feeds; inundation hazards likely increased by backwater effects until level rises enough to access CT River floodplain.

Step 7 - Narrative: **Aggradation and widening, potential for rapid planform change likely restricted to some extent by impoundment of Connecticut River during high flows. Reach, particularly bank stability, is affected by store and release regimes on the Connecticut. RR embankment confines stream under all but highest flows and thus changes confinement in terms of stream dynamics_highest flows are likely to go to CT River floodplain at Carter/Creamery St**

Step 1. Valley and Floodplain

1.1 Segmentation: **None**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	60	4	0	
Road:	514	8	391	6
Railroad:	2,104	15	0	
Imp. Path:	0		0	
Dev.:	755		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Flat	Hilly
Continuous w/ Bank:	Always	Sometimes
Within 1 Bankfull W:	Always	Always
Texture:	Sand	Sand

1.5 Valley Features

Valley Width (ft): **1,000**
Width Determination: **Estimated**
Confinement Type: **VB**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls: **None**

Stream: **Stevens River** Reach: **M101-0**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**71.90**	2.11 Riffle/Step Spacing:	**226 ft.**	2.13 Average Largest Particle on		
2.2 Max Depth (ft.):	**5.60**	2.12 Substrate Composition		Bed:	**1.9**	**inches**
2.3 Mean Depth (tf):	**4.23**	Bedrock:	**0.0 %**	Bar:	**1.4**	**inches**
2.4 Floodprone Width (ft.):	**481.90**	Boulder:	**0.0 %**	2.14 Stream Type		
2.5 Aband. Floodpn (ft.):	**7.00**	Cobble:	**0.0 %**	Stream Type:	**C**	
Human Elev FloodPln (ft.):		Coarse Gravel:	**6.0 %**	Bed Material:	**Sand**	
2.6 Width/Depth Ratio:	**17.00**	Fine Gravel:	**16.0 %**	Subclass Slope:	**None**	
2.7 Entrenchment Ratio:	**6.70**	Sand:	**68.0 %**	Bed Form:	**Riffle-Pool**	
2.8 Incision Ratio:	**1.25**	Silt and Smaller:	**10.0 %**	Field Measured Slope:		
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type		
2.9 Sinuosity:	**Low**	Detritus:	**5.0 %**	Reference Stream Type:		
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**55**	Reference Bed Material:		
				Reference Subclass Slope:		
				Reference Bedform:		

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**	**Mix**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**99.6**	**484.3**
Erosion Height (ft.):	**4.0**	**5.1**
Revetment Type:	**Multiple**	**Multiple**
Revetment Length:	**620.9**	**308.8**

Near Bank Vegetation Type	Left	Right
Dominant:	**Shrubs/Sapling**	**Herbaceous**
Sub-dominant:	**Herbaceous**	**Shrubs/Sapling**
Bank Canopy		
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**	**>100**
W less than 25	**27**	**997**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Shrubs/Sapling**	**Pasture**
Sub-dominant	**Forest**	**Shrubs/Sapling**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Stevens River** Reach: **M101-0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Minimal**
4.2 Adjacent Wetlands: **Abundant**
4.3 Flow Status: **Low**
4.4 # of Debris Jams: **0**

4.5 Flow Regulation Type **None**
Flow Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.: **None**

4.7 Stormwater Inputs
Field Ditch: **1** Road Ditch: **2**
Other: **0** Tile Drain: **0**
Overland Flow: **1** Urb Strm Wtr Pipe: **0**
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bridge	**42**	**Yes**	**Yes**	**Yes**	**Yes**	**None**
Bridge	**32**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Above,Deposition Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **2** Point: **7** Side: **7**
Diagonal: **0** Delta: **0** Island: **0** Braiding: **0**

5.2 Other Features
Flood chutes: **3**
Neck Cutoff: **0**
Avulsion: **0**
5.3 Steep Riffles and Head Cuts
Head Cuts: **0**
Steep Riffles: **0**
Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **Straightening**
Straightening Length (ft.): **2,602**
5.5 Dredging: **Dredging**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type Left Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**	Score	STD	Historic
7.1 Channel Degradation	**12**	**None**	**Yes**
7.2 Channel Aggradation	**12**	**None**	**No**
7.3 Widening Channel	**13**	**None**	**No**
7.4 Change in Planforml	**14**	**None**	**No**
Total Score	**51**		

Geomorphic Rating **0.64**
Channel Evolution Model **F**
Channel Evolution Stage **III**
Geomorphic Condition **Fair**
Stream Sensitivity **High**

Phase 2 Segment Summary Report **Stevens River**

Stream:	**Stevens River**	SGAT Version:	**4.56**
Reach:	**M102-0**	Organization:	**Caledonia County Conservation District**
Segment Length(ft):	**659**	Observers:	**D Ruddell**
Rain:	**Yes**	Completion Date:	**10/20/2010**
		Qualtiy Control Status - Consultant:	**Passed**
		Qualtiy Control Status - Staff:	**Provisional**
		Why Not Assessed:	**Other (to be explained in comments)**

Step 0 - Location: **Creamery Street bridge to Church Street bridge**

Step 5 - Notes: **Short reach at base of falls: walled in, difficult to determine incision or real nature of bank materials. Only real spot to do a x-section was just above outflow for hydro diversion_turbine, reduced x-sectional area and channel width reflected that - low confidence in x-sectional data due to these influences. Turbine is fed by diversion from sluice at base of reach M1.03; this is the Step 4 flow reg and upstream flow reg.**

Head of reach is Barnet Falls, but remainder would likely be Bc-type stream by reference; has basically been walled in, building off areas of existing bedrock in walls of valley. Riprap drops to 6' high at base of reach but still no floodplain access, entrenchment remains.

Step 7 - Narrative: **Largely stable but walled in, could not determine incision. Could be D-model evolution at this point due to very coarse materials in bed, but the banks are significantly armored; there are no apparent grade controls in the downstream portion of the reach. Armoring is a patchwork with bedrock outcrops in places; elevation of walls drops to 6 ft HABkf at DS end of reach. Flow diversion for hydro generation likely affects ability of sediments in US portion of reach to be moved.**

Step 1. Valley and Floodplain

1.1 Segmentation: **None**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	**0**		**0**	
Road:	**213**	**8**	**0**	
Railroad:	**0**		**0**	
Imp. Path:	**0**		**0**	
Dev.:	**113**		**255**	

1.4 Adjacent Side	Left	Right
Hillside Slope:	**Extr.Steep**	**Extr.Steep**
Continuous w/ Bank:	**Sometimes**	**Always**
Within 1 Bankfull W:	**Sometimes**	**Always**
Texture:	**Sand**	**Sand**

1.5 Valley Features

Valley Width (ft):	**49**
Width Determination:	**Measured**
Confinement Type:	**NC**
In Rock Gorge:	**No**
Human Caused Change in Valley Width?:	**Yes**

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Waterfall	**Mid-segment**	**88.0**	**92.0**	**Yes**	

Stream: **Stevens River**   Reach: **M102-0**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**44.30**	2.11 Riffle/Step Spacing:	**93 ft.**	2.13 Average Largest Particle on		
2.2 Max Depth (ft.):	**4.40**	2.12 Substrate Composition		Bed:	**17.3**	**inches**
2.3 Mean Depth (tf):	**3.30**	Bedrock:	**12.0 %**	Bar:	**12.5**	**inches**
2.4 Floodprone Width (ft.):	**48.60**	Boulder:	**42.0 %**	2.14 Stream Type		
2.5 Aband. Floodpn (ft.):	**4.40**	Cobble:	**25.0 %**	Stream Type:	**F**	
Human Elev FloodPln (ft.):	**16.40**	Coarse Gravel:	**8.0 %**	Bed Material:	**Boulder**	
2.6 Width/Depth Ratio:	**13.42**	Fine Gravel:	**7.0 %**	Subclass Slope:	**None**	
2.7 Entrenchment Ratio:	**1.10**	Sand:	**6.0 %**	Bed Form:	**Riffle-Pool**	
2.8 Incision Ratio:	**1.00**	Silt and Smaller:	**0.0 %**	Field Measured Slope:		
Human Elevated Inc. Rat.:	**3.73**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type		
2.9 Sinuosity:	**Low**	Detritus:	**5.0 %**	Reference Stream Type:		
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**10**	Reference Bed Material:		
				Reference Subclass Slope:		
				Reference Bedform:		

Step 3. Riparian Features

3.1 Stream Banks   Typical Bank Slope: **Steep**

Bank Texture	Left	Right	Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper			Erosion Length (ft.):	**0.0**	**0.0**	Dominant:	**Shrubs/Sapling**	**Deciduous**
Material Type:	**Sand**	**Mix**	Erosion Height (ft.):	**0.0**	**0.0**	Sub-dominant:	**Herbaceous**	**Herbaceous**
Consistency:	**Non-cohesive**	**Non-cohesive**	Revetment Type:	**Multiple**	**Hard Bank**	Bank Canopy		
Lower			Revetment Length:	**231.4**	**66.7**	Canopy %:	**26-50**	**26-50**
Material Type:	**Mix**	**Mix**				Mid-Channel Canopy:	**Open**	
Consistency:	**Non-cohesive**	**Non-cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**26-50**	**51-100**
Sub-Dominant	**0-25**	**0-25**
W less than 25	**360**	**0**
Buffer Vegitation Type		
Dominant	**Shrubs/Sapling**	**Herbaceous**
Sub-Dominant	**Herbaceous**	**Deciduous**

3.3 Riparian Corridor

Corridor Land	Left	Right		Left	Right
Dominant	**Commercial**	**Forest**	Mass Failures		
Sub-dominant	**Residential**	**Shrubs/Sapling**	Height		
(Legacy)	Amount	Mean Hieght	Gullies Number	**0**	
Failures	**None**		Gullies Length	**0**	
Gullies	**None**				

Stream: **Stevens River**   Reach: **M102-0**

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 **Small Bypass**
Flow Reg. Use: **Hydro-electric**
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs
Field Ditch: **0** Road Ditch: **0**
Other: **0** Tile Drain: **0**
Overland Flow: **0** Urb Strm Wtr Pipe: **1**
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bridge	**80**	**Yes**	**Yes**	**No**	**No**	**None**
Bedrock Outcrops	**33**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **0** Point: **1** Side: **3**
Diagonal: **0** Delta: **0** Island: **0** Braiding: **0**

5.2 Other Features
Flood chutes: **0**
Neck Cutoff: **0**
Avulsion: **0**
5.3 Steep Riffles and Head Cuts
Steep Riffles: **2**
Head Cuts: **0**
Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **Straightening**
Straightening Length (ft.): **353**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type   Left   Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Confined**	Score	STD	Historic
7.1 Channel Degradation	**4**	**B to F**	**Yes**
7.2 Channel Aggradation	**14**	**None**	**No**
7.3 Widening Channel	**10**	**None**	**No**
7.4 Change in Planforml	**12**	**None**	**No**
Total Score	**40**		

Geomorphic Rating **0.50**
Channel Evolution Model **F**
Channel Evolution Stage **III**
Geomorphic Condition **Fair**
Stream Sensitivity

Phase 2 Segment Summary Report **Stevens River**

Stream: **Stevens River**
Reach: **M103-A**
Segment Length(ft): **1,414**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **Ruddell, O'Brien**
Completion Date: **7/28/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **From Church St bridge to ~350 ft DS of I-91 culverts**

Step 5 - Notes: **sluice gate funnels water to dam at top of Great (aka Barnet or Stevens) Falls at base of reach (by Church St bridge) - hydro-electric generation at dam; residents report frequent ice jams that back up on floodplain/wetlands off RB, beneath I-91 northbound ramp**

Step 7 - Narrative: **arrested stage III-IV: minor planform adjustments following historic aggradation (dam sediments); relatively stable, likely due in large part to good floodplain access in RB wetland area**

Step 1. Valley and Floodplain

1.1 Segmentation: **Valley Width**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	1,391	10	0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	230		415	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Steep	Flat
Continuous w/ Bank:	Sometimes	Always
Within 1 Bankfull W:	Always	Always
Texture:	Sand	Sand

1.5 Valley Features
Valley Width (ft): **900**
Width Determination: **Measured**
Confinement Type: **VB**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Waterfall	Mid-segment	88.0	83.0	Yes	

Stream: **Stevens River** Reach: **M103-A**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**71.80**	2.11 Riffle/Step Spacing:	**300 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**6.60**	2.12 Substrate Composition		Bed:	**3.9 inches**
2.3 Mean Depth (tf):	**3.20**	Bedrock:	**0.0 %**	Bar:	**1 inches**
2.4 Floodprone Width (ft.):	**973.40**	Boulder:	**0.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**8.60**	Cobble:	**5.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**24.0 %**	Bed Material:	**Sand**
2.6 Width/Depth Ratio:	**22.44**	Fine Gravel:	**13.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**13.56**	Sand:	**47.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.30**	Silt and Smaller:	**11.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**2.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**6**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

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:	**Mix**	**Sand**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**118.5**	**165.5**
Erosion Height (ft.):	**4.9**	**4.6**
Revetment Type:	**Rip-Rap**	**Rip-Rap**
Revetment Length:	**218.0**	**140.2**

Near Bank Vegetation Type	Left	Right
Dominant:	**Herbaceous**	**Herbaceous**
Sub-dominant:	**Lawn**	**Shrubs/Sapling**
Bank Canopy		
Canopy %:	**1-25**	**1-25**
Mid-Channel Canopy:	**Open**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**26-50**	**>100**
Sub-Dominant	**0-25**	**None**
W less than 25	**781**	**0**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Residential**	**Shrubs/Sapling**
Sub-dominant	**Shrubs/Sapling**	**Residential**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Stevens River**   Reach: **M103-A**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Minimal**

4.2 Adjacent Wetlands: **Abundant**

4.3 Flow Status: **Moderate**

4.4 # of Debris Jams: **0**

4.5 Flow Regulation Type **Small Bypass**

Flow Reg. Use: **Hydro-electric**

Impoundments:

Impoundment Loc.:

4.6 Up/Down Strm flow reg.: **None**

(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs **None**

Field Ditch:

Road Ditch:

Other:

Tile Drain:

Overland Flow:

Urb Strm Wtr Pipe:

4.9 # of Beaver Dams: **0**

Affected Length (ft): **0**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid:	**3**	Diagonal:	**0**
Point:	**3**	Delta:	**0**
Side:	**0**	Island:	**0**
		Braiding:	**0**

5.2 Other Features

Flood chutes: **1**

Neck Cutoff: **0**

Avulsion: **0**

5.3 Steep Riffles and Head Cuts

Head Cuts: **0**

Steep Riffles: **0**

Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **No**

5.5 Straightening: **Straightening**

Straightening Length (ft.): **489**

5.5 Dredging: **Dredging**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:

6.2 Pool Substrate:

6.3 Pool Variability:

Total Score: **0**

Habitat Rating: **0.00**

Habitat Stream Condition:

6.4 Sediment Deposition:

6.5 Channel Flow Status:

6.6 Channel Alteration:

6.7 Channel Sinuosity:

Stream Gradiant Type   Left   Right

6.8 Bank Stability:

6.9 Bank Vegetation Protection

6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	Unconfined	Score	STD	Historic
7.1 Channel Degradation		**12**	**None**	**Yes**
7.2 Channel Aggradation		**12**	**None**	**Yes**
7.3 Widening Channel		**12**	**None**	**No**
7.4 Change in Planforml		**12**	**None**	**No**
Total Score		**48**		

Geomorphic Rating	**0.60**
Channel Evolution Model	**F**
Channel Evolution Stage	**IV**
Geomorphic Condition	**Fair**
Stream Sensitivity	**Very High**

Phase 2 Segment Summary Report Stevens River

Stream: **Stevens River**
Reach: **M103-B**
Segment Length(ft): **2,259**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **Ruddell, O'Brien**
Completion Date: **7/28/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **From ~350 ft DS of I-91 culverts to ~100 ft DS of Anderson St. bridge**

Step 5 - Notes: **much of segment likely windrowed during I-91 construction; critical access to floodplain is near location of x-section (mid-segment), as windrowing is higher at other points along stream and likely restricts floodplain access to a greater degree in those areas; wetland plants commonplace in the vicinity of that floodplain access**

Step 7 - Narrative: **arrested stage II-III: historic incision due primarily to windrowing, subsequent widening and planform change arrested by extensive armoring**

Step 1. Valley and Floodplain

1.1 Segmentation: **Valley Width**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	477	1	0	
Road:	1,435	10	0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	555		0	

1.4 Adjacent Side

	Left	Right
Hillside Slope:	Extr.Steep	Extr.Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Always
Texture:	Sand	Cobble

1.5 Valley Features

Valley Width (ft): **400**
Width Determination: **Measured**
Confinement Type: **NW**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **Yes**

1.6 Grade Controls: **None**

Stream: **Stevens River** Reach: **M103-B**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**62.80**	2.11 Riffle/Step Spacing:	**200 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**5.20**	2.12 Substrate Composition		Bed:	**18.2 inches**
2.3 Mean Depth (tf):	**3.49**	Bedrock:	**%**	Bar:	**10.6 inches**
2.4 Floodprone Width (ft.):	**360.00**	Boulder:	**19.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**5.20**	Cobble:	**39.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):	**6.20**	Coarse Gravel:	**10.0 %**	Bed Material:	**Cobble**
2.6 Width/Depth Ratio:	**17.99**	Fine Gravel:	**4.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**5.73**	Sand:	**28.0 %**	Bed Form:	**Plane Bed**
2.8 Incision Ratio:	**1.00**	Silt and Smaller:	**%**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**1.19**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Low**	Detritus:	**2.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**10**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

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:	**Boulder/Cobble**	**Boulder/Cobble**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**0.0**	**91.3**
Erosion Height (ft.):	**0.0**	**4.0**
Revetment Type:	**Rip-Rap**	**Rip-Rap**
Revetment Length:	**789.6**	**533.0**

Near Bank Vegetation Type	Left	Right
Dominant:	**Shrubs/Sapling**	**Herbaceous**
Sub-dominant:	**Herbaceous**	**Shrubs/Sapling**
Bank Canopy		
Canopy %:	**26-50**	**26-50**
Mid-Channel Canopy:	**Open**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**26-50**	**26-50**
Sub-Dominant	**0-25**	**>100**
W less than 25	**1,007**	**415**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Shrubs/Sapling**	**Mixed Trees**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**
Sub-dominant	**Residential**	**Forest**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Stevens River** Reach: **M103-B**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Minimal**
4.2 Adjacent Wetlands: **Minimal**
4.3 Flow Status: **Moderate**
4.4 # of Debris Jams: **0**

4.5 Flow Regulation Type **None**
Flow Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs **None**
Field Ditch: Road Ditch:
Other: Tile Drain:
Overland Flow: Urb Strm Wtr Pipe:
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Instream Culvert	**40**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Below,Alignment**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **0** Point: **3** Side: **3**
Diagonal: **0** Delta: **0** Island: **0** Braiding: **0**

5.2 Other Features
Flood chutes: **2**
Neck Cutoff: **0** Avulsion: **0**

5.3 Steep Riffles and Head Cuts
Steep Riffles: **1**
Head Cuts: **0**
Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **With Windrowing**
Straightening Length (ft.): **2,204**
5.5 Dredging: **Dredging**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type <u>Left</u> <u>Right</u>
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**	Score	STD	Historic
7.1 Channel Degradation	**8**	**None**	**Yes**
7.2 Channel Aggradation	**12**	**None**	**No**
7.3 Widening Channel	**13**	**None**	**No**
7.4 Change in Planforml	**8**	**None**	**No**
Total Score	**41**		

Geomorphic Rating	**0.51**
Channel Evolution Model	**F**
Channel Evolution Stage	**III**
Geomorphic Condition	**Fair**
Stream Sensitivity	**High**

Phase 2 Segment Summary Report Stevens River

Stream: **Stevens River**
Reach: **M104-0**
Segment Length(ft): **3,396**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, C Haynes**
Completion Date: **8/2/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **~1000' upstream of Patenaude Lane to Anderson Street bridge**

Step 5 - Notes: **Bedrock controlled_slope is borderline c subslope, calculating to ~1.9 pct, and dominant step-pool form likely due in part to influence of bedrock on elevated stream power. Alternating pockets of floodplain. Pulsing channel-widening/constricting. Nice fish habitat, some good pools and cover**

Step 7 - Narrative: **Largely stable, likley due in large part to coarse bed materials and bedrock controls; episodic enlargement**

Step 1. Valley and Floodplain

1.1 Segmentation: **None**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	243	10	0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	479		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Extr.Steep	Extr.Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Always	Always
Texture:	Boulder	Boulder

1.5 Valley Features
Valley Width (ft): **160**
Width Determination: **Measured**
Confinement Type: **SC**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Ledge	Mid-segment	6.0	4.0	Yes	
Ledge	Mid-segment	7.0	4.0	Yes	
Ledge	Mid-segment	6.0	5.0	Yes	

Stream: **Stevens River** Reach: **M104-0**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**77.30**	2.11 Riffle/Step Spacing:	**75 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**5.15**	2.12 Substrate Composition		Bed:	**14.5 inches**
2.3 Mean Depth (tf):	**3.47**	Bedrock:	**0.0 %**	Bar:	**11 inches**
2.4 Floodprone Width (ft.):	**119.70**	Boulder:	**28.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**5.15**	Cobble:	**39.0 %**	Stream Type:	**B**
Human Elev FloodPln (ft.):		Coarse Gravel:	**22.0 %**	Bed Material:	**Cobble**
2.6 Width/Depth Ratio:	**22.28**	Fine Gravel:	**7.0 %**	Subclass Slope:	**c**
2.7 Entrenchment Ratio:	**1.55**	Sand:	**4.0 %**	Bed Form:	**Step-Pool**
2.8 Incision Ratio:	**1.00**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Low**	Detritus:	**5.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Complete**	# Large Woody Debris:	**82**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Steep**

Bank Texture	Left	Right	Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper			Erosion Length (ft.):	**83.9**	**58.2**	Dominant:	**Deciduous**	**Deciduous**
Material Type:	**Sand**	**Mix**	Erosion Height (ft.):	**5.5**	**3.0**	Sub-dominant:	**Herbaceous**	**Herbaceous**
Consistency:	**Non-cohesive**	**Non-cohesive**	Revetment Type:	**None**	**Multiple**	Bank Canopy		
Lower			Revetment Length:	**0.0**	**83.1**	Canopy %:	**51-75**	**76-100**
Material Type:	**Boulder/Cobble**	**Boulder/Cobble**				Mid-Channel Canopy:	**Open**	
Consistency:	**Non-cohesive**	**Non-cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**26-50**	**26-50**
W less than 25	**146**	**153**
Buffer Vegitation Type		
Dominant	**Deciduous**	**Deciduous**
Sub-Dominant	**Herbaceous**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Pasture**	**Residential**
(Legacy)	Amount	Mean Hieght
Failures	**Multiple**	**18.3**
Gullies	**Multiple**	**4.5**

	Left	Right
Mass Failures	**56.39**	**147.7**
Height	**15.0**	**25.0**
Gullies Number	**2**	
Gullies Length	**260**	

Stream: **Stevens River**   Reach: **M104-0**

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 Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs
Field Ditch: **1**   Road Ditch: **6**
Other: **0**   Tile Drain: **0**
Overland Flow: **0**   Urb Strm Wtr Pipe: **0**
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bedrock Outcrops	**42**	**Yes**	**Yes**	**Yes**	**No**	**Deposition Above,Deposition Below**
Bridge	**30**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Above,Deposition Below**
Bridge	**45**	**Yes**	**Yes**	**Yes**	**No**	**Deposition Above**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **0**   Point: **4**   Side: **11**
Diagonal: **0**   Delta: **1**   Island: **0**   Braiding: **0**

5.2 Other Features
Flood chutes: **8**
Neck Cutoff: **0**
Avulsion: **0**

5.3 Steep Riffles and Head Cuts
Steep Riffles: **5**
Head Cuts: **0**
Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **Straightening**
Straightening Length (ft.): **690**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type   Left   Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Confined**	Score	STD	Historic
7.1 Channel Degradation	**15**	**None**	**No**
7.2 Channel Aggradation	**13**	**None**	**No**
7.3 Widening Channel	**15**	**None**	**No**
7.4 Change in Planforml	**13**	**None**	**No**
Total Score	**56**		

Geomorphic Rating	**0.70**
Channel Evolution Model	**F**
Channel Evolution Stage	**I**
Geomorphic Condition	**Good**
Stream Sensitivity	**Moderate**

Phase 2 Segment Summary Report Stevens River

Stream: **Stevens River**
Reach: **M105-0**
Segment Length(ft): **4,187**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, C Haynes**
Completion Date: **8/11/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location:

Step 5 - Notes: **Clay lenses exposed in bed and banks of upstream portion of reach, with log structures nearby_Beers Atlas indicates a historic brick factory a short distance upstream but away from the stream, but it appears possible this area may have had clay excavated_no confirmation obtained regarding this, but these observations were basis of dredging indexed in FIT.**

Clay lenses in bed and grade controls in next reach downstream likely limiting further bed degradation, contributing to widening as primary adjustment process in this reach.

Possible that flood chutes may be masked by cultivation or unmowed herbaceous vegetation, as well as lack of visibility from below high banks; lack of flood chutes was somewhat unexpected.

Step 7 - Narrative: **"Other" STD is E to C stream type: loss of planform may be due in part to historic straightening (much riprap now failing) and dredging, with reduced sinuosity; subsequent slow evolution may be due to reduced flows (Harvey's Lake influence). Current gravel substrate likely indicative of aggradation (anticipated substrate = sand), widening appears to be primary adjustment process.**

May be D-model evolution at this point in time, but historically incised - possibly due to dredging - so used F-model.

Step 1. Valley and Floodplain

1.1 Segmentation: **None**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	0		0	
Road:	0		0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	69		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Flat	Flat
Continuous w/ Bank:	Always	Always
Within 1 Bankfull W:	Always	Always
Texture:	Sand	Sand

1.5 Valley Features

Valley Width (ft): **650**
Width Determination: **Measured**
Confinement Type: **VB**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls: **None**

Stream: **Stevens River** Reach: **M105-0**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**54.40**	2.11 Riffle/Step Spacing:	**220 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**5.20**	2.12 Substrate Composition		Bed:	**4.5** inches
2.3 Mean Depth (tf):	**2.86**	Bedrock:	**0.0 %**	Bar:	**3.14** inches
2.4 Floodprone Width (ft.):	**710.00**	Boulder:	**0.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**7.70**	Cobble:	**36.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**26.0 %**	Bed Material:	**Gravel**
2.6 Width/Depth Ratio:	**19.02**	Fine Gravel:	**18.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**13.05**	Sand:	**20.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.48**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**10.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**142**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

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.):	**1,324.5**	**1,029.8**
Erosion Height (ft.):	**4.8**	**4.8**
Revetment Type:	**Rip-Rap**	**Multiple**
Revetment Length:	**273.6**	**819.4**

Near Bank Vegetation Type	Left	Right
Dominant:	**Herbaceous**	**Herbaceous**
Sub-dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Bank Canopy		
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	**501**	**30**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Shrubs/Sapling**	**Deciduous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Hay**	**Pasture**
Sub-dominant	**None**	**Shrubs/Sapling**
(Legacy)	Amount	Mean Hieght
Failures	**One**	**12.0**
Gullies	**None**	

	Left	Right
Mass Failures	**39.86**	
Height	**12.0**	
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Stevens River** Reach: **M105-0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Minimal**
4.2 Adjacent Wetlands: **Abundant**
4.3 Flow Status: **Low**
4.4 # of Debris Jams: **0**

4.5 Flow Regulation Type **None**
Flow Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs
Field Ditch: **0** Road Ditch: **3**
Other: **0** Tile Drain: **0**
Overland Flow: **0** Urb Strm Wtr Pipe: **0**
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **6** Point: **12** Side: **7**
Diagonal: **4** Delta: **2** Island: **0** Braiding: **0**

5.2 Other Features
Flood chutes: **1**
Neck Cutoff: **0**
Avulsion: **0**
5.3 Steep Riffles and Head Cuts
Steep Riffles: **0**
Head Cuts: **0**
Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **Yes**
5.5 Straightening: **Straightening**
Straightening Length (ft.): **4,187**
5.5 Dredging: **Dredging**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type — Left — Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	Unconfined Score	STD	Historic
7.1 Channel Degradation	**10**	**None**	**Yes**
7.2 Channel Aggradation	**12**	**None**	**No**
7.3 Widening Channel	**10**	**Other**	**No**
7.4 Change in Planforml	**9**	**None**	**No**
Total Score	**41**		

Geomorphic Rating	**0.51**
Channel Evolution Model	**F**
Channel Evolution Stage	**III**
Geomorphic Condition	**Fair**
Stream Sensitivity	

Phase 2 Segment Summary Report Stevens River

Stream: **Stevens River**
Reach: **M106-A**
Segment Length(ft): **2,154**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, C Haynes**
Completion Date: **8/18/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Tributary confluence near Barnet school to power line cut ~2000 feet upstream**

Step 5 - Notes: **Originally used x-section from M1.05 for channel dimensions_reach break could have been further up to include M106A which is virtually identical except valley is slightly narrower.**

Cross section was updated based on field visit to segment M1.06A on 6.27.11

Step 7 - Narrative: **Major widening, minor to major aggradation and planform adjustments following historic incision and more recent beaver dam blow-outs on tributary.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Channel Dimensions**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	0		0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side

	Left	Right
Hillside Slope:	Steep	Hilly
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Cobble	Cobble

1.5 Valley Features

Valley Width (ft): **600**
Width Determination: **Measured**
Confinement Type: **BD**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls: **None**

Stream: **Stevens River** Reach: **M106-A**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**50.00**	2.11 Riffle/Step Spacing:	**267 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**5.60**	2.12 Substrate Composition		Bed:	**4.7 inches**
2.3 Mean Depth (tf):	**4.42**	Bedrock:	**0.0 %**	Bar:	**3.2 inches**
2.4 Floodprone Width (ft.):	**302.70**	Boulder:	**13.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**6.80**	Cobble:	**27.0 %**	Stream Type:	**E**
Human Elev FloodPln (ft.):		Coarse Gravel:	**32.0 %**	Bed Material:	**Gravel**
2.6 Width/Depth Ratio:	**11.31**	Fine Gravel:	**15.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**6.05**	Sand:	**11.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.21**	Silt and Smaller:	**2.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**10.0 %**	Reference Stream Type:	**E**
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**90**	Reference Bed Material:	**Gravel**
				Reference Subclass Slope:	**None**
				Reference Bedform:	**Riffle-Pool**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Steep**

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

Bank Erosion	Left	Right
Erosion Length (ft.):	**101.3**	**408.1**
Erosion Height (ft.):	**4.1**	**3.9**
Revetment Type:	**None**	**Rip-Rap**
Revetment Length:	**0.0**	**37.4**

Near Bank Vegetation Type	Left	Right
Dominant:	**Herbaceous**	**Herbaceous**
Sub-dominant:	**Coniferous**	**Shrubs/Sapling**
Bank Canopy		
Canopy %:	**76-100**	**1-25**
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**	**1,051**
Buffer Vegitation Type		
Dominant	**Coniferous**	**Herbaceous**
Sub-Dominant	**Herbaceous**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Hay**
Sub-dominant	**Shrubs/Sapling**	**Shrubs/Sapling**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Stevens River** Reach: **M106-A**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Minimal**
4.2 Adjacent Wetlands: **Abundant**
4.3 Flow Status: **Low**
4.4 # of Debris Jams: **0**

4.5 Flow Regulation Type **None**
Flow Reg. Use:
Impoundments: **None**
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.: **None**

4.7 Stormwater Inputs **None**
Field Ditch: Road Ditch:
Other: Tile Drain:
Overland Flow: Urb Strm Wtr Pipe:
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types		Diagonal:	**1**	5.2 Other Features	Neck Cutoff: **0**	5.4 Stream Ford or Animal Crossing:	**No**
Mid:	**3**	Delta:	**0**	Flood chutes: **2**	Avulsion: **0**	5.5 Straightening:	**Straightening**
Point:	**5**	Island:	**1**	5.3 Steep Riffles and Head Cuts	Head Cuts: **0**	Straightening Length (ft.):	**924**
Side:	**5**	Braiding:	**1**	Steep Riffles: **0**	Trib Rejuv.: **No**	5.5 Dredging:	**None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type	Left	Right
6.8 Bank Stability:		
6.9 Bank Vegetation Protection		
6.10 Riparian Veg. Zone Width:		

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined** Score	STD	Historic
7.1 Channel Degradation	**12**	**None**	**Yes**
7.2 Channel Aggradation	**12**	**None**	**No**
7.3 Widening Channel	**11**	**None**	**No**
7.4 Change in Planforml	**11**	**None**	**No**
Total Score	**46**		

Geomorphic Rating	**0.57**
Channel Evolution Model	**F**
Channel Evolution Stage	**III**
Geomorphic Condition	**Fair**
Stream Sensitivity	**Very High**

Phase 2 Segment Summary Report **Stevens River**

Stream: **Stevens River**
Reach: **M106-B**
Segment Length(ft): **2,443**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, C Haynes**
Completion Date: **8/18/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Power line cut upstream of Barnet School to end of Lester Lane, ~1500 downstream of Barnet Center Road Bridge**

Step 5 - Notes: **Appears straightened on map but not evidenced in field; LVW mass failure 20-30 years ago may have pushed stream over and contributed to neck cut-off, now slow to evolve because all but highest flows are insufficient to carry coarse sediment. Evidence of large bars may be obscured by vegetation and may have the finer sediments.**

Documentation inside Ben's Mill indicates dam (next reach upstream) was breached sometime in the early 1980s, which likely helps explain these observations.

Step 7 - Narrative: **Aggradation, widening and planform change following historic incision likely associated with breach of old mill dam; slow channel evolution due to coarse materials. No incision evident at x-section; believe this is because significant aggradation has obscured evidence of incision; old mass failure on upstream end of segment.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Channel Dimensions**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	528	6	0	
Railroad:	0		0	
Imp. Path:	97	6	0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Steep	Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Boulder	Cobble

1.5 Valley Features

Valley Width (ft): **260**
Width Determination: **Measured**
Confinement Type: **NW**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Waterfall	**Mid-segment**	**9.0**	**7.0**	**Yes**	

Stream: **Stevens River**   Reach: **M106-B**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**63.70**	2.11 Riffle/Step Spacing:	**82 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**3.30**	2.12 Substrate Composition		Bed:	**11.5 inches**
2.3 Mean Depth (tf):	**2.40**	Bedrock:	**0.0 %**	Bar:	**8.5 inches**
2.4 Floodprone Width (ft.):	**253.40**	Boulder:	**34.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**3.60**	Cobble:	**33.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**23.0 %**	Bed Material:	**Cobble**
2.6 Width/Depth Ratio:	**26.54**	Fine Gravel:	**5.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**3.98**	Sand:	**5.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.09**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**10.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**41**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Moderate**

Bank Texture	Left	Right
Upper		
Material Type:	**Boulder/Cobble**	**Mix**
Consistency:	**Cohesive**	**Non-cohesive**
Lower		
Material Type:	**Mix**	**Boulder/Cobble**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**115.0**	**100.3**
Erosion Height (ft.):	**4.1**	**4.0**
Revetment Type:	**Rip-Rap**	**None**
Revetment Length:	**64.3**	**0.0**

Near Bank Vegetation Type	Left	Right
Dominant:	**Herbaceous**	**Coniferous**
Sub-dominant:	**Shrubs/Sapling**	**Herbaceous**
Bank Canopy		
Canopy %:	**76-100**	**76-100**

Mid-Channel Canopy: **Open**

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**None**	**0-25**
W less than 25	**87**	**397**
Buffer Vegitation Type		
Dominant	**Coniferous**	**Coniferous**
Sub-Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Shrubs/Sapling**	**Shrubs/Sapling**
(Legacy)	Amount	Mean Hieght
Failures	**One**	**20.0**
Gullies	**None**	

	Left	Right
Mass Failures	**53.49**	
Height	**20.0**	
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Stevens River** Reach: **M106-B**

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 Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs **None**
Field Ditch: Road Ditch:
Other: Tile Drain:
Overland Flow: Urb Strm Wtr Pipe:
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **1**
Point: **4**
Side: **3**
Diagonal: **4**
Delta: **0**
Island: **1**
Braiding: **0**

5.2 Other Features
Flood chutes: **3**
Neck Cutoff: **1**
Avulsion: **0**

5.3 Steep Riffles and Head Cuts
Steep Riffles: **4**
Head Cuts: **0**
Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **None**
Straightening Length (ft.): **0**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type Left Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**10**	**None**	**Yes**
7.2 Channel Aggradation	**7**	**None**	**No**
7.3 Widening Channel	**10**	**None**	**No**
7.4 Change in Planforml	**10**	**None**	**No**
Total Score	**37**		

Geomorphic Rating	**0.46**
Channel Evolution Model	**F**
Channel Evolution Stage	**III**
Geomorphic Condition	**Fair**
Stream Sensitivity	**High**

Phase 2 Segment Summary Report Stevens River

Stream: **Stevens River**
Reach: **M107-A**
Segment Length(ft): **762**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, C Haynes**
Completion Date: **8/30/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Downstream end of Lester Lane (~1500' downstream of Barnet Center Road bridge) to abandoned trailer ~800' upstream**

Step 5 - Notes: **Very short segment that is virtually identical with M1.06B_reach break could have been placed at head of this segment_used M106B as representational x-sec.**
Coarse sediments contributing to slow channel evolution_weak riffles forming but borders on plane bed_deposition starting to rebuild meanders so that stream is not as straight as it appears on maps. Breach of Ben's Mill dam (documentation at Ben's Mill indicates breach was likely in early 1980s, details uncertain) in next segment upstream may have contributed to significant deposition lending to plane bed characterisitics

Cross section updated based on field work on 6.27.11

Step 7 - Narrative: **Minor aggradation, stabilizing following historic incision and widening after dam breach**

Step 1. Valley and Floodplain

1.1 Segmentation: **Depositional Features**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	0		0	
Road:	0		0	
Railroad:	0		0	
Imp. Path:	486	6	0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Steep	Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Cobble	Cobble

1.5 Valley Features
Valley Width (ft): **320**
Width Determination: **Measured**
Confinement Type: **NW**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls: **None**

Stream: **Stevens River** Reach: **M107-A**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**79.80**	2.11 Riffle/Step Spacing:	**74 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**4.35**	2.12 Substrate Composition		Bed:	**10.4 inches**
2.3 Mean Depth (tf):	**2.96**	Bedrock:	**0.0 %**	Bar:	**7.4 inches**
2.4 Floodprone Width (ft.):	**189.95**	Boulder:	**19.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**5.95**	Cobble:	**34.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**18.0 %**	Bed Material:	**Cobble**
2.6 Width/Depth Ratio:	**26.96**	Fine Gravel:	**13.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**2.38**	Sand:	**16.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.37**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**8.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**90**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Moderate**

Bank Texture	Left	Right
Upper		
Material Type:	**Mix**	**Mix**
Consistency:	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type:	**Boulder/Cobble**	**Boulder/Cobble**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**0.0**	**0.0**
Erosion Height (ft.):	**0.0**	**0.0**
Revetment Type:	**Rip-Rap**	**None**
Revetment Length:	**100.4**	**0.0**

Near Bank Vegetation Type	Left	Right
Dominant:	**Herbaceous**	**Coniferous**
Sub-dominant:	**Shrubs/Sapling**	**Herbaceous**
Bank Canopy		
Canopy %:	**76-100**	**76-100**
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 Vegitation Type		
Dominant	**Coniferous**	**Coniferous**
Sub-Dominant	**Shrubs/Sapling**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Shrubs/Sapling**	**Shrubs/Sapling**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Stevens River** Reach: **M107-A**

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 Reg. Use:
Impoundments: **None**
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.: **None**

4.7 Stormwater Inputs **None**
Field Ditch: Road Ditch:
Other: Tile Drain:
Overland Flow: Urb Strm Wtr Pipe:
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types			
		Diagonal:	**0**
Mid:	**0**	Delta:	**0**
Point:	**2**	Island:	**0**
Side:	**1**	Braiding:	**0**

5.2 Other Features — Neck Cutoff: **0**
Flood chutes: **1** — Avulsion: **0**
5.3 Steep Riffles and Head Cuts — Head Cuts: **0**
Steep Riffles: **0** — Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **Straightening**
Straightening Length (ft.): **688**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type — Left — Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined** Score	STD	Historic
7.1 Channel Degradation	**11**	**None**	**No**
7.2 Channel Aggradation	**13**	**None**	**No**
7.3 Widening Channel	**12**	**None**	**No**
7.4 Change in Planforml	**14**	**None**	**No**
Total Score	**50**		

Geomorphic Rating	**0.63**
Channel Evolution Model	**F**
Channel Evolution Stage	**IV**
Geomorphic Condition	**Good**
Stream Sensitivity	**Moderate**

Phase 2 Segment Summary Report Stevens River

Stream: **Stevens River**
Reach: **M107-B**
Segment Length(ft): **3,117**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, C Haynes**
Completion Date: **8/30/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Upstream end of S-curve in stream by base of Gilfillan Rd, upstream to Ben's Mill Road**

Step 5 - Notes: **Riffle-pools setting up, in contrast to next segment and reach downstream- likely due to higher stream power.**

Step 7 - Narrative: **Minor aggradation following historic incision; frequent bedrock outcrops contribute to short term enlargement; trees important for stability as indicated by freqent scour.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Depositional Features**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

	Length (ft)	One Height	Both	Height
Berm:	0		0	
Road:	2,024	8	0	
Railroad:	0		0	
Imp. Path:	391	6	0	
Dev.:	273		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Steep	Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Other	Other

1.5 Valley Features

Valley Width (ft): **260**
Width Determination: **Measured**
Confinement Type: **SC**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **Yes**

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Ledge	Mid-segment	5.0	2.0	Yes	
Ledge	Mid-segment	3.0	1.0	Yes	

Stream: **Stevens River** Reach: **M107-B**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**66.20**	2.11 Riffle/Step Spacing:	**75 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**3.30**	2.12 Substrate Composition		Bed:	**9.3 inches**
2.3 Mean Depth (tf):	**2.70**	Bedrock:	**13.0 %**	Bar:	**5.5 inches**
2.4 Floodprone Width (ft.):	**249.20**	Boulder:	**22.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**4.80**	Cobble:	**16.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**27.0 %**	Bed Material:	**Cobble**
2.6 Width/Depth Ratio:	**24.52**	Fine Gravel:	**10.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**3.76**	Sand:	**12.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.45**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Low**	Detritus:	**10.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**90**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Steep**

Bank Texture	Left	Right
Upper		
Material Type:	**Mix**	**Mix**
Consistency:	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type:	**Boulder/Cobble**	**Boulder/Cobble**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**52.4**	**0.0**
Erosion Height (ft.):	**4.2**	**0.0**
Revetment Type:	**Rip-Rap**	**Rip-Rap**
Revetment Length:	**590.4**	**1,005.6**

Near Bank Vegetation Type	Left	Right
Dominant:	**Coniferous**	**Coniferous**
Sub-dominant:	**Herbaceous**	**Herbaceous**
Bank Canopy		
Canopy %:	**76-100**	**76-100**
Mid-Channel Canopy:	**Open**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**26-50**	**26-50**
W less than 25	**239**	**413**
Buffer Vegitation Type		
Dominant	**Coniferous**	**Herbaceous**
Sub-Dominant	**Herbaceous**	**Coniferous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Shrubs/Sapling**	**Residential**
(Legacy)	Amount	Mean Hieght
Failures	**Multiple**	**9.0**
Gullies	**None**	

	Left	Right
Mass Failures	**82.95**	
Height	**8.7**	
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Stevens River** Reach: **M107-B**

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 Reg. Use:
Impoundments: **None**
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs
Field Ditch: **1** Road Ditch: **5**
Other: **0** Tile Drain: **0**
Overland Flow: **0** Urb Strm Wtr Pipe: **1**
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bedrock Outcrops	**51**	**Yes**	**Yes**	**Yes**	**No**	**Deposition Above,Scour Above,Scour Below**
Bridge	**32**	**Yes**	**Yes**	**No**	**No**	**Scour Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **2** Point: **1** Side: **5**
Diagonal: **2** Delta: **0** Island: **0** Braiding: **0**

5.2 Other Features
Flood chutes: **2**
Neck Cutoff: **0** Avulsion: **0** Head Cuts: **0** Trib Rejuv.: **No**
5.3 Steep Riffles and Head Cuts
Steep Riffles: **1**

5.4 Stream Ford or Animal Crossing: **Yes**
5.5 Straightening: **Straightening**
Straightening Length (ft.): **3,117**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type — Left — Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**10**	**None**	**Yes**
7.2 Channel Aggradation	**11**	**None**	**No**
7.3 Widening Channel	**10**	**None**	**No**
7.4 Change in Planforml	**13**	**None**	**No**
Total Score	**44**		

Geomorphic Rating	**0.55**
Channel Evolution Model	**F**
Channel Evolution Stage	**III**
Geomorphic Condition	**Fair**
Stream Sensitivity	**High**

Phase 2 Segment Summary Report Stevens River

Stream:	**Stevens River**	SGAT Version:	**4.56**
Reach:	**M107-C**	Organization:	**Caledonia County Conservation District**
Segment Length(ft):	**2,627**	Observers:	**D Ruddell, C Haynes**
Rain:	**Yes**	Completion Date:	**8/31/2010**
		Qualtiy Control Status - Consultant:	**Passed**
		Qualtiy Control Status - Staff:	**Provisional**

Step 0 - Location: **Ben's Mill dam upstream to confluence with South Peacham and Peacham Hollow Brooks**

Step 5 - Notes: **Legacy sediment near Ben's Mill (7-8' high banks). Banks upstream are high also. Likely rapid incision when dan breached. Trees play a vital role in retaining banks, highly erodible.**

Step 7 - Narrative: **Historic aggradation at dam followed by incision, now widening but somewhat stabilized by trees and other vegetation. Assigned Poor condition despite score that placed segment just into Fair range, due to stream type departure and very high incision due to rapid loss of legacy sediments after dam breach.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Channel Dimensions**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	**0**		**0**	
Road:	**1,414**	**14**	**0**	
Railroad:	**0**		**0**	
Imp. Path:	**0**		**0**	
Dev.:	**937**		**0**	

1.4 Adjacent Side	Left	Right
Hillside Slope:	**Extr.Steep**	**Extr.Steep**
Continuous w/ Bank:	**Sometimes**	**Sometimes**
Within 1 Bankfull W:	**Always**	**Always**
Texture:	**Sand**	**Sand**

1.5 Valley Features

Valley Width (ft):	**450**
Width Determination:	**Measured**
Confinement Type:	**BD**
In Rock Gorge:	**No**
Human Caused Change in Valley Width?:	**No**

1.6 Grade Controls: **None**

Stream: **Stevens River** Reach: **M107-C**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**54.50**	2.11 Riffle/Step Spacing:	**163 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**3.50**	2.12 Substrate Composition		Bed:	**6.1** inches
2.3 Mean Depth (tf):	**2.90**	Bedrock:	**1.0 %**	Bar:	**3.2** inches
2.4 Floodprone Width (ft.):	**58.70**	Boulder:	**16.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**8.80**	Cobble:	**19.0 %**	Stream Type:	**F**
Human Elev FloodPln (ft.):		Coarse Gravel:	**34.0 %**	Bed Material:	**Gravel**
2.6 Width/Depth Ratio:	**18.79**	Fine Gravel:	**14.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**1.08**	Sand:	**16.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**2.51**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Low**	Detritus:	**8.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**182**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Steep**

Bank Texture	Left	Right	Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper			Erosion Length (ft.):	**374.0**	**83.9**	Dominant:	**Coniferous**	**Herbaceous**
Material Type:	**Sand**	**Sand**	Erosion Height (ft.):	**6.4**	**6.0**	Sub-dominant:	**Herbaceous**	**Coniferous**
Consistency:	**Non-cohesive**	**Non-cohesive**	Revetment Type:	**None**	**Rip-Rap**	Bank Canopy		
Lower			Revetment Length:	**0.0**	**195.6**	Canopy %:	**76-100**	**51-75**
Material Type:	**Sand**	**Sand**				Mid-Channel Canopy:	**Open**	
Consistency:	**Non-cohesive**	**Non-cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**26-50**
Sub-Dominant	**None**	**51-100**
W less than 25	**0**	**892**
Buffer Vegitation Type		
Dominant	**Coniferous**	**Herbaceous**
Sub-Dominant	**Herbaceous**	**Coniferous**

3.3 Riparian Corridor

Corridor Land	Left	Right		Left	Right
Dominant	**Forest**	**Commercial**	Mass Failures		
Sub-dominant	**None**	**Residential**	Height		
(Legacy)	Amount	Mean Hieght	Gullies Number	**0**	
Failures	**None**		Gullies Length	**0**	
Gullies	**None**				

Stream: **Stevens River**   Reach: **M107-C**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	**Minimal**	4.5 Flow Regulation Type	**None**	4.7 Stormwater Inputs	**None**
4.2 Adjacent Wetlands:	**Minimal**	Flow Reg. Use:		Field Ditch:	Road Ditch:
4.3 Flow Status:	**Low**	Impoundments:	**None**	Other:	Tile Drain:
4.4 # of Debris Jams:	**1**	Impoundment Loc.:		Overland Flow:	Urb Strm Wtr Pipe:
		4.6 Up/Down Strm flow reg.:	**None**	4.9 # of Beaver Dams:	**0**
		(old) Upstrm Flow Reg.:		Affected Length (ft):	**0**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types		Diagonal:	**0**	5.2 Other Features		Neck Cutoff:	**0**	5.4 Stream Ford or Animal Crossing:	**Yes**
Mid:	**4**	Delta:	**0**	Flood chutes:	**4**	Avulsion:	**0**	5.5 Straightening:	**With Windrowing**
Point:	**3**	Island:	**0**	5.3 Steep Riffles and Head Cuts		Head Cuts:	**0**	Straightening Length (ft.):	**2,066**
Side:	**9**	Braiding:	**0**	Steep Riffles:	**2**	Trib Rejuv.:	**No**	5.5 Dredging:	**Dredging**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:		6.4 Sediment Deposition:	Stream Gradiant Type	Left	Right
6.2 Pool Substrate:		6.5 Channel Flow Status:	6.8 Bank Stability:		
6.3 Pool Variability:		6.6 Channel Alteration:	6.9 Bank Vegetation Protection		
Total Score:	**0**	6.7 Channel Sinuosity:	6.10 Riparian Veg. Zone Width:		
Habitat Rating:	**0.00**				
Habitat Stream Condition:					

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined** Score	STD	Historic		
7.1 Channel Degradation	**5**	**C to F**	**Yes**	Geomorphic Rating	**0.38**
7.2 Channel Aggradation	**11**	**None**	**Yes**	Channel Evolution Model	**F**
7.3 Widening Channel	**6**	**None**	**No**	Channel Evolution Stage	**III**
7.4 Change in Planforml	**8**	**None**	**No**	Geomorphic Condition	**Poor**
Total Score	**30**			Stream Sensitivity	**Extreme**

Phase 2 Segment Summary Report Stevens River

Stream: **Peacham Hollow Brook**
Reach: **T1.01-A**
Segment Length(ft): **1,572**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **Ruddell, O'Brien**
Completion Date: **7/21/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **From upstream end of Ferguson Road to confluence with South Peacham Brook**

Step 5 - Notes: **Riffles are depositional, poorly formed and many stretches are plane bed. Extensive armoring and bank toe stabilization. Hydric soils in reach_unclear if wetlands have been altered historically; reach is within extent of glacial Lake Hitchcock and soils reflect that. Some possibility of reference E type stream (this seg, T1.01A , is ~0.8 pct slope; seg B ~1.2 pct slope) and STD to C type, but used ±2 margin for w/d to classify as a C type largley because of relatively low sinuosity and cobble substrate.**

Step 7 - Narrative: **Stage II-III: Historic incision_widening and planform change limited due to extensive windrowing_armoring. Likely portions of the stream have been windrowed more than once. Some possibility of reference E type stream and STD to C type, but used ±2 margin for w/d because of relatively low sinuosity and cobble substrate.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Banks and Buffers**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	0		0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	156		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Flat	Flat
Continuous w/ Bank:	Always	Always
Within 1 Bankfull W:	Always	Always
Texture:	Sand	Sand

1.5 Valley Features
Valley Width (ft): **1,080**
Width Determination: **Measured**
Confinement Type: **VB**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls: **None**

Stream: **Peacham Hollow Brook** Reach: **T1.01-A**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**30.50**	2.11 Riffle/Step Spacing:	**215 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**3.65**	2.12 Substrate Composition		Bed:	**14.8** inches
2.3 Mean Depth (tf):	**2.83**	Bedrock:	**0.0 %**	Bar:	**2.9** inches
2.4 Floodprone Width (ft.):	**274.70**	Boulder:	**15.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**5.85**	Cobble:	**41.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**15.0 %**	Bed Material:	**Cobble**
2.6 Width/Depth Ratio:	**10.78**	Fine Gravel:	**8.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**9.01**	Sand:	**21.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.60**	Silt and Smaller:	**%**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**0.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**7**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Steep**

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

Bank Erosion	Left	Right
Erosion Length (ft.):	**0.0**	**29.5**
Erosion Height (ft.):	**0.0**	**6.0**
Revetment Type:	**Rip-Rap**	**Rip-Rap**
Revetment Length:	**258.4**	**243.2**

Near Bank Vegetation Type	Left	Right
Dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Sub-dominant:	**Deciduous**	**Deciduous**
Bank Canopy		
Canopy %:	**26-50**	**26-50**
Mid-Channel Canopy:	**Open**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**26-50**	**26-50**
Sub-Dominant	**None**	**>100**
W less than 25	**0**	**0**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Hay**	**Hay**
Sub-dominant	**Residential**	**Forest**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Peacham Hollow Brook** Reach: **T1.01-A**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	**Minimal**	4.5 Flow Regulation Type	**None**	4.7 Stormwater Inputs	**None**		
4.2 Adjacent Wetlands:	**Minimal**	Flow Reg. Use:		Field Ditch:		Road Ditch:	
4.3 Flow Status:	**Low**	Impoundments:		Other:		Tile Drain:	
4.4 # of Debris Jams:	**0**	Impoundment Loc.:		Overland Flow:		Urb Strm Wtr Pipe:	
		4.6 Up/Down Strm flow reg.:	**None**	4.9 # of Beaver Dams:			**0**
		(old) Upstrm Flow Reg.:		Affected Length (ft):			**0**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types		Diagonal:	**0**	5.2 Other Features		Neck Cutoff:	**0**	5.4 Stream Ford or Animal Crossing:	**Yes**
Mid:	**1**	Delta:	**0**	Flood chutes:	**0**	Avulsion:	**0**	5.5 Straightening:	**With Windrowing**
Point:	**4**	Island:	**0**	5.3 Steep Riffles and Head Cuts		Head Cuts:	**0**	Straightening Length (ft.):	**1,569**
Side:	**2**	Braiding:	**0**	Steep Riffles:	**1**	Trib Rejuv.:	**No**	5.5 Dredging:	**Dredging**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:		6.4 Sediment Deposition:	Stream Gradiant Type		Left	Right
6.2 Pool Substrate:		6.5 Channel Flow Status:	6.8 Bank Stability:			
6.3 Pool Variability:		6.6 Channel Alteration:	6.9 Bank Vegetation Protection			
Total Score:	**0**	6.7 Channel Sinuosity:	6.10 Riparian Veg. Zone Width:			
Habitat Rating:	**0.00**					
Habitat Stream Condition:						

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined** Score	STD	Historic		
7.1 Channel Degradation	**10**	**None**	**Yes**	Geomorphic Rating	**0.57**
7.2 Channel Aggradation	**12**	**None**	**No**	Channel Evolution Model	**F**
7.3 Widening Channel	**13**	**None**	**No**	Channel Evolution Stage	**III**
7.4 Change in Planforml	**11**	**None**	**No**	Geomorphic Condition	**Fair**
Total Score	**46**			Stream Sensitivity	**High**

Phase 2 Segment Summary Report Stevens River

Stream: **Peacham Hollow Brook**
Reach: **T1.01-B**
Segment Length(ft): **1,954**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **Ruddell, O'Brien**
Completion Date: **7/21/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Upstream of Ferguson Road to reach break just downstream of bridge on East Peacham Road**

Step 5 - Notes: **Upstream portion confined by road but now winrowed like downstream segment. Riffle-steps are depositional, irregularly spaced.**

Step 7 - Narrative: **Stage II-III: Minor widening, aggradation, and plan form adjustment following historic incision_evolution slowed by armoring and good buffers**

Step 1. Valley and Floodplain

1.1 Segmentation: **Grade Controls**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	0		0	
Road:	1,594	9	0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Steep	Very Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Cobble	Cobble

1.5 Valley Features

Valley Width (ft): **475**
Width Determination: **Measured**
Confinement Type: **VB**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **Yes**

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Ledge	Mid-segment	4.0	2.0	Yes	

Stream: **Peacham Hollow Brook** Reach: **T1.01-B**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**39.50**	2.11 Riffle/Step Spacing:	**115 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**4.10**	2.12 Substrate Composition		Bed:	**11.8 inches**
2.3 Mean Depth (tf):	**3.17**	Bedrock:	**0.0 %**	Bar:	**4 inches**
2.4 Floodprone Width (ft.):	**199.50**	Boulder:	**24.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**5.50**	Cobble:	**32.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**20.0 %**	Bed Material:	**Cobble**
2.6 Width/Depth Ratio:	**12.46**	Fine Gravel:	**7.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**5.05**	Sand:	**17.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.34**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**0.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**28**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Undercut**

Bank Texture	Left	Right
Upper		
Material Type:	**Boulder/Cobble**	**Boulder/Cobble**
Consistency:	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type:	**Mix**	**Mix**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**0.0**	**22.8**
Erosion Height (ft.):	**0.0**	**2.0**
Revetment Type:	**Rip-Rap**	**Rip-Rap**
Revetment Length:	**154.3**	**421.4**

Near Bank Vegetation Type	Left	Right
Dominant:	**Coniferous**	**Coniferous**
Sub-dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Bank Canopy		
Canopy %:	**76-100**	**76-100**
Mid-Channel Canopy:	**Closed**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**51-100**
Sub-Dominant	**51-100**	**>100**
W less than 25	**0**	**89**
Buffer Vegitation Type		
Dominant	**Coniferous**	**Herbaceous**
Sub-Dominant	**Herbaceous**	**Shrubs/Sapling**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Hay**	**Hay**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Peacham Hollow Brook**   Reach: **T1.01-B**

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 Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs
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**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bridge	**23**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **2**   Point: **1**   Side: **6**
Diagonal: **0**   Delta: **0**   Island: **0**   Braiding: **0**

5.2 Other Features
Flood chutes: **0**
Neck Cutoff: **0**   Avulsion: **0**   Head Cuts: **0**   Trib Rejuv.: **No**
5.3 Steep Riffles and Head Cuts
Steep Riffles: **0**

5.4 Stream Ford or Animal Crossing: **Yes**
5.5 Straightening: **With Windrowing**
Straightening Length (ft.): **1,120**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type   Left   Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined** Score	STD	Historic
7.1 Channel Degradation	**13**	**None**	**Yes**
7.2 Channel Aggradation	**13**	**None**	**No**
7.3 Widening Channel	**12**	**None**	**No**
7.4 Change in Planforml	**12**	**None**	**No**
Total Score	**50**		

Geomorphic Rating	**0.63**
Channel Evolution Model	**F**
Channel Evolution Stage	**III**
Geomorphic Condition	**Fair**
Stream Sensitivity	**High**

Phase 2 Segment Summary Report   Stevens River

Stream: **Peacham Hollow Brook**
Reach: **T1.02-A**
Segment Length(ft): **2,963**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, C Haynes**
Completion Date: **8/3/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **~0.3 miles downstream of Morrison and Somerhill Rd to ~400 feet upstream of Sommerhill Rd Bridge**

Step 5 - Notes: **Road narrows valley some, acts in tandem with naturally narrow valley to restrict planform change to some degree but there is evidence of active use of most of valley floor over time (flood chutes etc); good buffers important to stream stability: skid rd_ford in DS portion indicates sensitvity of impacts to buffers_skid rd acting as stormwater input**

Step 7 - Narrative: **Planform changes restricted by road in conjunction with narrow valley, some widening and aggradation following historic incision.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Substrate Size**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	2,417	10	529	5
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Very Steep	Very Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Cobble	Cobble

1.5 Valley Features

Valley Width (ft): **200**
Width Determination: **Estimated**
Confinement Type: **NW**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **Yes**

1.6 Grade Controls: **None**

Stream: **Peacham Hollow Brook** Reach: **T1.02-A**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**44.70**	2.11 Riffle/Step Spacing:	**97.5 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**4.10**	2.12 Substrate Composition		Bed:	**8.8 inches**
2.3 Mean Depth (tf):	**2.77**	Bedrock:	**0.0 %**	Bar:	**4.8 inches**
2.4 Floodprone Width (ft.):	**147.00**	Boulder:	**23.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**5.05**	Cobble:	**36.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**10.0 %**	Bed Material:	**Cobble**
2.6 Width/Depth Ratio:	**16.14**	Fine Gravel:	**15.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**3.29**	Sand:	**16.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.23**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**10.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**156**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Steep**

Bank Texture	Left	Right
Upper		
Material Type:	**Mix**	**Mix**
Consistency:	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type:	**Boulder/Cobble**	**Boulder/Cobble**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**0.0**	**53.9**
Erosion Height (ft.):	**0.0**	**3.6**
Revetment Type:	**None**	**None**
Revetment Length:	**0.0**	**0.0**

Near Bank Vegetation Type	Left	Right
Dominant:	**Coniferous**	**Coniferous**
Sub-dominant:	**Herbaceous**	**Herbaceous**
Bank Canopy		
Canopy %:	**76-100**	**76-100**
Mid-Channel Canopy:	**Closed**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**26-50**	**26-50**
W less than 25	**0**	**296**
Buffer Vegitation Type		
Dominant	**Coniferous**	**Coniferous**
Sub-Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Residential**	**Residential**
(Legacy)	Amount	Mean Hieght
Failures	**Multiple**	**9.7**
Gullies	**None**	

	Left	Right
Mass Failures	**54.42**	**81.49**
Height	**6.0**	**11.3**
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Peacham Hollow Brook**   Reach: **T1.02-A**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Minimal**
4.2 Adjacent Wetlands: **Minimal**
4.3 Flow Status: **Moderate**
4.4 # of Debris Jams: **3**

4.5 Flow Regulation Type **None**
Flow Reg. Use:
Impoundments: **None**
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs
Field Ditch: **0** Road Ditch: **0**
Other: **0** Tile Drain: **0**
Overland Flow: **2** Urb Strm Wtr Pipe: **0**
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bridge	**24**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Above,Deposition Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **6** Point: **7** Side: **10**
Diagonal: **2** Delta: **1** Island: **3** Braiding: **2**

5.2 Other Features
Flood chutes: **5**
Neck Cutoff: **0** Avulsion: **0**
5.3 Steep Riffles and Head Cuts
Head Cuts: **0**
Steep Riffles: **1** Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **Yes**
5.5 Straightening: **Straightening**
Straightening Length (ft.): **845**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type   Left   Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined** Score	STD	Historic
7.1 Channel Degradation	**11**	**None**	**Yes**
7.2 Channel Aggradation	**13**	**None**	**No**
7.3 Widening Channel	**13**	**None**	**No**
7.4 Change in Planforml	**11**	**None**	**No**
Total Score	**48**		

Geomorphic Rating	**0.60**
Channel Evolution Model	**F**
Channel Evolution Stage	**IV**
Geomorphic Condition	**Fair**
Stream Sensitivity	**High**

Phase 2 Segment Summary Report   Stevens River

Stream:	Peacham Hollow Brook	SGAT Version:	4.56
Reach:	T1.02-B	Organization:	Caledonia County Conservation District
Segment Length(ft):	1,794	Observers:	D Ruddell, S Pealer
Rain:	No	Completion Date:	7/6/2010
		Qualtiy Control Status - Consultant:	Passed
		Qualtiy Control Status - Staff:	Provisional

Step 0 - Location: **Confined segment up agains Peacham-Barnet Road**

Step 5 - Notes: **Slope higher in this segment than rest of reach. Some riffle-pools along with dominant step-pool expose dense till, couple of bedrock outcrops on upstream end.**

Step 7 - Narrative: **Moderate aggradation and widening, cwd contributing to planform change**

Step 1. Valley and Floodplain

1.1 Segmentation: **Valley Width**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	0		0	
Road:	1,794	10	0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Steep	Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Boulder	Boulder

1.5 Valley Features

Valley Width (ft):	150
Width Determination:	Estimated
Confinement Type:	SC
In Rock Gorge:	No
Human Caused Change in Valley Width?:	Yes

1.6 Grade Controls: **None**

Stream: **Peacham Hollow Brook** Reach: **T1.02-B**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**42.90**	2.11 Riffle/Step Spacing:	**100 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**2.90**	2.12 Substrate Composition		Bed:	**18.9** **inches**
2.3 Mean Depth (tf):	**2.28**	Bedrock:	**0.0 %**	Bar:	**9.1** **inches**
2.4 Floodprone Width (ft.):	**89.80**	Boulder:	**16.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**4.70**	Cobble:	**37.0 %**	Stream Type:	**B**
Human Elev FloodPln (ft.):		Coarse Gravel:	**18.0 %**	Bed Material:	**Cobble**
2.6 Width/Depth Ratio:	**18.82**	Fine Gravel:	**13.0 %**	Subclass Slope:	**c**
2.7 Entrenchment Ratio:	**2.09**	Sand:	**16.0 %**	Bed Form:	**Step-Pool**
2.8 Incision Ratio:	**1.62**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**10.0 %**	Reference Stream Type:	**B**
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**61**	Reference Bed Material:	**Cobble**
				Reference Subclass Slope:	**c**
				Reference Bedform:	**Step-Pool**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Steep**

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

Bank Erosion	Left	Right
Erosion Length (ft.):	**122.0**	**0.0**
Erosion Height (ft.):	**3.0**	**0.0**
Revetment Type:	**Rip-Rap**	**None**
Revetment Length:	**65.5**	**0.0**

Near Bank Vegetation Type	Left	Right
Dominant:	**Coniferous**	**Coniferous**
Sub-dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Bank Canopy		
Canopy %:	**76-100**	**76-100**
Mid-Channel Canopy:	**Closed**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**51-100**	**>100**
Sub-Dominant	**26-50**	**None**
W less than 25	**193**	**0**
Buffer Vegitation Type		
Dominant	**Coniferous**	**Coniferous**
Sub-Dominant	**Herbaceous**	**Shrubs/Sapling**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Bare**	**None**
(Legacy)	Amount	Mean Hieght
Failures	**One**	**25.0**
Gullies	**None**	

	Left	Right
Mass Failures		**72.8**
Height		**25.0**
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Peacham Hollow Brook** Reach: **T1.02-B**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	**Minimal**	4.5 Flow Regulation Type	**None**	4.7 Stormwater Inputs			
4.2 Adjacent Wetlands:	**Minimal**	Flow Reg. Use:		Field Ditch:	**0**	Road Ditch:	**1**
4.3 Flow Status:	**Low**	Impoundments:	**None**	Other:	**0**	Tile Drain:	**0**
4.4 # of Debris Jams:	**0**	Impoundment Loc.:		Overland Flow:	**0**	Urb Strm Wtr Pipe:	**0**
		4.6 Up/Down Strm flow reg.:	**None**	4.9 # of Beaver Dams:			**0**
		(old) Upstrm Flow Reg.:		Affected Length (ft):			**0**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types		Diagonal:	**0**	5.2 Other Features		Neck Cutoff:	**0**	5.4 Stream Ford or Animal Crossing:	**No**
Mid:	**2**	Delta:	**0**	Flood chutes:	**1**	Avulsion:	**0**	5.5 Straightening:	**Straightening**
Point:	**1**	Island:	**0**	5.3 Steep Riffles and Head Cuts		Head Cuts:	**0**	Straightening Length (ft.):	**1,520**
Side:	**6**	Braiding:	**0**	Steep Riffles:	**0**	Trib Rejuv.:	**Yes**	5.5 Dredging:	**None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:		6.4 Sediment Deposition:	Stream Gradiant Type	Left	Right
6.2 Pool Substrate:		6.5 Channel Flow Status:	6.8 Bank Stability:		
6.3 Pool Variability:		6.6 Channel Alteration:	6.9 Bank Vegetation Protection		
Total Score:	**0**	6.7 Channel Sinuosity:	6.10 Riparian Veg. Zone Width:		
Habitat Rating:	**0.00**				
Habitat Stream Condition:					

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Confined** Score	STD	Historic		
7.1 Channel Degradation	**10**	**None**	**Yes**	Geomorphic Rating	**0.60**
7.2 Channel Aggradation	**13**	**None**	**Yes**	Channel Evolution Model	**F**
7.3 Widening Channel	**11**	**None**	**No**	Channel Evolution Stage	**III**
7.4 Change in Planforml	**14**	**None**	**No**	Geomorphic Condition	**Fair**
Total Score	**48**			Stream Sensitivity	**High**

Phase 2 Segment Summary Report Stevens River

Stream:	Peacham Hollow Brook	SGAT Version:	4.56
Reach:	T1.02-C	Organization:	Caledonia County Conservation District
Segment Length(ft):	3,030	Observers:	D Ruddell, C Haynes
Rain:	Yes	Completion Date:	7/5/2010
		Qualtiy Control Status - Consultant:	Passed
		Qualtiy Control Status - Staff:	Provisional
		Why Not Assessed:	beaver dam

Step 0 - Location: **along E Peacham Rd midway between Morrison Hill_Somer Hill jct and Blanchard Hill**

Step 5 - Notes: **Multiple dams spread through segment, with high recent tree mortality mid-seg in particular. Ford was for cedar salvage logging job. Couple of fields along segment are being utilized for hay and parking RVs_farm bridge located in hayfield.**

Step 7 - Narrative:

Step 1. Valley and Floodplain

1.1 Segmentation: **Other Reason**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	0		0	
Road:	563	10	0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Hilly	Flat
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Sand	Sand

1.5 Valley Features

Valley Width (ft):	500
Width Determination:	Estimated
Confinement Type:	VB
In Rock Gorge:	No
Human Caused Change in Valley Width?:	Yes

1.6 Grade Controls: **None**

Stream: **Peacham Hollow Brook** Reach: **T1.02-C**

Step 2. Stream Channel

2.1Bankfull Width (ft.):		2.11 Riffle/Step Spacing:		2.13 Average Largest Particle on	
2.2 Max Depth (ft.):		2.12 Substrate Composition		Bed:	
2.3 Mean Depth (tf):		Bedrock:	%	Bar:	
2.4 Floodprone Width (ft.):		Boulder:	%	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):		Cobble:	%	Stream Type:	
Human Elev FloodPln (ft.):		Coarse Gravel:	%	Bed Material:	
2.6 Width/Depth Ratio:	**0.00**	Fine Gravel:	%	Subclass Slope:	
2.7 Entrenchment Ratio:	**0.00**	Sand:	%	Bed Form:	
2.8 Incision Ratio:	**0.00**	Silt and Smaller:	%	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:		2.15 Sub-reach Stream Type	
2.9 Sinuosity:		Detritus:	%	Reference Stream Type:	
2.10 Riffles Type:		# Large Woody Debris:		Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope:

Bank Texture	Left	Right
Upper		
Material Type:	**Clay**	**Clay**
Consistency:	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type:	**Clay**	**Clay**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**0.0**	**0.0**
Erosion Height (ft.):	**0.0**	**0.0**
Revetment Type:	**Rip-Rap**	**None**
Revetment Length:	**40.3**	**0.0**

Near Bank Vegetation Type	Left	Right
Dominant:	**Herbaceous**	**Coniferous**
Sub-dominant:	**Coniferous**	**Herbaceous**
Bank Canopy		
Canopy %:	**26-50**	**1-25**
Mid-Channel Canopy:	**Open**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**0-25**	**>100**
Sub-Dominant	**>100**	**0-25**
W less than 25	**436**	**230**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Coniferous**
Sub-Dominant	**Coniferous**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**None**	**None**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Peacham Hollow Brook** Reach: **T1.02-C**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Abundant**

4.2 Adjacent Wetlands: **Abundant**

4.3 Flow Status: **Low**

4.4 # of Debris Jams: **0**

4.5 Flow Regulation Type **None**

Flow Reg. Use:

Impoundments: **None**

Impoundment Loc.:

4.6 Up/Down Strm flow reg.: **None**

(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs

Field Ditch: **2** Road Ditch: **0**

Other: **0** Tile Drain: **0**

Overland Flow: **0** Urb Strm Wtr Pipe: **0**

4.9 # of Beaver Dams: **12**

Affected Length (ft): **1325**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bridge	**38**	**Yes**	**Yes**	**Yes**	**No**	**None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid: Diagonal:

Point: Delta:

Side: Island:

Braiding: **0**

5.2 Other Features

Flood chutes: **0**

Neck Cutoff: **0**

Avulsion: **0**

5.3 Steep Riffles and Head Cuts

Steep Riffles: **0**

Head Cuts: **0**

Trib Rejuv.:

5.4 Stream Ford or Animal Crossing: **Yes**

5.5 Straightening: **Straightening**

Straightening Length (ft.): **877**

5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:

6.2 Pool Substrate:

6.3 Pool Variability:

Total Score:

Habitat Rating:

Habitat Stream Condition:

6.4 Sediment Deposition:

6.5 Channel Flow Status:

6.6 Channel Alteration:

6.7 Channel Sinuosity:

Stream Gradiant Type	Left	Right
6.8 Bank Stability:		
6.9 Bank Vegetation Protection		
6.10 Riparian Veg. Zone Width:		

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	Score	STD	Historic
7.1 Channel Degradation			
7.2 Channel Aggradation			
7.3 Widening Channel			
7.4 Change in Planforml			
Total Score			

Geomorphic Rating

Channel Evolution Model

Channel Evolution Stage

Geomorphic Condition

Stream Sensitivity

Phase 2 Segment Summary Report Stevens River

Stream:	Peacham Hollow Brook	SGAT Version:	4.56
Reach:	T1.02-D	Organization:	Caledonia County Conservation District
Segment Length(ft):	4,784	Observers:	D Ruddell, C Haynes`
Rain:	Yes	Completion Date:	7/5/2010
		Qualtiy Control Status - Consultant:	Passed
		Qualtiy Control Status - Staff:	Provisional

Step 0 - Location: **~600 feet upstream of Barnet/Peacham line to ~480 feet upstreeam of Blanchard Hill Rd Jct with East Peacham Rd**

Step 5 - Notes: **Tractor path along stream on right bank upstream, ford short distance downstream (maybe for logging access?). Small bypass is likely low head bypass set up, looks unused at present.**

Step 7 - Narrative: **Minor aggradation, widening and planform change following historic incision; process tempered significantly by good buffers.**

Used unconfined RGA evaluation: although this segment is in a semi-confined valley, it is clearly a riffle-pool system with relatively low slope (1.5 pct), no steps, and point bar sediment storage. Scoring on confined sheet came out very similar, but questions related to step-pool systems were ill-suited.

Step 1. Valley and Floodplain

1.1 Segmentation: **Valley Width**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	0		0	
Railroad:	0		0	
Imp. Path:	840	8	0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Very Steep	Very Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Cobble	Cobble

1.5 Valley Features	
Valley Width (ft):	150
Width Determination:	Estimated
Confinement Type:	SC
In Rock Gorge:	No
Human Caused Change in Valley Width?:	No

1.6 Grade Controls: **None**

Stream:	**Peacham Hollow Brook**	Reach:	**T1.02-D**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**39.80**	2.11 Riffle/Step Spacing:	**111 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**3.75**	2.12 Substrate Composition		Bed:	**20 inches**
2.3 Mean Depth (tf):	**2.76**	Bedrock:	**0.0 %**	Bar:	**8.5 inches**
2.4 Floodprone Width (ft.):	**148.40**	Boulder:	**26.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**5.05**	Cobble:	**20.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**21.0 %**	Bed Material:	**Gravel**
2.6 Width/Depth Ratio:	**14.42**	Fine Gravel:	**12.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**3.73**	Sand:	**21.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.35**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**8.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**118**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

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:	**Boulder/Cobble**	**Boulder/Cobble**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**58.8**	**88.7**
Erosion Height (ft.):	**2.5**	**4.3**
Revetment Type:	**None**	**None**
Revetment Length:	**0.0**	**0.0**

Near Bank Vegetation Type	Left	Right
Dominant:	**Coniferous**	**Coniferous**
Sub-dominant:	**Shrubs/Sapling**	**Herbaceous**
Bank Canopy		
Canopy %:	**76-100**	**76-100**
Mid-Channel Canopy:	**Open**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**26-50**	**26-50**
W less than 25	**292**	**0**
Buffer Vegitation Type		
Dominant	**Coniferous**	**Coniferous**
Sub-Dominant	**Herbaceous**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Hay**	**None**
(Legacy)	Amount	Mean Hieght
Failures	**Multiple**	**12.4**
Gullies	**None**	

	Left	Right
Mass Failures	**102.18**	**74.15**
Height	**13.3**	**12.6**
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Peacham Hollow Brook**   Reach: **T1.02-D**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Abundant**

4.2 Adjacent Wetlands: **Minimal**

4.3 Flow Status: **Low**

4.4 # of Debris Jams: **1**

4.5 Flow Regulation Type **Small Bypass**

Flow Reg. Use: **Hydro-electric**

Impoundments:

Impoundment Loc.:

4.6 Up/Down Strm flow reg.: **None**

(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs

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

4.9 # of Beaver Dams: **1**

Affected Length (ft): **50**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types		Diagonal:	**1**	5.2 Other Features		Neck Cutoff:	**0**	5.4 Stream Ford or Animal Crossing:	**Yes**
Mid:	**4**	Delta:	**0**	Flood chutes:	**13**	Avulsion:	**0**	5.5 Straightening:	**None**
Point:	**11**	Island:	**1**	5.3 Steep Riffles and Head Cuts		Head Cuts:	**0**	Straightening Length (ft.):	**0**
Side:	**8**	Braiding:	**0**	Steep Riffles:	**3**	Trib Rejuv.:	**No**	5.5 Dredging:	**None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:

6.2 Pool Substrate:

6.3 Pool Variability:

Total Score: **0**

Habitat Rating: **0.00**

Habitat Stream Condition:

6.4 Sediment Deposition:

6.5 Channel Flow Status:

6.6 Channel Alteration:

6.7 Channel Sinuosity:

Stream Gradiant Type	Left	Right
6.8 Bank Stability:		
6.9 Bank Vegetation Protection		
6.10 Riparian Veg. Zone Width:		

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**	Score	STD	Historic
7.1 Channel Degradation	**13**	**None**	**Yes**
7.2 Channel Aggradation	**13**	**None**	**No**
7.3 Widening Channel	**12**	**None**	**No**
7.4 Change in Planforml	**11**	**None**	**No**
Total Score	**49**		

Geomorphic Rating	**0.61**
Channel Evolution Model	**F**
Channel Evolution Stage	**IV**
Geomorphic Condition	**Fair**
Stream Sensitivity	**Very High**

Phase 2 Segment Summary Report **Stevens River**

Stream: **Peacham Hollow Brook**
Reach: **T1.03-0**
Segment Length(ft):
Rain:

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **ruddell, Haynes**
Completion Date:
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**
Why Not Assessed: **Other (to be explained in comments)**

Step 0 - Location: **Reach was segmented_see T1.03 segment entries**

Step 5 - Notes:

Step 7 - Narrative:

Step 1. Valley and Floodplain

1.1 Segmentation:
1.2 Alluvial Fan:
1.3 Corridor Encroachments:

	Length (ft)	One	Height	Both	Height
Berm:					
Road:					
Railroad:					
Imp. Path:					
Dev.:					

1.4 Adjacent Side	Left	Right
Hillside Slope:		
Continuous w/ Bank:		
Within 1 Bankfull W:		
Texture:		

1.5 Valley Features
Valley Width (ft):
Width Determination:
Confinement Type:
In Rock Gorge:
Human Caused Change in Valley Width?:

1.6 Grade Controls:

Stream: **Peacham Hollow Brook**   Reach: **T1.03-0**

Step 2. Stream Channel

2.1Bankfull Width (ft.):		2.11 Riffle/Step Spacing:		2.13 Average Largest Particle on	
2.2 Max Depth (ft.):		2.12 Substrate Composition		Bed:	
2.3 Mean Depth (tf):		Bedrock:	%	Bar:	
2.4 Floodprone Width (ft.):		Boulder:	%	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):		Cobble:	%	Stream Type:	
Human Elev FloodPln (ft.):		Coarse Gravel:	%	Bed Material:	
2.6 Width/Depth Ratio:	**0.00**	Fine Gravel:	%	Subclass Slope:	
2.7 Entrenchment Ratio:	**0.00**	Sand:	%	Bed Form:	
2.8 Incision Ratio:	**0.00**	Silt and Smaller:	%	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:		2.15 Sub-reach Stream Type	
2.9 Sinuosity:		Detritus:	%	Reference Stream Type:	
2.10 Riffles Type:		# Large Woody Debris:		Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope:

Bank Texture	Left	Right	Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper			Erosion Length (ft.):			Dominant:		
Material Type:			Erosion Height (ft.):			Sub-dominant:		
Consistency:			Revetment Type:			Bank Canopy		
Lower			Revetment Length:			Canopy %:		
Material Type:						Mid-Channel Canopy:		
Consistency:								

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant		
Sub-Dominant		
W less than 25		
Buffer Vegitation Type		
Dominant		
Sub-Dominant		

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant		
Sub-dominant		
(Legacy)	Amount	Mean Hieght
Failures		
Gullies		

	Left	Right
Mass Failures		
Height		
Gullies Number		
Gullies Length		

Stream: **Peacham Hollow Brook** Reach: **T1.03-0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	4.5 Flow Regulation Type		4.7 Stormwater Inputs **None**	
4.2 Adjacent Wetlands:	Flow Reg. Use:		Field Ditch:	Road Ditch:
4.3 Flow Status:	Impoundments:		Other:	Tile Drain:
4.4 # of Debris Jams:	Impoundment Loc.:		Overland Flow:	Urb Strm Wtr Pipe:
	4.6 Up/Down Strm flow reg.:		4.9 # of Beaver Dams:	
	(old) Upstrm Flow Reg.:		Affected Length (ft):	

4.8 Channel Constrictions:

Step 5. Channel Bed and Planform Changes

5.1 Bar Types	Diagonal:	5.2 Other Features	Neck Cutoff:	5.4 Stream Ford or Animal Crossing:
Mid:	Delta:	Flood chutes:	Avulsion:	5.5 Straightening:
Point:	Island:	5.3 Steep Riffles and Head Cuts	Head Cuts:	Straightening Length (ft.): **0**
Side:	Braiding:	Steep Riffles:	Trib Rejuv.:	5.5 Dredging:

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:	6.4 Sediment Deposition:	Stream Gradiant Type	Left	Right
6.2 Pool Substrate:	6.5 Channel Flow Status:	6.8 Bank Stability:		
6.3 Pool Variability:	6.6 Channel Alteration:	6.9 Bank Vegetation Protection		
Total Score:	6.7 Channel Sinuosity:	6.10 Riparian Veg. Zone Width:		
Habitat Rating:				
Habitat Stream Condition:				

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	Score	STD	Historic	
7.1 Channel Degradation				Geomorphic Rating
7.2 Channel Aggradation				Channel Evolution Model
7.3 Widening Channel				Channel Evolution Stage
7.4 Change in Planforml				Geomorphic Condition
Total Score				Stream Sensitivity

Phase 2 Segment Summary Report   Stevens River

Stream: **Peacham Hollow Brook**
Reach: **T1.03-A**
Segment Length(ft): **1,729**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, C Haynes**
Completion Date: **7/1/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Downstream of Stevenson Brook Road to downstream end of Manetti hayfield**

Step 5 - Notes: **Straightening is based on extensive bank toe stabilization and riprap, which have limited planform adjustments**

Step 7 - Narrative: **Stabilizing: Minor aggradation and some widening following historic incision (flow alterations upstream at historic mills)**

Step 1. Valley and Floodplain

1.1 Segmentation: **Channel Dimensions**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	266	0	0	
Railroad:	0		0	
Imp. Path:	230	10	0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Hilly	Flat
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Sand	Sand

1.5 Valley Features

Valley Width (ft): **454**
Width Determination: **Measured**
Confinement Type: **VB**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls: **None**

Stream: **Peacham Hollow Brook** Reach: **T1.03-A**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**24.40**	2.11 Riffle/Step Spacing:	**120 ft.**	2.13 Average Largest Particle on		
2.2 Max Depth (ft.):	**3.20**	2.12 Substrate Composition		Bed:	**5.2**	**inches**
2.3 Mean Depth (tf):	**2.70**	Bedrock:	**0.0 %**	Bar:	**2.2**	**inches**
2.4 Floodprone Width (ft.):	**454.00**	Boulder:	**5.0 %**	2.14 Stream Type		
2.5 Aband. Floodpn (ft.):	**4.00**	Cobble:	**8.0 %**	Stream Type:	**E**	
Human Elev FloodPln (ft.):		Coarse Gravel:	**41.0 %**	Bed Material:	**Gravel**	
2.6 Width/Depth Ratio:	**9.04**	Fine Gravel:	**23.0 %**	Subclass Slope:	**None**	
2.7 Entrenchment Ratio:	**18.61**	Sand:	**23.0 %**	Bed Form:	**Riffle-Pool**	
2.8 Incision Ratio:	**1.25**	Silt and Smaller:	**0.0 %**	Field Measured Slope:		
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type		
2.9 Sinuosity:	**Moderate**	Detritus:	**6.0 %**	Reference Stream Type:		
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**25**	Reference Bed Material:		
				Reference Subclass Slope:		
				Reference Bedform:		

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Undercut**

Bank Texture	Left	Right	Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper			Erosion Length (ft.):	**0.0**	**145.2**	Dominant:	**Herbaceous**	**Herbaceous**
Material Type:	**Sand**	**Sand**	Erosion Height (ft.):	**0.0**	**4.2**	Sub-dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Consistency:	**Non-cohesive**	**Non-cohesive**	Revetment Type:	**Rip-Rap**	**Rip-Rap**	Bank Canopy		
Lower			Revetment Length:	**297.9**	**318.9**	Canopy %:	**1-25**	**1-25**
Material Type:	**Sand**	**Mix**				Mid-Channel Canopy:	**Open**	
Consistency:	**Non-cohesive**	**Non-cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**0-25**	**0-25**
Sub-Dominant	**26-50**	**26-50**
W less than 25	**490**	**824**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Coniferous**	**Deciduous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Pasture**	**Pasture**
Sub-dominant	**Shrubs/Sapling**	**Forest**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Peacham Hollow Brook** Reach: **T1.03-A**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	**Minimal**	4.5 Flow Regulation Type	**None**	4.7 Stormwater Inputs	**None**
4.2 Adjacent Wetlands:	**Minimal**	Flow Reg. Use:		Field Ditch:	Road Ditch:
4.3 Flow Status:	**Low**	Impoundments:		Other:	Tile Drain:
4.4 # of Debris Jams:	**1**	Impoundment Loc.:		Overland Flow:	Urb Strm Wtr Pipe:
		4.6 Up/Down Strm flow reg.:	**None**	4.9 # of Beaver Dams:	**0**
		(old) Upstrm Flow Reg.:		Affected Length (ft):	**0**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types		Diagonal:	**3**	5.2 Other Features		Neck Cutoff:	**0**	5.4 Stream Ford or Animal Crossing:	**No**
Mid:	**0**	Delta:	**0**	Flood chutes:	**1**	Avulsion:	**1**	5.5 Straightening:	**Straightening**
Point:	**1**	Island:	**0**	5.3 Steep Riffles and Head Cuts		Head Cuts:	**0**	Straightening Length (ft.):	**1,417**
Side:	**1**	Braiding:	**0**	Steep Riffles:	**1**	Trib Rejuv.:	**No**	5.5 Dredging:	**None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:		6.4 Sediment Deposition:	Stream Gradiant Type	Left	Right
6.2 Pool Substrate:		6.5 Channel Flow Status:	6.8 Bank Stability:		
6.3 Pool Variability:		6.6 Channel Alteration:	6.9 Bank Vegetation Protection		
Total Score:	**0**	6.7 Channel Sinuosity:	6.10 Riparian Veg. Zone Width:		
Habitat Rating:	**0.00**				
Habitat Stream Condition:					

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined** Score	STD	Historic		
7.1 Channel Degradation	**14**	**None**	**Yes**	Geomorphic Rating	**0.75**
7.2 Channel Aggradation	**15**	**None**	**No**	Channel Evolution Model	**F**
7.3 Widening Channel	**15**	**None**	**No**	Channel Evolution Stage	**IV**
7.4 Change in Planforml	**16**	**None**	**No**	Geomorphic Condition	**Good**
Total Score	**60**			Stream Sensitivity	**High**

Phase 2 Segment Summary Report Stevens River

Stream: **Peacham Hollow Brook**
Reach: **T1.03-B**
Segment Length(ft): **860**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, C Haynes, S Pealer, G Alexander**
Completion Date: **6/15/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **East Peacham near old house to Stevenson Road**

Step 5 - Notes: **Entire segment straightened, largely by virtue of road encroachment and likely windrowing during arch culvert installation. Ford is historic, not currently being used. Sub reach_slope for this seg ~3.0 pct. May be plane bed by reference (neither steps or riffles setting up due to borderline slope) but there are steps setting up at this point in time, possibly due to increased stream power from straightening, slope and confinment changes. Peculiar geologic formation thru here as stream makes bend: terraces very high, and the valley is a 'pinch point' naturally (further exacerbated by construction of Stevenson Rd along valley wall); wondered about possible Lake Hitchcock/Quechee Gorge type scenario, where a glacial stream may have been impounded by sediments and then created a massive headcut when the jam let loose; no records of mill dams in this area has been located.**

Step 7 - Narrative: **widening (impeded by riprap on 35 pct of LB) and planform change following straightening and historic incision_RAF and incision ratio possibly obscured by shaping of adjacent slopes during road construction and maintenance_may be plane bed by reference but steps are setting up now**

Step 1. Valley and Floodplain

1.1 Segmentation: **Channel Dimensions**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

	Length (ft) One	Height	Length (ft) Both	Height
Berm:	0		0	
Road:	450	0	0	
Railroad:	0		0	
Imp. Path:	169	10	0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Steep	Hilly
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Always
Texture:	Cobble	Cobble

1.5 Valley Features

Valley Width (ft): **154**
Width Determination: **Measured**
Confinement Type: **SC**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **Yes**

1.6 Grade Controls: **None**

Stream: **Peacham Hollow Brook** Reach: **T1.03-B**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**28.20**	2.11 Riffle/Step Spacing:	**100 ft.**	2.13 Average Largest Particle on		
2.2 Max Depth (ft.):	**3.60**	2.12 Substrate Composition		Bed:	**26.5**	**inches**
2.3 Mean Depth (tf):	**2.54**	Bedrock:	**0.0 %**	Bar:	**6.8**	**inches**
2.4 Floodprone Width (ft.):	**84.20**	Boulder:	**48.0 %**	2.14 Stream Type		
2.5 Aband. Floodpn (ft.):	**7.20**	Cobble:	**8.0 %**	Stream Type:	**C**	
Human Elev FloodPln (ft.):		Coarse Gravel:	**10.0 %**	Bed Material:	**Cobble**	
2.6 Width/Depth Ratio:	**11.10**	Fine Gravel:	**12.0 %**	Subclass Slope:	**b**	
2.7 Entrenchment Ratio:	**2.99**	Sand:	**22.0 %**	Bed Form:	**Step-Pool**	
2.8 Incision Ratio:	**2.00**	Silt and Smaller:	**0.0 %**	Field Measured Slope:		
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type		
2.9 Sinuosity:	**Low**	Detritus:	**8.0 %**	Reference Stream Type:	**C**	
2.10 Riffles Type:	**Complete**	# Large Woody Debris:	**17**	Reference Bed Material:	**Cobble**	
				Reference Subclass Slope:	**b**	
				Reference Bedform:	**Step-Pool**	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Moderate**

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

Bank Erosion	Left	Right
Erosion Length (ft.):	**32.6**	**0.0**
Erosion Height (ft.):	**2.0**	**0.0**
Revetment Type:	**Rip-Rap**	**None**
Revetment Length:	**112.0**	**0.0**

Near Bank Vegetation Type	Left	Right
Dominant:	**Deciduous**	**Coniferous**
Sub-dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Bank Canopy		
Canopy %:	**51-75**	**76-100**
Mid-Channel Canopy:	**Closed**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**26-50**	**>100**
Sub-Dominant	**0-25**	**None**
W less than 25	**133**	**0**
Buffer Vegitation Type		
Dominant	**Deciduous**	**Coniferous**
Sub-Dominant	**Herbaceous**	**Shrubs/Sapling**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Hay**	**None**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Peacham Hollow Brook**   Reach: **T1.03-B**

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 Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs **None**
Field Ditch:
Road Ditch:
Other:
Tile Drain:
Overland Flow:
Urb Strm Wtr Pipe:
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Instream Culvert	**22**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Above**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **0** Point: **0** Side: **2**
Diagonal: **0** Delta: **0** Island: **1** Braiding: **0**

5.2 Other Features
Flood chutes: **0**
Neck Cutoff: **0** Avulsion: **0** Head Cuts: **0** Trib Rejuv.: **No**

5.3 Steep Riffles and Head Cuts
Steep Riffles: **0**

5.4 Stream Ford or Animal Crossing: **Yes**
5.5 Straightening: **With Windrowing**
Straightening Length (ft.): **771**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type	Left	Right
6.8 Bank Stability:		
6.9 Bank Vegetation Protection		
6.10 Riparian Veg. Zone Width:		

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**	Score	STD	Historic
7.1 Channel Degradation	**4**	**None**	**Yes**
7.2 Channel Aggradation	**14**	**None**	**No**
7.3 Widening Channel	**10**	**None**	**No**
7.4 Change in Planforml	**10**	**None**	**Yes**
Total Score	**38**		

Geomorphic Rating	**0.47**
Channel Evolution Model	**F**
Channel Evolution Stage	**III**
Geomorphic Condition	**Fair**
Stream Sensitivity	**High**

Phase 2 Segment Summary Report   Stevens River

Stream: **Peacham Hollow Brook**
Reach: **T1.03-C**
Segment Length(ft): **2,004**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, C Haynes, S Pealer, G Alexander**
Completion Date: **6/15/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Audobon preserve, East Peacham village**

Step 5 - Notes: **Possible alluvial fan in segment, with several streams feeding into DS end of segment; may also have been sediments backed up behind glacial sediment dam (see T1.03B Step 5 comments). May have been a dam or some sort of other structure in downstream end of segment, though nothing has turned up on historic maps or any records (field evidence of some sort of wooden structure - not very substantial - was noted). Large wetland beyond road off LB is on older topos but not more recent ones; it does show up in VSWI. Charles and Thelma White wildlife observation deck (Audubon) in middle of segment. Wetland veg evident but not common; reed canary possibly hampering tree establishment. Heavy thunderstorms on 8/2/2010: Willow Brook is contributing some sediments, but Peacham Hollow Brook is mostly clear to US portion of this reach and is picking up sediments in T1.03 C and B. Bank toe stabilization common, failed in numerous places.**

Step 7 - Narrative: **widening and planform change with minor aggradation_D model evolution due to highly erodible characteristics of banks and limited evidence of incision**

Step 1. Valley and Floodplain

1.1 Segmentation: **Channel Dimensions**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	298	6	0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Flat	Flat
Continuous w/ Bank:	Always	Sometimes
Within 1 Bankfull W:	Always	Always
Texture:	Sand	Sand

1.5 Valley Features

Valley Width (ft): **800**
Width Determination: **Estimated**
Confinement Type: **VB**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **Yes**

1.6 Grade Controls: **None**

Stream: **Peacham Hollow Brook** Reach: **T1.03-C**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**22.00**	2.11 Riffle/Step Spacing:	**200 ft.**	2.13 Average Largest Particle on		
2.2 Max Depth (ft.):	**3.10**	2.12 Substrate Composition		Bed:	**10.8**	**inches**
2.3 Mean Depth (tf):	**2.60**	Bedrock:	**0.0 %**	Bar:	**4.5**	**inches**
2.4 Floodprone Width (ft.):	**392.00**	Boulder:	**4.0 %**	2.14 Stream Type		
2.5 Aband. Floodpn (ft.):	**3.10**	Cobble:	**10.0 %**	Stream Type:	**E**	
Human Elev FloodPln (ft.):		Coarse Gravel:	**26.0 %**	Bed Material:	**Gravel**	
2.6 Width/Depth Ratio:	**8.46**	Fine Gravel:	**27.0 %**	Subclass Slope:	**None**	
2.7 Entrenchment Ratio:	**17.82**	Sand:	**33.0 %**	Bed Form:	**Riffle-Pool**	
2.8 Incision Ratio:	**1.00**	Silt and Smaller:	**0.0 %**	Field Measured Slope:		
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type		
2.9 Sinuosity:	**Low**	Detritus:	**5.0 %**	Reference Stream Type:		
2.10 Riffles Type:	**Complete**	# Large Woody Debris:	**93**	Reference Bed Material:		
				Reference Subclass Slope:		
				Reference Bedform:		

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.):	**196.2**	**194.4**
Erosion Height (ft.):	**2.7**	**3.7**
Revetment Type:	**Rip-Rap**	**Rip-Rap**
Revetment Length:	**327.2**	**154.9**

Near Bank Vegetation Type	Left	Right
Dominant:	**Herbaceous**	**Herbaceous**
Sub-dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Bank Canopy		
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**	**>100**
W less than 25	**1,350**	**796**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Coniferous**
Sub-Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**
Sub-dominant	**None**	**Forest**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**One**	**3.0**

	Left	Right
Mass Failures		
Height		
Gullies Number	**1**	
Gullies Length	**5**	

Stream: **Peacham Hollow Brook**   Reach: **T1.03-C**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	**Abundant**	4.5 Flow Regulation Type	**None**	4.7 Stormwater Inputs			
4.2 Adjacent Wetlands:	**Abundant**	Flow Reg. Use:		Field Ditch:	**2**	Road Ditch:	**0**
4.3 Flow Status:	**Low**	Impoundments:		Other:	**0**	Tile Drain:	**0**
4.4 # of Debris Jams:	**1**	Impoundment Loc.:		Overland Flow:	**0**	Urb Strm Wtr Pipe:	**0**
		4.6 Up/Down Strm flow reg.:	**None**	4.9 # of Beaver Dams:			**0**
		(old) Upstrm Flow Reg.:		Affected Length (ft):			**0**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types		Diagonal:	**3**	5.2 Other Features		Neck Cutoff:	**0**	5.4 Stream Ford or Animal Crossing:	**Yes**
Mid:	**3**	Delta:	**5**	Flood chutes:	**1**	Avulsion:	**0**	5.5 Straightening:	**Straightening**
Point:	**3**	Island:	**3**	5.3 Steep Riffles and Head Cuts		Head Cuts:	**0**	Straightening Length (ft.):	**1,210**
Side:	**5**	Braiding:	**0**	Steep Riffles:	**1**	Trib Rejuv.:	**No**	5.5 Dredging:	**None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:		6.4 Sediment Deposition:	Stream Gradiant Type	Left	Right
6.2 Pool Substrate:		6.5 Channel Flow Status:	6.8 Bank Stability:		
6.3 Pool Variability:		6.6 Channel Alteration:	6.9 Bank Vegetation Protection		
Total Score:	**0**	6.7 Channel Sinuosity:	6.10 Riparian Veg. Zone Width:		
Habitat Rating:	**0.00**				
Habitat Stream Condition:					

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined** Score	STD	Historic		
7.1 Channel Degradation	**16**	**None**	**No**	Geomorphic Rating	**0.66**
7.2 Channel Aggradation	**14**	**None**	**No**	Channel Evolution Model	**D**
7.3 Widening Channel	**12**	**None**	**No**	Channel Evolution Stage	**IId**
7.4 Change in Planforml	**11**	**None**	**No**	Geomorphic Condition	**Good**
Total Score	**53**			Stream Sensitivity	**High**

Phase 2 Segment Summary Report Stevens River

Stream: **Peacham Hollow Brook**
Reach: **T1.04-0**
Segment Length(ft): **1,493**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **Ruddell, O'Brien**
Completion Date: **6/22/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **East Peacham Village**

Step 5 - Notes: **Stream lacks E planform because entire reach is straightened. Soil maps indicate much of the reach is located on dense till, but materials are silt and fine sandy loams.**
Borderline habitat departure toward plane bed is primarily due to windrowing, with only weak riffle formation, but there is also a short stretch of step-pool concentrated in upper 200 feet of reach.
Possible alluvial fan in reach, related to Willow Brook feeding into DS end; alternatively may have been sediments backed up behind glacial sediment dam where a glacial stream may have been impounded by sediments and then created a massive headcut when the jam let loose (see also T1.03B and T1.03C Step 5 comments). Terrace off RB (in shared floodplain with Willow Brook) was not accounted as a recently abandoned floodplain because it seems more likely this feature may be of glacial origin. Soil maps indicate both alluvial and glaciofluvial sediments in confluence between this reach (T1.04) and Willow Brook (to the south of this reach); bank composition in the field is obscured by extensive armoring, and the reach appears relatively stable at this point in time.

Step 7 - Narrative: **Aggradation and loss of planform following repeated windrowing, weak depositional features and shallow pools forming but probably not remainng stable. Channel evolution (anticipated to be primarily through lateral movement and planform change because of resistant bed - hence D-model evolution) impeded by windrowing and armoring.**

Step 1. Valley and Floodplain

1.1 Segmentation: **None**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	0		0	
Road:	776	3	0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	192		639	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Hilly	Hilly
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Sand	Sand

1.5 Valley Features
Valley Width (ft): **635**
Width Determination: **Estimated**
Confinement Type: **VB**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls: **None**

Stream: **Peacham Hollow Brook** Reach: **T1.04-0**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**20.00**	2.11 Riffle/Step Spacing:	**260 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**3.10**	2.12 Substrate Composition		Bed:	**25.9 inches**
2.3 Mean Depth (tf):	**1.99**	Bedrock:	**0.0 %**	Bar:	**4.7 inches**
2.4 Floodprone Width (ft.):	**115.20**	Boulder:	**4.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**3.10**	Cobble:	**26.0 %**	Stream Type:	**E**
Human Elev FloodPln (ft.):		Coarse Gravel:	**19.0 %**	Bed Material:	**Gravel**
2.6 Width/Depth Ratio:	**10.05**	Fine Gravel:	**19.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**5.76**	Sand:	**21.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.00**	Silt and Smaller:	**11.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Low**	Detritus:	**8.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**11**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Steep**

Bank Texture	Left	Right
Upper		
Material Type:	**Boulder/Cobble**	**Boulder/Cobble**
Consistency:	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type:	**Mix**	**Mix**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**0.0**	**19.2**
Erosion Height (ft.):	**0.0**	**2.0**
Revetment Type:	**Multiple**	**Rip-Rap**
Revetment Length:	**204.5**	**291.6**

Near Bank Vegetation Type	Left	Right
Dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Sub-dominant:	**Herbaceous**	**Coniferous**
Bank Canopy		
Canopy %:	**51-75**	**76-100**
Mid-Channel Canopy:	**Open**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**0-25**	**0-25**
Sub-Dominant	**26-50**	**>100**
W less than 25	**36**	**1,231**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Residential**	**Residential**
Sub-dominant	**Hay**	**Forest**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Peacham Hollow Brook** Reach: **T1.04-0**

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 Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs
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**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Instream Culvert	10	Yes	Yes	Yes	Yes	Deposition Below,Scour Above,Alignment
Bridge	22	Yes	Yes	No	No	None
Bridge	17.5	Yes	Yes	Yes	Yes	Scour Above,Alignment
Instream Culvert	8	Yes	Yes	Yes	Yes	Scour Below

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **1** Point: **4** Side: **2**
Diagonal: **0** Delta: **1** Island: **0** Braiding: **0**

5.2 Other Features
Flood chutes: **0**
Neck Cutoff: **0** Avulsion: **0** Head Cuts: **0** Trib Rejuv.: **Yes**
5.3 Steep Riffles and Head Cuts
Steep Riffles: **1**

5.4 Stream Ford or Animal Crossing: **Yes**
5.5 Straightening: **With Windrowing**
Straightening Length (ft.): **1,205**
5.5 Dredging: **Dredging**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type Left Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	9	None	No
7.2 Channel Aggradation	5	None	No
7.3 Widening Channel	13	None	No
7.4 Change in Planforml	10	None	No
Total Score	37		

Geomorphic Rating **0.46**
Channel Evolution Model **D**
Channel Evolution Stage **IIc**
Geomorphic Condition **Fair**
Stream Sensitivity **Extreme**

Phase 2 Segment Summary Report Stevens River

Stream:	Peacham Hollow Brook	SGAT Version:	4.56
Reach:	T1.05-0	Organization:	Caledonia County Conservation District
Segment Length(ft):	9,378	Observers:	D Ruddell, C Haynes
Rain:	Yes	Completion Date:	9/20/2010
		Qualtiy Control Status - Consultant:	Passed
		Qualtiy Control Status - Staff:	Provisional

Step 0 - Location: **~400' upstream of E. Peacham Village to Ewells Mills at Peacham-Danville Rd**

Step 5 - Notes: **Alternates between Reference-C in narrow valley and B-confined in areas near old mills and major road confinements. "Pulsing" with greater stream power in constricted areas, sediment dumps downstream of those. Manipulated both historically and recently.**

Step 7 - Narrative: **Aggradation contributing to planform change following historic incision and planform change due to mills and encroachments.**

Step 1. Valley and Floodplain

1.1 Segmentation: **None**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

	Length (ft)	One Height	Both	Height
Berm:	73	8	0	
Road:	2,542	8	0	
Railroad:	0		0	
Imp. Path:	38	10	0	
Dev.:	2,127		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Extr.Steep	Extr.Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Other	Other

1.5 Valley Features	
Valley Width (ft):	350
Width Determination:	Estimated
Confinement Type:	BD
In Rock Gorge:	No
Human Caused Change in Valley Width?:	Yes

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Ledge	Mid-segment	11.0	10.0	Yes	
Ledge	Mid-segment	3.0	3.0	Yes	
Ledge	Mid-segment	5.0	4.0	Yes	
Ledge	Mid-segment	4.0	2.0	Yes	

Stream: **Peacham Hollow Brook**   Reach: **T1.05-0**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**33.90**	2.11 Riffle/Step Spacing:	**60 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**3.45**	2.12 Substrate Composition		Bed:	**10.7** inches
2.3 Mean Depth (tf):	**2.29**	Bedrock:	**0.0 %**	Bar:	**9.1** inches
2.4 Floodprone Width (ft.):	**113.20**	Boulder:	**20.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**4.55**	Cobble:	**29.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**21.0 %**	Bed Material:	**Gravel**
2.6 Width/Depth Ratio:	**14.80**	Fine Gravel:	**6.0 %**	Subclass Slope:	**b**
2.7 Entrenchment Ratio:	**3.34**	Sand:	**24.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.32**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**10.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**1,104**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks   Typical Bank Slope: **Moderate**

Bank Texture	Left	Right	Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper			Erosion Length (ft.):	**199.6**	**132.9**	Dominant:	**Coniferous**	**Coniferous**
Material Type:	**Mix**	**Mix**	Erosion Height (ft.):	**4.0**	**2.7**	Sub-dominant:	**Herbaceous**	**Herbaceous**
Consistency:	**Non-cohesive**	**Non-cohesive**	Revetment Type:	**Multiple**	**Rip-Rap**	Bank Canopy		
Lower			Revetment Length:	**855.2**	**323.3**	Canopy %:	**76-100**	**76-100**
Material Type:	**Mix**	**Mix**				Mid-Channel Canopy:	**Closed**	
Consistency:	**Non-cohesive**	**Non-cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**0-25**	**26-50**
W less than 25	**123**	**324**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Coniferous**
Sub-Dominant	**Coniferous**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right		Left	Right
Dominant	**Forest**	**Forest**	Mass Failures		**8.84**
Sub-dominant	**Residential**	**Shrubs/Sapling**	Height		**10.0**
(Legacy)	Amount	Mean Hieght	Gullies Number	**0**	
Failures	**One**	**10.0**	Gullies Length	**0**	
Gullies	**None**				

Stream: **Peacham Hollow Brook** Reach: **T1.05-0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Abundant**
4.2 Adjacent Wetlands: **Minimal**
4.3 Flow Status: **Low**
4.4 # of Debris Jams: **48**

4.5 Flow Regulation Type **Small Withdrawal**
Flow Reg. Use: **Other**
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs
Field Ditch: **3** Road Ditch: **10**
Other: **0** Tile Drain: **3**
Overland Flow: **0** Urb Strm Wtr Pipe: **3**
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bridge	**29.5**	**Yes**	**Yes**	**Yes**	**No**	**Deposition Below**
Instream Culvert	**6**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Above,Scour Below**
Instream Culvert	**6**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Above**
Instream Culvert	**6**	**Yes**	**Yes**	**No**	**No**	**Deposition Above,Scour Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types Diagonal: **1**
Mid: **29** Delta: **1**
Point: **27** Island: **5**
Side: **34** Braiding: **0**

5.2 Other Features Neck Cutoff: **0**
Flood chutes: **24** Avulsion: **0**
5.3 Steep Riffles and Head Cuts Head Cuts: **0**
Steep Riffles: **22** Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **Yes**
5.5 Straightening: **With Windrowing**
Straightening Length (ft.): **4,257**
5.5 Dredging: **Gravel Mining**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type Left Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**	Score	STD	Historic
7.1 Channel Degradation	**10**	**None**	**Yes**
7.2 Channel Aggradation	**11**	**None**	**No**
7.3 Widening Channel	**12**	**None**	**No**
7.4 Change in Planforml	**10**	**None**	**No**
Total Score	**43**		

Geomorphic Rating	**0.54**
Channel Evolution Model	**F**
Channel Evolution Stage	**III**
Geomorphic Condition	**Fair**
Stream Sensitivity	**Very High**

Phase 2 Segment Summary Report Stevens River

Stream: **Peacham Hollow Brook**
Reach: **T1.06-A**
Segment Length(ft): **632**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell**
Completion Date: **10/4/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Ewell's Mills at Peacham-Danville Road upstream to widening below Still Run**

Step 5 - Notes: **Road has narrowed valley somewhat (minimal, not enough to change confinement), but valley is likely Semi-confined by reference. Bedrock grade controls continuous throughout the segment.**

Stage DI channel evolution selected for this segment assumes possibility of some historical adjustments. Extensive, significant mill history in this area. It seems likely that the stream had planform changes at some point, particularly given apparent entrenchment upstream (believe these are glacial terraces) and likelihood of significant adjustments when upstream dams at Still Run (both human and beaver) and/ or dams at Ewells Mills (DS in top of reach T1.05) were breached.

Assumption of glacial time frame for the upstream (Still Run) entrenchment, however, and nearly continuous presence of bedrock in this segment: it seems likely that historic (i.e., post-glacial) adjustments in this segment were likely to be widening and planform change, limited in extent due to narrow valley (by reference).

This segment (T1.06A) is a subreach: type A (10 pct slope_632 ft).
T1.06B was designated as Ph1 reference: Cb3 (~2.9 pct slope_692 ft). T1.06C was excluded due to beaver impoundments but is ~1.8 pct slope over 1956 ft (likely C4 reference but would be Cb if combined with T1.06B_reasons for segmentation were anthropogenic).

Step 7 - Narrative: **Minor widening and planform adjustments in response to alterations in watershed inputs (beaver dam blow-outs, upstream dams and straightening). Stage DI assumes historical adjustments - primarily widening and planform - would be limited in extent due to narrow valley (by reference); near-continuous bedrock prevents incision. See further comments in Step 5.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Planform and Scope**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	632	10	0	
Railroad:	0		0	
Imp. Path:	141	15	0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Extr.Steep	Extr.Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Always	Always
Texture:	Other	Other

1.5 Valley Features
Valley Width (ft): **50**
Width Determination: **Measured**
Confinement Type: **SC**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **Yes**

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Ledge	Mid-segment	51.0	49.0	Yes	

Stream: **Peacham Hollow Brook** Reach: **T1.06-A**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**22.60**	2.11 Riffle/Step Spacing:	**105 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**3.30**	2.12 Substrate Composition		Bed:	**11.5** inches
2.3 Mean Depth (tf):	**1.89**	Bedrock:	**35.0 %**	Bar:	**10.3** inches
2.4 Floodprone Width (ft.):	**32.30**	Boulder:	**24.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**3.30**	Cobble:	**10.0 %**	Stream Type:	**A**
Human Elev FloodPln (ft.):		Coarse Gravel:	**5.0 %**	Bed Material:	**Boulder**
2.6 Width/Depth Ratio:	**11.96**	Fine Gravel:	**7.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**1.43**	Sand:	**19.0 %**	Bed Form:	**Cascade**
2.8 Incision Ratio:	**1.00**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Low**	Detritus:	**15.0 %**	Reference Stream Type:	**A**
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**62**	Reference Bed Material:	**Boulder**
				Reference Subclass Slope:	**None**
				Reference Bedform:	**Cascade**

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Moderate**

Bank Texture	Left	Right
Upper		
Material Type:	**Mix**	**Mix**
Consistency:	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type:	**Bedrock**	**Bedrock**
Consistency:	**Cohesive**	**Cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**0.0**	**0.0**
Erosion Height (ft.):	**0.0**	**0.0**
Revetment Type:	**Rip-Rap**	**Rip-Rap**
Revetment Length:	**50.4**	**468.4**

Near Bank Vegetation Type	Left	Right
Dominant:	**Coniferous**	**Shrubs/Sapling**
Sub-dominant:	**Shrubs/Sapling**	**Herbaceous**
Bank Canopy		
Canopy %:	**76-100**	**76-100**
Mid-Channel Canopy:	**Closed**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**26-50**
Sub-Dominant	**None**	**None**
W less than 25	**0**	**32**
Buffer Vegitation Type		
Dominant	**Coniferous**	**Coniferous**
Sub-Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Residential**
Sub-dominant	**None**	**Forest**
(Legacy)	Amount	Mean Hieght
Failures	**One**	**20.0**
Gullies	**None**	

	Left	Right
Mass Failures	**40.06**	
Height	**20.0**	
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Peacham Hollow Brook** Reach: **T1.06-A**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	**Minimal**	4.5 Flow Regulation Type	**None**	4.7 Stormwater Inputs			
4.2 Adjacent Wetlands:	**Minimal**	Flow Reg. Use:		Field Ditch:	**1**	Road Ditch:	**2**
4.3 Flow Status:	**Low**	Impoundments:		Other:	**0**	Tile Drain:	**0**
4.4 # of Debris Jams:	**2**	Impoundment Loc.:		Overland Flow:	**0**	Urb Strm Wtr Pipe:	**0**
		4.6 Up/Down Strm flow reg.:	**None**	4.9 # of Beaver Dams:	**0**		
		(old) Upstrm Flow Reg.:		Affected Length (ft):	**0**		

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types		Diagonal:	**0**	5.2 Other Features		Neck Cutoff:	**0**	5.4 Stream Ford or Animal Crossing:	**No**
Mid:	**1**	Delta:	**0**	Flood chutes:	**4**	Avulsion:	**0**	5.5 Straightening:	**Straightening**
Point:	**0**	Island:	**1**	5.3 Steep Riffles and Head Cuts		Head Cuts:	**0**	Straightening Length (ft.):	**560**
Side:	**3**	Braiding:	**0**	Steep Riffles:	**2**	Trib Rejuv.:	**No**	5.5 Dredging:	**None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:		6.4 Sediment Deposition:		Stream Gradiant Type	Left	Right
6.2 Pool Substrate:		6.5 Channel Flow Status:		6.8 Bank Stability:		
6.3 Pool Variability:		6.6 Channel Alteration:		6.9 Bank Vegetation Protection		
Total Score:	**0**	6.7 Channel Sinuosity:		6.10 Riparian Veg. Zone Width:		
Habitat Rating:	**0.00**					
Habitat Stream Condition:						

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Confined** Score	STD	Historic		
7.1 Channel Degradation	**13**	**None**	**No**	Geomorphic Rating	**0.68**
7.2 Channel Aggradation	**13**	**None**	**No**	Channel Evolution Model	**D**
7.3 Widening Channel	**14**	**None**	**No**	Channel Evolution Stage	**I**
7.4 Change in Planforml	**14**	**None**	**No**	Geomorphic Condition	**Good**
Total Score	**54**			Stream Sensitivity	

Phase 2 Segment Summary Report   Stevens River

Stream: **Peacham Hollow Brook**
Reach: **T1.06-B**
Segment Length(ft): **692**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell**
Completion Date: **10/5/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Upstream of confined valley at Ewells Mills to Still Run beaver ponds**

Step 5 - Notes: **Although short, this seg (T1.06B) designated as Ph1 Cb3 reference (~2.9 pct slope_692 ft). T1.06A is A (10 pct slope_632 ft) and T1.06C was excluded due to beaver impoundments but is ~1.8 pct slope over 1956 ft (likely C4 reference). Significant recent land use changes (not apparent on '98 orthos) in next reach upstream (T1.07) but beaver-controlled area (T1.06C) in between.**

Current LVW is a high terrace (11 ft above thalweg) that appears likely to be of glacial origin; was originally accounted as LTER but reassessed as current LVW_ soils are glacial or dense till but fine to very fine sandy loam, well vegetated. RAF in step 2 is blank because of difficulty in determining if this feature is of glacial origin, or represents historic (i.e., post-glacial) incision.

Appears that glacial legacy in this area may be similar to dynamics noted for reaches T1.03 and 1.04, with glacial ponding that left massive incision when sediment dams that created these impoundments let loose; former low gradient valley would have been a Broad valley on the higher terrace rather than the current Narrow valley. Regardless, Cb to F stream type departure is due to current entrenchment and wide stream, accessing adjacent floodchutes at bankfull flows; debris jams and sudden migrations common.

Step 7 - Narrative: **Aggradation, widening, and planform change following historic incision (likely due in large part to glacial history, but dam history may have played a large role as well) down stream of old dam. Hard to determine if incision is historic (i.e., post-glacial); see further Step 5 comments. Good buffers currently present here are probably critical to bank stability; contribute CWD that is playing a large role in sediment retention and diffusion of stream power; and slow rate of channel evolution.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Planform and Scope**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	649	10	0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Very Steep	Very Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Other	Other

1.5 Valley Features
Valley Width (ft): **90**
Width Determination: **Measured**
Confinement Type: **NW**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **Yes**

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Ledge	Mid-segment	4.0	3.0	Yes	

Stream: **Peacham Hollow Brook** Reach: **T1.06-B**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**42.30**	2.11 Riffle/Step Spacing:	**77 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**2.75**	2.12 Substrate Composition		Bed:	**8.3 inches**
2.3 Mean Depth (tf):	**1.29**	Bedrock:	**0.0 %**	Bar:	**5.8 inches**
2.4 Floodprone Width (ft.):	**49.20**	Boulder:	**9.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):		Cobble:	**36.0 %**	Stream Type:	**F**
Human Elev FloodPln (ft.):		Coarse Gravel:	**11.0 %**	Bed Material:	**Gravel**
2.6 Width/Depth Ratio:	**32.79**	Fine Gravel:	**9.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**1.16**	Sand:	**35.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**0.00**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**15.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**44**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Moderate**

Bank Texture	Left	Right
Upper		
Material Type:	**Mix**	**Mix**
Consistency:	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type:	**Boulder/Cobble**	**Boulder/Cobble**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**0.0**	**0.0**
Erosion Height (ft.):	**0.0**	**0.0**
Revetment Type:	**Rip-Rap**	**Rip-Rap**
Revetment Length:	**28.7**	**268.0**

Near Bank Vegetation Type	Left	Right
Dominant:	**Deciduous**	**Deciduous**
Sub-dominant:	**Shrubs/Sapling**	**Coniferous**
Bank Canopy		
Canopy %:	**76-100**	**76-100**
Mid-Channel Canopy:	**Closed**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**51-100**
Sub-Dominant	**None**	**26-50**
W less than 25	**0**	**0**
Buffer Vegitation Type		
Dominant	**Deciduous**	**Deciduous**
Sub-Dominant	**Shrubs/Sapling**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**None**	**Residential**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Peacham Hollow Brook** Reach: **T1.06-B**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Minimal**

4.2 Adjacent Wetlands: **Minimal**

4.3 Flow Status: **Moderate**

4.4 # of Debris Jams: **0**

4.5 Flow Regulation Type **None**

Flow Reg. Use:

Impoundments:

Impoundment Loc.:

4.6 Up/Down Strm flow reg.: **None**

(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs

Field Ditch: **0** Road Ditch: **2**

Other: **0** Tile Drain: **0**

Overland Flow: **0** Urb Strm Wtr Pipe: **0**

4.9 # of Beaver Dams: **1**

Affected Length (ft): **50**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Instream Culvert	**5.8**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid: **0** Diagonal: **0**

Point: **2** Delta: **0**

Side: **1** Island: **0**

Braiding: **0**

5.2 Other Features

Flood chutes: **4**

Neck Cutoff: **0**

Avulsion: **0**

5.3 Steep Riffles and Head Cuts

Steep Riffles: **3**

Head Cuts: **0**

Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **No**

5.5 Straightening: **Straightening**

Straightening Length (ft.): **524**

5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:

6.2 Pool Substrate:

6.3 Pool Variability:

Total Score: **0**

Habitat Rating: **0.00**

Habitat Stream Condition:

6.4 Sediment Deposition:

6.5 Channel Flow Status:

6.6 Channel Alteration:

6.7 Channel Sinuosity:

Stream Gradiant Type — Left — Right

6.8 Bank Stability:

6.9 Bank Vegetation Protection

6.10 Riparian Veg. Zone Width:

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	**9**	**None**	**No**
7.4 Change in Planforml	**10**	**None**	**No**
Total Score	**34**		

Geomorphic Rating **0.43**

Channel Evolution Model **F**

Channel Evolution Stage **IV**

Geomorphic Condition **Fair**

Stream Sensitivity

Phase 2 Segment Summary Report Stevens River

Stream: **Peacham Hollow Brook**
Reach: **T1.06-C**
Segment Length(ft): **1,956**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell**
Completion Date: **10/5/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**
Why Not Assessed: **beaver dam**

Step 0 - Location: **Start of beaver ponds upstream of Still Run to Slack St/Bayley Hazen Rd junction**

Step 5 - Notes: **Multiple beaver dams and high tree mortality through much of segment_beavers have built on foundation of an old human dam just US of Still Run at base of this segment (T1.06C). Overall slope for this segment (1956 ft) is ~1.8 pct, and next segment DS (T1.06B) is ~2.9 pct over 700 ft_assumed that overall reference for reach is Cb riffle-pool. T1.06A at base of reach is ~10 pct slope over 632 ft.**

Step 7 - Narrative:

Step 1. Valley and Floodplain

1.1 Segmentation: **Other Reason**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	0		0	
Road:	0		0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Flat	Flat
Continuous w/ Bank:	Always	Always
Within 1 Bankfull W:	Always	Always
Texture:	Sand	Sand

1.5 Valley Features
Valley Width (ft): **850**
Width Determination: **Estimated**
Confinement Type: **VB**
In Rock Gorge:
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls: **None**

Stream: **Peacham Hollow Brook** Reach: **T1.06-C**

Step 2. Stream Channel

2.1Bankfull Width (ft.):		2.11 Riffle/Step Spacing:		2.13 Average Largest Particle on	
2.2 Max Depth (ft.):		2.12 Substrate Composition		Bed:	
2.3 Mean Depth (tf):		Bedrock:	**%**	Bar:	
2.4 Floodprone Width (ft.):		Boulder:	**%**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):		Cobble:	**%**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**%**	Bed Material:	**Gravel**
2.6 Width/Depth Ratio:	**0.00**	Fine Gravel:	**%**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**0.00**	Sand:	**%**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**0.00**	Silt and Smaller:	**%**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:		2.15 Sub-reach Stream Type	
2.9 Sinuosity:		Detritus:	**0.0 %**	Reference Stream Type:	
2.10 Riffles Type:		# Large Woody Debris:		Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Undercut**

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

Bank Erosion	Left	Right
Erosion Length (ft.):	**0.0**	**0.0**
Erosion Height (ft.):	**0.0**	**0.0**
Revetment Type:	**Rip-Rap**	**None**
Revetment Length:	**95.7**	**0.0**

Near Bank Vegetation Type	Left	Right
Dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Sub-dominant:	**Herbaceous**	**Herbaceous**
Bank Canopy		
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 Vegitation Type		
Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**
Sub-Dominant	**Mixed Trees**	**Mixed Trees**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**
Sub-dominant	**Forest**	**Forest**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Peacham Hollow Brook** Reach: **T1.06-C**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Abundant**
4.2 Adjacent Wetlands: **Abundant**
4.3 Flow Status: **Moderate**
4.4 # of Debris Jams: **2**

4.5 Flow Regulation Type **None**
Flow Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs **None**
Field Ditch:
Road Ditch:
Other:
Tile Drain:
Overland Flow:
Urb Strm Wtr Pipe:
4.9 # of Beaver Dams: **6**
Affected Length (ft): **1100**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Diagonal:
Mid:
Delta:
Point:
Island:
Side:
Braiding: **0**

5.2 Other Features
Flood chutes: **1**
5.3 Steep Riffles and Head Cuts
Steep Riffles: **0**
Neck Cutoff: **0**
Avulsion: **0**
Head Cuts: **0**
Trib Rejuv.:

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **Straightening**
Straightening Length (ft.): **112**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score:
Habitat Rating:
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type — Left — Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	Score	STD	Historic
7.1 Channel Degradation			
7.2 Channel Aggradation			
7.3 Widening Channel			
7.4 Change in Planforml			
Total Score			

Geomorphic Rating
Channel Evolution Model
Channel Evolution Stage
Geomorphic Condition
Stream Sensitivity

Phase 2 Segment Summary Report Stevens River

Stream: **Peacham Hollow Brook**
Reach: **T1.07-A**
Segment Length(ft): **3,087**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, E McLane**
Completion Date: **10/6/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Slack Street and Bayley-Hazen Road junction to ~500 feet downstream of Butternut Hill Road.**

Step 5 - Notes: **Development and road fill encroachments=intermittent valley narrowing but not enough to change confinement. Knotweed at center of Slack and Bayley-Hazen Jct is currently still away from stream. Potential project: Slack Street, just upstream of Bayley-Hazen, headcutting in southwest ditch off roadside (recent flash flooding impact). Much of the 3.6% slope is accounted in grade controls- "Cb" may actually be C-type with interspersed grade controls. Flow Reg upstream is a small recreational pond at the head of the reach (T107C) where there has also been significant forest cutting (visible between 1998 orthos and 2009 NAIPs). Fieldwork on T107C originally tracked up an unmapped tributary in the area of recent forest cutting, which at this point in time appears to be larger than the mapped T107_unclear of the relationship between the cutting and the flow levels of that trib.**

Aggradation in this seg (T107A) is heavily influenced by very recent microburst activity and may be masking recent incision thorugh 'washouts' with more recent aggradation.

Step 7 - Narrative: **Active adjustments to recent changes in flow and inputs and straightening upstream, exacerbated by very recent microburst impacts. Recent incision followed, and likley masked, by aggradation "washouts" but not yet manifesting as widening.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Planform and Scope**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	252	10	0	
Road:	860	0	148	8
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	203		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Steep	Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Other	Other

1.5 Valley Features

Valley Width (ft): **220**
Width Determination: **Measured**
Confinement Type: **VB**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **Yes**

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Ledge	Mid-segment	3.0	2.0	No	
Ledge	Mid-segment	9.0	7.0	No	
Ledge	Mid-segment	7.0	6.0	No	

Stream: **Peacham Hollow Brook** Reach: **T1.07-A**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**20.20**	2.11 Riffle/Step Spacing:	**64 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**2.55**	2.12 Substrate Composition		Bed:	**4.2** **inches**
2.3 Mean Depth (tf):	**1.01**	Bedrock:	**0.0 %**	Bar:	**1.8** **inches**
2.4 Floodprone Width (ft.):	**108.20**	Boulder:	**19.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**4.00**	Cobble:	**37.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**6.0 %**	Bed Material:	**Cobble**
2.6 Width/Depth Ratio:	**20.00**	Fine Gravel:	**6.0 %**	Subclass Slope:	**b**
2.7 Entrenchment Ratio:	**5.36**	Sand:	**32.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.57**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**12.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**204**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Undercut**

Bank Texture	Left	Right
Upper		
Material Type:	**Mix**	**Mix**
Consistency:	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type:	**Boulder/Cobble**	**Boulder/Cobble**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**48.9**	**75.4**
Erosion Height (ft.):	**2.0**	**2.0**
Revetment Type:	**None**	**Rip-Rap**
Revetment Length:	**0.0**	**142.7**

Near Bank Vegetation Type	Left	Right
Dominant:	**Coniferous**	**Deciduous**
Sub-dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Bank Canopy		
Canopy %:	**76-100**	**76-100**
Mid-Channel Canopy:	**Closed**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**26-50**	**0-25**
W less than 25	**233**	**29**
Buffer Vegitation Type		
Dominant	**Coniferous**	**Coniferous**
Sub-Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Residential**	**None**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Peacham Hollow Brook** Reach: **T1.07-A**

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: **24**

4.5 Flow Regulation Type **Small Withdrawal**

Flow Reg. Use: **Other**

Impoundments:

Impoundment Loc.:

4.6 Up/Down Strm flow reg.: **None**

(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs

Field Ditch: **0** Road Ditch: **4**

Other: **0** Tile Drain: **0**

Overland Flow: **0** Urb Strm Wtr Pipe: **0**

4.9 # of Beaver Dams: **0**

Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Instream Culvert	**4.6**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Above,Deposition Below,Scour Below**
Instream Culvert	**2.4**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Above,Scour Above,Scour Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid: **10**	Diagonal: **2**		
Point: **9**	Delta: **0**		
Side: **7**	Island: **1**		
	Braiding: **0**		

5.2 Other Features

Flood chutes: **20**

Neck Cutoff: **0**

Avulsion: **0**

Head Cuts: **0**

Trib Rejuv.: **No**

5.3 Steep Riffles and Head Cuts

Steep Riffles: **4**

5.4 Stream Ford or Animal Crossing: **No**

5.5 Straightening: **Straightening**

Straightening Length (ft.): **1,826**

5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:

6.2 Pool Substrate:

6.3 Pool Variability:

Total Score: **0**

Habitat Rating: **0.00**

Habitat Stream Condition:

6.4 Sediment Deposition:

6.5 Channel Flow Status:

6.6 Channel Alteration:

6.7 Channel Sinuosity:

Stream Gradiant Type Left Right

6.8 Bank Stability:

6.9 Bank Vegetation Protection

6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**	Score	STD	Historic
7.1 Channel Degradation	**9**	**None**	**No**
7.2 Channel Aggradation	**11**	**None**	**No**
7.3 Widening Channel	**11**	**None**	**No**
7.4 Change in Planforml	**10**	**None**	**No**
Total Score	**41**		

Geomorphic Rating	**0.51**
Channel Evolution Model	**F**
Channel Evolution Stage	**III**
Geomorphic Condition	**Fair**
Stream Sensitivity	**High**

Phase 2 Segment Summary Report   Stevens River

Stream: **Peacham Hollow Brook**
Reach: **T1.07-B**
Segment Length(ft): **1,296**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, E McLane**
Completion Date: **10/12/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Where valley wall pinches downstream of Butternut Farm on Slack Street to valley wall widening as Slack Street swings away from stream**

Step 5 - Notes: **Segment includes a section of stream just DS of entrance to Butternut Hill Farm where stream was rerouted through a culvert under the entrance drive, effectively removing a meander that used to cross under the road to the valley wall and then back under the road again. Recent microburst went through this culvert and tore out both banks and scoured the bed to bedrock. Segment slope is ~5.6 pct, but much of this is accounted in multiple small ledge grade controls. W/D ratio is within parameters for E-type stream, but segment appears an anomaly due to very recent impacts of microburst storm and is expected to rapidlyu evolve back toward C dimensions.**
Flow Reg upstream is a small recreational pond at the head of the reach (T107C) where there has also been significant tree cutting (visible between 1998 orthos and 2009 NAIPs). Fieldwork on T107C originally tracked up an unmapped tributary in the area of recent cutting, which at this point in time appears to be larger than the mapped T107_unclear of the relationship between the cutting and the flow levels of that trib.

Step 7 - Narrative: **Loss of planform due to straightening: recent flash flood scoured to bedrock and tore banks out in mid-segment. 'Other' stream type departure is a Cb to Eb; current low w/d ratio (basis of Eb typing) is an anomaly due to very recent nature of impacts from microburst; stream is likely to start widening back toward Cb dimensions in relatively short order, particularly in areas of 4-5 ft erosion at base of both banks at riffle sections.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Grade Controls**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	0		0	
Road:	1,296	0	0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Extr.Steep	Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Cobble	Cobble

1.5 Valley Features
Valley Width (ft): **108**
Width Determination: **Measured**
Confinement Type: **NW**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **Yes**

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Ledge	Mid-segment	5.0	4.0	Yes	
Ledge	Mid-segment	3.0	3.0	Yes	
Ledge	Mid-segment	3.0	3.0	No	
Ledge	Mid-segment	4.0	3.0	Yes	
Ledge	Mid-segment	6.0	5.0	Yes	
Ledge	Mid-segment	3.0	2.0	No	
Ledge	Mid-segment	1.0	0.0	No	
Ledge	Mid-segment	3.0	2.0	No	

Stream: **Peacham Hollow Brook**   Reach: **T1.07-B**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**9.90**	2.11 Riffle/Step Spacing:	**56.5 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**1.50**	2.12 Substrate Composition		Bed:	**5** inches
2.3 Mean Depth (tf):	**1.13**	Bedrock:	**0.0 %**	Bar:	**1.5** inches
2.4 Floodprone Width (ft.):	**42.10**	Boulder:	**15.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**2.00**	Cobble:	**24.0 %**	Stream Type:	**E**
Human Elev FloodPln (ft.):		Coarse Gravel:	**8.0 %**	Bed Material:	**Gravel**
2.6 Width/Depth Ratio:	**8.76**	Fine Gravel:	**14.0 %**	Subclass Slope:	**b**
2.7 Entrenchment Ratio:	**4.25**	Sand:	**38.0 %**	Bed Form:	**Plane Bed**
2.8 Incision Ratio:	**1.33**	Silt and Smaller:	**4.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Low**	Detritus:	**15.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**121**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Undercut**

Bank Texture	Left	Right
Upper		
Material Type:	**Mix**	**Mix**
Consistency:	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type:	**Boulder/Cobble**	**Boulder/Cobble**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**189.7**	**155.4**
Erosion Height (ft.):	**4.4**	**4.6**
Revetment Type:	**Rip-Rap**	**Rip-Rap**
Revetment Length:	**93.3**	**92.6**

Near Bank Vegetation Type	Left	Right
Dominant:	**Coniferous**	**Coniferous**
Sub-dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Bank Canopy		
Canopy %:	**51-75**	**51-75**
Mid-Channel Canopy:	**Open**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**26-50**	**26-50**
Sub-Dominant	**>100**	**51-100**
W less than 25	**0**	**0**
Buffer Vegitation Type		
Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**
Sub-Dominant	**Herbaceous**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Shrubs/Sapling**	**Residential**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Peacham Hollow Brook** Reach: **T1.07-B**

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: **9**

4.5 Flow Regulation Type **Small Bypass**
Flow Reg. Use: **Recreation**
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs
Field Ditch: **0** Road Ditch: **3**
Other: **0** Tile Drain: **0**
Overland Flow: **0** Urb Strm Wtr Pipe: **0**
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Instream Culvert	**4.6**	**Yes**	**Yes**	**Yes**	**Yes**	**Scour Below**
Bridge	**6.5**	**Yes**	**Yes**	**Yes**	**Yes**	**None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types Diagonal: **1**
Mid: **0** Delta: **0**
Point: **4** Island: **0**
Side: **1** Braiding: **0**

5.2 Other Features Neck Cutoff: **0**
Flood chutes: **6** Avulsion: **0**
5.3 Steep Riffles and Head Cuts Head Cuts: **0**
Steep Riffles: **0** Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **Yes**
5.5 Straightening: **Straightening**
Straightening Length (ft.): **1,029**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type Left Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**	Score	STD	Historic
7.1 Channel Degradation	**5**	**Other**	**No**
7.2 Channel Aggradation	**10**	**None**	**No**
7.3 Widening Channel	**6**	**None**	**No**
7.4 Change in Planforml	**7**	**None**	**No**
Total Score	**28**		

Geomorphic Rating	**0.35**
Channel Evolution Model	**F**
Channel Evolution Stage	**III**
Geomorphic Condition	**Poor**
Stream Sensitivity	**Extreme**

Phase 2 Segment Summary Report Stevens River

Stream: **Peacham Hollow Brook**
Reach: **T1.07-C**
Segment Length(ft): **2,047**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, E McLane**
Completion Date: **10/18/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Back Achers property after stream swings away from Slack Street**

Step 5 - Notes: **T107C is currently smaller than an unmapped tributary that departs west from a confluence near the base of this segment_that trib appears to be contributing significantly to recent high flows in microburst storms. Section of T107C DS of confluence with unmapped trib appears to have had recent cedar blowdown and salvage log job, and fords were corduroyed with cedar slash that remained afterward_braiding, debris jams and flood chutes common in this low-slope area near base of seg. Small recreational pond at top of T107C, but there appears to be sufficient flood plain if it ever blows. A couple of short, narrowed parts of valley at grade controls, and grade controls account for a good bit of slope: overall seg slope ~4.6 pct but ~ 3.7 pct when grade controls are accounted.**

Step 7 - Narrative: **Some recent incision - pond outlet concentrates flow at top of marsh, extensive clearing. Corduroy at base of marsh (for a logging road) alters planform but retains sediments.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Planform and Scope**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	470	0	0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Very Steep	Very Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Other	Other

1.5 Valley Features
Valley Width (ft): **170**
Width Determination: **Measured**
Confinement Type: **VB**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Ledge	Mid-segment	7.0	7.0	No	
Ledge	Mid-segment	6.0	6.0	No	
Ledge	Mid-segment	4.0	4.0	Yes	
Dam	Mid-segment	10.0	2.0	Yes	

Stream: **Peacham Hollow Brook** Reach: **T1.07-C**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**13.10**	2.11 Riffle/Step Spacing:	**71.7 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**1.70**	2.12 Substrate Composition		Bed:	**1.1 inches**
2.3 Mean Depth (tf):	**0.87**	Bedrock:	**0.0 %**	Bar:	**0.7 inches**
2.4 Floodprone Width (ft.):	**106.10**	Boulder:	**0.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**2.50**	Cobble:	**4.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**13.0 %**	Bed Material:	**Sand**
2.6 Width/Depth Ratio:	**15.06**	Fine Gravel:	**23.0 %**	Subclass Slope:	**b**
2.7 Entrenchment Ratio:	**8.10**	Sand:	**57.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.47**	Silt and Smaller:	**3.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**10.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**62**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Shallow**

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

Bank Erosion	Left	Right
Erosion Length (ft.):	**0.0**	**19.4**
Erosion Height (ft.):	**0.0**	**3.0**
Revetment Type:	**None**	**None**
Revetment Length:	**0.0**	**0.0**

Near Bank Vegetation Type	Left	Right
Dominant:	**Coniferous**	**Coniferous**
Sub-dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Bank Canopy		
Canopy %:	**76-100**	**76-100**
Mid-Channel Canopy:	**Closed**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**26-50**	**26-50**
W less than 25	**0**	**0**
Buffer Vegitation Type		
Dominant	**Coniferous**	**Shrubs/Sapling**
Sub-Dominant	**Shrubs/Sapling**	**Coniferous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Shrubs/Sapling**	**Shrubs/Sapling**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **Peacham Hollow Brook** Reach: **T1.07-C**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	**Abundant**	4.5 Flow Regulation Type	**Small Run of River**	4.7 Stormwater Inputs	**None**
4.2 Adjacent Wetlands:	**Abundant**	Flow Reg. Use:	**Recreation**	Field Ditch:	Road Ditch:
4.3 Flow Status:	**Low**	Impoundments:		Other:	Tile Drain:
4.4 # of Debris Jams:	**13**	Impoundment Loc.:		Overland Flow:	Urb Strm Wtr Pipe:
		4.6 Up/Down Strm flow reg.:	**None**	4.9 # of Beaver Dams:	**0**
		(old) Upstrm Flow Reg.:		Affected Length (ft):	**0**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types		Diagonal:	**1**	5.2 Other Features		Neck Cutoff:	**0**	5.4 Stream Ford or Animal Crossing:	**Yes**
Mid:	**2**	Delta:	**0**	Flood chutes:	**6**	Avulsion:	**0**	5.5 Straightening:	**Straightening**
Point:	**4**	Island:	**0**	5.3 Steep Riffles and Head Cuts		Head Cuts:	**0**	Straightening Length (ft.):	**495**
Side:	**0**	Braiding:	**2**	Steep Riffles:	**0**	Trib Rejuv.:	**No**	5.5 Dredging:	**None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:		6.4 Sediment Deposition:	Stream Gradiant Type	Left	Right
6.2 Pool Substrate:		6.5 Channel Flow Status:	6.8 Bank Stability:		
6.3 Pool Variability:		6.6 Channel Alteration:	6.9 Bank Vegetation Protection		
Total Score:	**0**	6.7 Channel Sinuosity:	6.10 Riparian Veg. Zone Width:		
Habitat Rating:	**0.00**				
Habitat Stream Condition:					

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined** Score	STD	Historic		
7.1 Channel Degradation	**12**	**None**	**No**	Geomorphic Rating	**0.64**
7.2 Channel Aggradation	**13**	**None**	**No**	Channel Evolution Model	**F**
7.3 Widening Channel	**13**	**None**	**No**	Channel Evolution Stage	**II**
7.4 Change in Planforml	**13**	**None**	**No**	Geomorphic Condition	**Fair**
Total Score	**51**			Stream Sensitivity	**Very High**

Phase 2 Segment Summary Report Stevens River

Stream: **South Peacham Brook**
Reach: **T2.01-0**
Segment Length(ft): **5,816**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, C Haynes**
Completion Date: **9/7/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Confluence with Stevens mainstem and Peacham Hollow Brook (Peacham-Barnet Rd/E. PeachamRd) to opening at downstream end of Choate field.**

Step 5 - Notes: **Although the shared floodplain with the Stevens mainstem at the confluence of T2.01 is a broader valley than the bulk of the reach, T2.01 was not segmented for assessment because only the section downstream of the West Barnet Rd bridge (less than 700 ft) has access to that broader valley. Although not apparent on topographic maps in either situation, the same is true at the upstream end of the reach where the valley does not widen until US of a private bridge over an old dam site, less than 600 ft from the T2.02 reach break.**

There is no dam present at the upstream site now, and no real remains; now only has a low stone structure for recreational in -stream pool, and the private bridge built over the old remains is high above the stream.

A couple of old mill remains in reach. Slope (~1.7 pct) and confinement place reach at border of riffle_step-pool systems; one spot in map 4 is classic disorganized plane bed-neither steps or riffles setting up.

Step 4 Upstream flow regulation is dam DS of Harvey's Lake: seasonal installation and removal of flashboards to control lake levels appears to be contributing to 'pulse flows' in this reach that may be slowing channel evolution, with sediment 'slugs' moving thorugh system based on intermittent flow changes

Step 7 - Narrative: **Aggradation and planform change occuring in conjunction with "pulse flows"- sediment slugs moving periodically reduced flows in between.**

Step 1. Valley and Floodplain

1.1 Segmentation: **None**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	0		0	
Road:	2,346	7	0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	174		0	

1.4 Adjacent Side

	Left	Right
Hillside Slope:	Very Steep	Very Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Boulder	Boulder

1.5 Valley Features

Valley Width (ft): **220**
Width Determination: **Measured**
Confinement Type: **NW**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls: **None**

Stream: **South Peacham Brook** Reach: **T2.01-0**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**43.80**	2.11 Riffle/Step Spacing:	**80 ft.**	2.13 Average Largest Particle on			
2.2 Max Depth (ft.):	**3.65**	2.12 Substrate Composition			Bed:	**9.1**	**inches**
2.3 Mean Depth (tf):	**2.67**	Bedrock:	**0.0 %**		Bar:	**7.2**	**inches**
2.4 Floodprone Width (ft.):	**157.20**	Boulder:	**28.0 %**	2.14 Stream Type			
2.5 Aband. Floodpn (ft.):	**4.55**	Cobble:	**43.0 %**	Stream Type:	**C**		
Human Elev FloodPln (ft.):		Coarse Gravel:	**6.0 %**	Bed Material:	**Cobble**		
2.6 Width/Depth Ratio:	**16.40**	Fine Gravel:	**11.0 %**	Subclass Slope:	**None**		
2.7 Entrenchment Ratio:	**3.59**	Sand:	**12.0 %**	Bed Form:	**Riffle-Pool**		
2.8 Incision Ratio:	**1.25**	Silt and Smaller:	**0.0 %**	Field Measured Slope:			
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type			
2.9 Sinuosity:	**Moderate**	Detritus:	**15.0 %**	Reference Stream Type:			
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**359**	Reference Bed Material:			
				Reference Subclass Slope:			
				Reference Bedform:			

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Steep**

Bank Texture	Left	Right
Upper		
Material Type:	**Mix**	**Mix**
Consistency:	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type:	**Boulder/Cobble**	**Boulder/Cobble**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**59.1**	**0.0**
Erosion Height (ft.):	**2.6**	**0.0**
Revetment Type:	**Multiple**	**Rip-Rap**
Revetment Length:	**524.0**	**375.0**

Near Bank Vegetation Type	Left	Right
Dominant:	**Herbaceous**	**Herbaceous**
Sub-dominant:	**Coniferous**	**Coniferous**
Bank Canopy		
Canopy %:	**76-100**	**76-100**
Mid-Channel Canopy:	**Closed**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**26-50**	**0-25**
W less than 25	**400**	**390**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Coniferous**	**Coniferous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Residential**	**Hay**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **South Peacham Brook** Reach: **T2.01-0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	**Minimal**	4.5 Flow Regulation Type	**None**	4.7 Stormwater Inputs			
4.2 Adjacent Wetlands:	**Minimal**	Flow Reg. Use:		Field Ditch:	**0**	Road Ditch:	**3**
4.3 Flow Status:	**Low**	Impoundments:		Other:	**0**	Tile Drain:	**0**
4.4 # of Debris Jams:	**7**	Impoundment Loc.:		Overland Flow:	**0**	Urb Strm Wtr Pipe:	**0**
		4.6 Up/Down Strm flow reg.:	**Up Stream**	4.9 # of Beaver Dams:			**0**
		(old) Upstrm Flow Reg.:	**Store-release Dam**	Affected Length (ft):			**0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bridge	**29.5**	**Yes**	**Yes**	**Yes**	**No**	**Deposition Above,Deposition Below,Alignment**
Bridge	**30**	**Yes**	**Yes**	**Yes**	**No**	**Deposition Above,Alignment**
Bridge	**38**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Above,Deposition Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types		Diagonal:	**1**	5.2 Other Features		Neck Cutoff:	**0**	5.4 Stream Ford or Animal Crossing:	**No**
Mid:	**10**	Delta:	**1**	Flood chutes:	**11**	Avulsion:	**1**	5.5 Straightening:	**Straightening**
Point:	**11**	Island:	**3**	5.3 Steep Riffles and Head Cuts		Head Cuts:	**0**	Straightening Length (ft.):	**2,387**
Side:	**13**	Braiding:	**3**	Steep Riffles:	**12**	Trib Rejuv.:	**No**	5.5 Dredging:	**Dredging**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:		6.4 Sediment Deposition:	Stream Gradiant Type	Left	Right
6.2 Pool Substrate:		6.5 Channel Flow Status:	6.8 Bank Stability:		
6.3 Pool Variability:		6.6 Channel Alteration:	6.9 Bank Vegetation Protection		
Total Score:	**0**	6.7 Channel Sinuosity:	6.10 Riparian Veg. Zone Width:		
Habitat Rating:	**0.00**				
Habitat Stream Condition:					

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined** Score	STD	Historic		
7.1 Channel Degradation	**11**	**None**	**No**	Geomorphic Rating	**0.52**
7.2 Channel Aggradation	**10**	**None**	**No**	Channel Evolution Model	**F**
7.3 Widening Channel	**11**	**None**	**No**	Channel Evolution Stage	**III**
7.4 Change in Planforml	**10**	**None**	**No**	Geomorphic Condition	**Fair**
Total Score	**42**			Stream Sensitivity	**High**

Phase 2 Segment Summary Report **Stevens River**

Stream:	**South Peacham Brook**	SGAT Version:	**4.56**
Reach:	**T2.02-A**	Organization:	**Caledonia County Conservation District**
Segment Length(ft):	**3,900**	Observers:	**Ruddell, Haynes**
Rain:	**Yes**	Completion Date:	**9/15/2010**
		Qualtiy Control Status - Consultant:	**Passed**
		Qualtiy Control Status - Staff:	**Provisional**

Step 0 - Location: **Extent of Choate fields both downstream and upstream of the farm buildings**

Step 5 - Notes: **Downstream portion after stream leaves woods appears ditched and is a nearly continuous pool: xsect taken in upstream portion of segment which has not been ditched.**
Old dam site in most upstream portion is braided through old legacy sediments:
large, nearly continuous debris jams in this area.
Step 4 Upstream flow regulation is dam DS of Harvey's Lake: seasonal installation and removal of flashboards to control lake levels

Step 7 - Narrative: **Channel appears ditched, subsequent widening and planfom adjustment limited by extensive riprap**

Step 1. Valley and Floodplain

1.1 Segmentation: **Channel Dimensions**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	**0**		**0**	
Road:	**332**	**0**	**0**	
Railroad:	**0**		**0**	
Imp. Path:	**593**	**4**	**0**	
Dev.:	**441**		**0**	

1.4 Adjacent Side	Left	Right
Hillside Slope:	**Hilly**	**Hilly**
Continuous w/ Bank:	**Sometimes**	**Sometimes**
Within 1 Bankfull W:	**Always**	**Always**
Texture:	**Sand**	**Sand**

1.5 Valley Features

Valley Width (ft):	**670**
Width Determination:	**Measured**
Confinement Type:	**VB**
In Rock Gorge:	**No**
Human Caused Change in Valley Width?:	**No**

1.6 Grade Controls: **None**

Stream: **South Peacham Brook** Reach: **T2.02-A**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**25.50**	2.11 Riffle/Step Spacing:	**400 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**4.10**	2.12 Substrate Composition		Bed:	**2.6** **inches**
2.3 Mean Depth (tf):	**2.99**	Bedrock:	**0.0 %**	Bar:	**0.9** **inches**
2.4 Floodprone Width (ft.):	**485.50**	Boulder:	**5.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**6.60**	Cobble:	**4.0 %**	Stream Type:	**E**
Human Elev FloodPln (ft.):		Coarse Gravel:	**23.0 %**	Bed Material:	**Gravel**
2.6 Width/Depth Ratio:	**8.53**	Fine Gravel:	**19.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**19.04**	Sand:	**38.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.61**	Silt and Smaller:	**11.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**Yes**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**6.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**218**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

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.):	**194.6**	**546.2**
Erosion Height (ft.):	**2.4**	**3.6**
Revetment Type:	**Rip-Rap**	**Rip-Rap**
Revetment Length:	**1,374.5**	**816.1**

Near Bank Vegetation Type	Left	Right
Dominant:	**Herbaceous**	**Herbaceous**
Sub-dominant:	**Coniferous**	**Coniferous**
Bank Canopy		
Canopy %:	**26-50**	**26-50**
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	**2,492**	**2,591**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Coniferous**	**Coniferous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Pasture**	**Pasture**
Sub-dominant	**Forest**	**Forest**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **South Peacham Brook**   Reach: **T2.02-A**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	**Minimal**	4.5 Flow Regulation Type	**None**	4.7 Stormwater Inputs			
4.2 Adjacent Wetlands:	**Minimal**	Flow Reg. Use:		Field Ditch:	**3**	Road Ditch:	**3**
4.3 Flow Status:	**Low**	Impoundments:		Other:	**1**	Tile Drain:	**1**
4.4 # of Debris Jams:	**4**	Impoundment Loc.:		Overland Flow:	**1**	Urb Strm Wtr Pipe:	**0**
		4.6 Up/Down Strm flow reg.:	**Up Stream**	4.9 # of Beaver Dams:			**0**
		(old) Upstrm Flow Reg.:	**Store-release Dam**	Affected Length (ft):			**0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bridge	**20**	**Yes**	**Yes**	**Yes**	**No**	**None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types		Diagonal:	**0**	5.2 Other Features		Neck Cutoff:	**0**	5.4 Stream Ford or Animal Crossing:		**Yes**
Mid:	**6**	Delta:	**0**	Flood chutes:	**1**	Avulsion:	**1**	5.5 Straightening:	**Straightening**	
Point:	**10**	Island:	**0**	5.3 Steep Riffles and Head Cuts		Head Cuts:	**0**	Straightening Length (ft.):	**3,233**	
Side:	**4**	Braiding:	**1**	Steep Riffles:	**0**	Trib Rejuv.:	**No**	5.5 Dredging:	**Dredging**	

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:		6.4 Sediment Deposition:		Stream Gradiant Type	Left	Right
6.2 Pool Substrate:		6.5 Channel Flow Status:		6.8 Bank Stability:		
6.3 Pool Variability:		6.6 Channel Alteration:		6.9 Bank Vegetation Protection		
Total Score:	**0**	6.7 Channel Sinuosity:		6.10 Riparian Veg. Zone Width:		
Habitat Rating:	**0.00**					
Habitat Stream Condition:						

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**	Score	STD	Historic		
7.1 Channel Degradation	**8**	**None**	**Yes**	Geomorphic Rating	**0.52**
7.2 Channel Aggradation	**11**	**None**	**No**	Channel Evolution Model	**F**
7.3 Widening Channel	**11**	**None**	**No**	Channel Evolution Stage	**III**
7.4 Change in Planforml	**12**	**None**	**No**	Geomorphic Condition	**Fair**
Total Score	**42**			Stream Sensitivity	**Extreme**

Phase 2 Segment Summary Report Stevens River

Stream: **South Peacham Brook**
Reach: **T2.02-B**
Segment Length(ft): **2,570**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **Ruddell, Haynes**
Completion Date: **9/15/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **At upstream end of Choate field to dam behind the West Barnet Garage**

Step 5 - Notes: **Much of segment has been filled or riprapped on left bank, and it is difficult to know what height of original terrace off LB may have been; historical access to that terrace might mean a significantly higher incision ratio (~2.8), but glacial hsitory in other portions of the watershed indicates this could be a feature of glacial origin instead. Hence, Incision Ratio was based on a smaller, and likely more recent, right terrace. Segment has only occassional flood plain access, primarily in area near Garland Hill bridge where LB fill is slightly lower.**

Step 4 Upstream flow regulation is dam DS of Harvey's Lake: seasonal installation and removal of flashboards to control lake levels

Step 7 - Narrative: **Incision followed by limited widening and planform change. Channel evolution stage II-III_incision temporarily arrested by check dam, widening and plan form change arrested by extensive left bank armoring.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Channel Dimensions**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	0		0	
Road:	2,358	10	0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	1,764		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Extr.Steep	Very Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Mixed	Mixed

1.5 Valley Features

Valley Width (ft): **270**
Width Determination: **Measured**
Confinement Type: **BD**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **Yes**

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Dam	Mid-segment	5.0	2.0	Yes	
Dam	Mid-segment	4.0	1.0	Yes	

Stream: **South Peacham Brook**   Reach: **T2.02-B**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**34.40**	2.11 Riffle/Step Spacing:	**90 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**3.70**	2.12 Substrate Composition		Bed:	**7.8 inches**
2.3 Mean Depth (tf):	**2.74**	Bedrock:	**0.0 %**	Bar:	**6.3 inches**
2.4 Floodprone Width (ft.):	**56.60**	Boulder:	**16.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**5.90**	Cobble:	**45.0 %**	Stream Type:	**B**
Human Elev FloodPln (ft.):		Coarse Gravel:	**10.0 %**	Bed Material:	**Cobble**
2.6 Width/Depth Ratio:	**12.55**	Fine Gravel:	**4.0 %**	Subclass Slope:	**c**
2.7 Entrenchment Ratio:	**1.65**	Sand:	**25.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.59**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**5.0 %**	Reference Stream Type:	**C**
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**113**	Reference Bed Material:	**Cobble**
				Reference Subclass Slope:	
				Reference Bedform:	**Riffle-Pool**

Step 3. Riparian Features

3.1 Stream Banks   Typical Bank Slope: **Steep**

Bank Texture	Left	Right
Upper		
Material Type:	**Mix**	**Mix**
Consistency:	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type:	**Mix**	**Mix**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**0.0**	**37.3**
Erosion Height (ft.):	**0.0**	**2.0**
Revetment Type:	**Multiple**	**Rip-Rap**
Revetment Length:	**1,808.1**	**333.5**

Near Bank Vegetation Type	Left	Right
Dominant:	**Herbaceous**	**Coniferous**
Sub-dominant:	**Shrubs/Sapling**	**Herbaceous**
Bank Canopy		
Canopy %:	**26-50**	**76-100**
Mid-Channel Canopy:	**Open**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**0-25**	**>100**
Sub-Dominant	**26-50**	**26-50**
W less than 25	**638**	**0**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Coniferous**
Sub-Dominant	**Shrubs/Sapling**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Residential**	**Forest**
Sub-dominant	**Commercial**	**Commercial**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **South Peacham Brook** Reach: **T2.02-B**

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 Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **Up Stream**
(old) Upstrm Flow Reg.: **Store-release Dam**

4.7 Stormwater Inputs
Field Ditch: **0** Road Ditch: **1**
Other: **0** Tile Drain: **0**
Overland Flow: **0** Urb Strm Wtr Pipe: **2**
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bridge	**21.5**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Above,Scour Below**
Bridge	**29.5**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Above**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **1** Point: **9** Side: **7**
Diagonal: **1** Delta: **0** Island: **1** Braiding: **0**

5.2 Other Features
Flood chutes: **2**
Neck Cutoff: **0** Avulsion: **0**

5.3 Steep Riffles and Head Cuts
Steep Riffles: **5** Head Cuts: **0** Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **With Windrowing**
Straightening Length (ft.): **2,524**
5.5 Dredging: **Dredging**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type — Left — Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**	Score	STD	Historic
7.1 Channel Degradation	**3**	**C to B**	**Yes**
7.2 Channel Aggradation	**11**	**None**	**No**
7.3 Widening Channel	**10**	**None**	**No**
7.4 Change in Planforml	**9**	**None**	**No**
Total Score	**33**		

Geomorphic Rating **0.41**
Channel Evolution Model **F**
Channel Evolution Stage **III**
Geomorphic Condition **Fair**
Stream Sensitivity **High**

Phase 2 Segment Summary Report   Stevens River

Stream: **South Peacham Brook**
Reach: **T2.02-C**
Segment Length(ft): **1,616**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D. Ruddell, C.Haynes**
Completion Date: **9/8/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**
Why Not Assessed: **impounded**

Step 0 - Location: **West Barnet Village, from dam behind West Barnet garage upstream to Harvey Mountain Road bridge**

Step 5 - Notes: **Segment is impounded to control level at Harvey's Lake; this segment and Jewett Brook from Harvey's Lake are level. This segment can back up into Harvey's Lake at high flows. Campground mows to right bank edge at confluence with Jewett Brook.**

Step 7 - Narrative:

Step 1. Valley and Floodplain

1.1 Segmentation: **Channel Dimensions**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	0		0	
Road:	259	9	0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	253		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Flat	Flat
Continuous w/ Bank:	Always	Always
Within 1 Bankfull W:	Always	Always
Texture:	Sand	Sand

1.5 Valley Features
Valley Width (ft): **1,000**
Width Determination: **Measured**
Confinement Type: **VB**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Dam	Mid-segment	12.0	6.0	Yes	

Stream: **South Peacham Brook**   Reach: **T2.02-C**

Step 2. Stream Channel

2.1Bankfull Width (ft.):		2.11 Riffle/Step Spacing:		2.13 Average Largest Particle on	
2.2 Max Depth (ft.):		2.12 Substrate Composition		Bed:	
2.3 Mean Depth (tf):		Bedrock:	%	Bar:	
2.4 Floodprone Width (ft.):		Boulder:	%	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):		Cobble:	%	Stream Type:	
Human Elev FloodPln (ft.):		Coarse Gravel:	%	Bed Material:	
2.6 Width/Depth Ratio:	**0.00**	Fine Gravel:	%	Subclass Slope:	
2.7 Entrenchment Ratio:	**0.00**	Sand:	%	Bed Form:	
2.8 Incision Ratio:	**0.00**	Silt and Smaller:	%	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:		2.15 Sub-reach Stream Type	
2.9 Sinuosity:		Detritus:	%	Reference Stream Type:	
2.10 Riffles Type:		# Large Woody Debris:		Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

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.):	**36.1**	**69.7**
Erosion Height (ft.):	**3.0**	**4.0**
Revetment Type:	**None**	**Rip-Rap**
Revetment Length:	**0.0**	**33.3**

Near Bank Vegetation Type	Left	Right
Dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Sub-dominant:	**Herbaceous**	**Herbaceous**
Bank Canopy		
Canopy %:	**26-50**	**26-50**
Mid-Channel Canopy:	**Open**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**>100**
Sub-Dominant	**26-50**	**0-25**
W less than 25	**237**	**34**
Buffer Vegitation Type		
Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**
Sub-Dominant	**Herbaceous**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**
Sub-dominant	**Commercial**	**Commercial**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **South Peacham Brook** Reach: **T2.02-C**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Minimal**
4.2 Adjacent Wetlands: **Abundant**
4.3 Flow Status:
4.4 # of Debris Jams: **0**

4.5 Flow Regulation Type **Large Store and Release**
Flow Reg. Use: **Recreation**
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs
Field Ditch: **1** Road Ditch: **0**
Other: **0** Tile Drain: **0**
Overland Flow: **0** Urb Strm Wtr Pipe: **0**
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid:
Point: **1**
Side:
Diagonal:
Delta:
Island:
Braiding: **0**

5.2 Other Features
Flood chutes: **1**
5.3 Steep Riffles and Head Cuts
Steep Riffles: **0**
Neck Cutoff: **0**
Avulsion: **0**
Head Cuts: **0**
Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **Straightening**
Straightening Length (ft.): **426**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score:
Habitat Rating:
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type	Left	Right
6.8 Bank Stability:		
6.9 Bank Vegetation Protection		
6.10 Riparian Veg. Zone Width:		

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	Score	STD	Historic
7.1 Channel Degradation			
7.2 Channel Aggradation			
7.3 Widening Channel			
7.4 Change in Planforml			
Total Score			

Geomorphic Rating
Channel Evolution Model
Channel Evolution Stage
Geomorphic Condition
Stream Sensitivity

Phase 2 Segment Summary Report Stevens River

Stream:	South Peacham Brook	SGAT Version:	4.56
Reach:	T2.02-D	Organization:	Caledonia County Conservation District
Segment Length(ft):	1,137	Observers:	D. Ruddell, C. Haynes
Rain:	Yes	Completion Date:	9/9/2010
		Qualtiy Control Status - Consultant:	Passed
		Qualtiy Control Status - Staff:	Provisional

Step 0 - Location: **Harvey Mountain Road Bridge to reach break with T2.03, approx. 325' downstream of Peacham-Barnet Road Bridge**

Step 5 - Notes: **In village segment is extensively riprapped but usually only one side at a time.**
Step 4 Downstream flow regulation is dam DS of Harvey's Lake: seasonal installation and removal of flashboards to control lake levels

Step 7 - Narrative: **Minor aggradation, widening and planform change following historic incision, dam in next segment downstream**

Step 1. Valley and Floodplain

1.1 Segmentation: **Channel Dimensions**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	0		0	
Road:	837	8	272	8
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	846		92	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Flat	Flat
Continuous w/ Bank:	Always	Always
Within 1 Bankfull W:	Always	Always
Texture:	Sand	Sand

1.5 Valley Features

Valley Width (ft):	635
Width Determination:	Measured
Confinement Type:	VB
In Rock Gorge:	No
Human Caused Change in Valley Width?:	No

1.6 Grade Controls: **None**

Stream: **South Peacham Brook** Reach: **T2.02-D**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**20.30**	2.11 Riffle/Step Spacing:	**142 ft.**	2.13 Average Largest Particle on		
2.2 Max Depth (ft.):	**3.40**	2.12 Substrate Composition		Bed:	**2.7**	**inches**
2.3 Mean Depth (tf):	**2.60**	Bedrock:	**0.0 %**	Bar:	**1.8**	**inches**
2.4 Floodprone Width (ft.):	**543.40**	Boulder:	**4.0 %**	2.14 Stream Type		
2.5 Aband. Floodpn (ft.):	**6.20**	Cobble:	**7.0 %**	Stream Type:	**E**	
Human Elev FloodPln (ft.):		Coarse Gravel:	**24.0 %**	Bed Material:	**Gravel**	
2.6 Width/Depth Ratio:	**7.81**	Fine Gravel:	**17.0 %**	Subclass Slope:	**None**	
2.7 Entrenchment Ratio:	**26.77**	Sand:	**48.0 %**	Bed Form:	**Riffle-Pool**	
2.8 Incision Ratio:	**1.82**	Silt and Smaller:	**0.0 %**	Field Measured Slope:		
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type		
2.9 Sinuosity:	**High**	Detritus:	**8.0 %**	Reference Stream Type:		
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**38**	Reference Bed Material:		
				Reference Subclass Slope:		
				Reference Bedform:		

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.):	**75.4**	**57.0**
Erosion Height (ft.):	**3.7**	**3.0**
Revetment Type:	**Rip-Rap**	**Rip-Rap**
Revetment Length:	**370.3**	**195.3**

Near Bank Vegetation Type	Left	Right
Dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Sub-dominant:	**Herbaceous**	**Herbaceous**
Bank Canopy		
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**	**>100**
W less than 25	**300**	**534**
Buffer Vegitation Type		
Dominant	**Shrubs/Sapling**	**Herbaceous**
Sub-Dominant	**Herbaceous**	**Shrubs/Sapling**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Residential**	**Hay**
Sub-dominant	**Shrubs/Sapling**	**Shrubs/Sapling**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **South Peacham Brook** Reach: **T2.02-D**

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 Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **Down Stream**
(old) Upstrm Flow Reg.: **Store-release Dam**

4.7 Stormwater Inputs **None**
Field Ditch: Road Ditch:
Other: Tile Drain:
Overland Flow: Urb Strm Wtr Pipe:
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bridge	**25**	**Yes**	**Yes**	**No**	**No**	**Scour Below,Alignment**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **1** Point: **4** Side: **4**
Diagonal: **0** Delta: **0** Island: **0** Braiding: **0**

5.2 Other Features
Flood chutes: **0**
Neck Cutoff: **0** Avulsion: **0** Head Cuts: **0** Trib Rejuv.: **No**

5.3 Steep Riffles and Head Cuts
Steep Riffles: **1**

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **Straightening**
Straightening Length (ft.): **1,087**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type — Left — Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**	Score	STD	Historic
7.1 Channel Degradation	**11**	**None**	**Yes**
7.2 Channel Aggradation	**11**	**None**	**No**
7.3 Widening Channel	**12**	**None**	**No**
7.4 Change in Planforml	**12**	**None**	**Yes**
Total Score	**46**		

Geomorphic Rating	**0.57**
Channel Evolution Model	**F**
Channel Evolution Stage	**III**
Geomorphic Condition	**Fair**
Stream Sensitivity	**Extreme**

Phase 2 Segment Summary Report Stevens River

Stream: **South Peacham Brook**
Reach: **T2.03-A**
Segment Length(ft): **2,055**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, C Haynes**
Completion Date: **8/5/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **~250 feet downstream of Peacham-Barnet Rd Bridge near Mckinley Drive to downsteam edge of Roy's Pasture at Peacham-Barnet line**

Step 5 - Notes: **C to B Stream Type Departure (STD) noted for this segment is borderline - Entrenchment without old road bed would have been ~2.0-2.1 (B-type stream entrenchment ratio = 1.4-2.2, +/- 0.2; use of the margin of error could indicate a C-type stream). With old road bed entrenchment is 1.7.**

Step 7 - Narrative: **Loss of planform due to long term straightening (road encroachments), minor to major aggradation and widening.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Valley Width**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	1,915	8	117	8
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	237		0	

1.4 Adjacent Side

	Left	Right
Hillside Slope:	Steep	Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Always	Always
Texture:	Cobble	Cobble

1.5 Valley Features

Valley Width (ft): **220**
Width Determination: **Measured**
Confinement Type: **NW**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **Yes**

1.6 Grade Controls: **None**

Stream: **South Peacham Brook** Reach: **T2.03-A**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**42.40**	2.11 Riffle/Step Spacing:	**145.7 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**3.60**	2.12 Substrate Composition		Bed:	**5.1 inches**
2.3 Mean Depth (tf):	**2.71**	Bedrock:	**0.0 %**	Bar:	**3.3 inches**
2.4 Floodprone Width (ft.):	**71.60**	Boulder:	**26.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**4.50**	Cobble:	**23.0 %**	Stream Type:	**B**
Human Elev FloodPln (ft.):		Coarse Gravel:	**21.0 %**	Bed Material:	**Gravel**
2.6 Width/Depth Ratio:	**15.65**	Fine Gravel:	**13.0 %**	Subclass Slope:	**c**
2.7 Entrenchment Ratio:	**1.69**	Sand:	**17.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.25**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**8.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**65**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Undercut**

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

Bank Erosion	Left	Right
Erosion Length (ft.):	**0.0**	**107.0**
Erosion Height (ft.):	**0.0**	**4.0**
Revetment Type:	**Rip-Rap**	**Rip-Rap**
Revetment Length:	**171.1**	**922.5**

Near Bank Vegetation Type	Left	Right
Dominant:	**Coniferous**	**Coniferous**
Sub-dominant:	**Herbaceous**	**Herbaceous**
Bank Canopy		
Canopy %:	**76-100**	**76-100**
Mid-Channel Canopy:	**Closed**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**51-100**
Sub-Dominant	**51-100**	**>100**
W less than 25	**0**	**208**
Buffer Vegitation Type		
Dominant	**Coniferous**	**Herbaceous**
Sub-Dominant	**Coniferous**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**None**	**Residential**
(Legacy)	Amount	Mean Hieght
Failures	**One**	**8.0**
Gullies	**None**	

	Left	Right
Mass Failures	**60.79**	
Height	**8.0**	
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **South Peacham Brook** Reach: **T2.03-A**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Abundant**
4.2 Adjacent Wetlands: **Minimal**
4.3 Flow Status: **Low**
4.4 # of Debris Jams: **1**

4.5 Flow Regulation Type **None**
Flow Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs
Field Ditch: **0** Road Ditch: **6**
Other: **0** Tile Drain: **0**
Overland Flow: **1** Urb Strm Wtr Pipe: **0**
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bridge	**52**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Above,Deposition Below,Alignment**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **4** Point: **2** Side: **9**
Diagonal: **3** Delta: **0** Island: **0** Braiding: **0**

5.2 Other Features
Flood chutes: **3**
Neck Cutoff: **0**
Avulsion: **0**
5.3 Steep Riffles and Head Cuts
Steep Riffles: **2**
Head Cuts: **0**
Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **Straightening**
Straightening Length (ft.): **2,055**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type Left Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

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	**10**	**None**	**No**
7.4 Change in Planforml	**8**	**None**	**No**
Total Score	**35**		

Geomorphic Rating	**0.44**
Channel Evolution Model	**F**
Channel Evolution Stage	**III**
Geomorphic Condition	**Fair**
Stream Sensitivity	**Very High**

Phase 2 Segment Summary Report Stevens River

Stream: **South Peacham Brook**
Reach: **T2.03-B**
Segment Length(ft): **815**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, C Haynes**
Completion Date: **8/5/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Downstream edge of Roy's pasture at Peacham-Barnet line to ~300 feet downstream of Hollow Woods Road bridge.**

Step 5 - Notes: **Cows have full access to the stream, grazing woodlot on one side of the stream and pasture_hayfield and wooded buffers on the other side.**

Reference type for this segment is difficult to judge with certainty based on current state of stream, as straightened planform upstream is of long-standing historical nature.

X-section location difficult to find due to debris jams and rip-rap failures, and selected location (very close to start of next reach) was more influenced by straightening and bridge dynamics than would have been ideal.

W/d ratio of 10.6 could indicate an STD from C to E due to straightening/degradation, or segment could be E by reference (subreach). Decision to type as C stream by reference (using ± 2 margin of error for w/d ratio) was based primarily on low sinuosity (which does, however, appear related to historical manipulation US, and location DS of the bridge) and general channel dimensions; it also was based in part on the decreasing valley confinement as the stream makes the transition toward segment T2.03A.

Step 7 - Narrative: **Widening and planform changes following historic incision due to extensive upstream straightening. W/d ratio of 10.6 could indicate may indicate an E type stream and STD from C to E due to straightening/degradation, or segment could be E by reference (subreach). Decision to type as C stream by reference (using ± 2 margin of error for w/d ratio) was based primarily on low sinuosity and reduction in valley confinement as stream makes transition toward T2.03A.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Valley Width**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	0		0	
Road:	73	8	0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Steep	Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Cobble	Cobble

1.5 Valley Features
Valley Width (ft): **500**
Width Determination: **Estimated**
Confinement Type: **VB**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **No**

1.6 Grade Controls: **None**

Stream: **South Peacham Brook** Reach: **T2.03-B**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**27.00**	2.11 Riffle/Step Spacing:	**122.5 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**3.50**	2.12 Substrate Composition		Bed:	**3.4 inches**
2.3 Mean Depth (tf):	**2.54**	Bedrock:	**0.0 %**	Bar:	**2.5 inches**
2.4 Floodprone Width (ft.):	**397.00**	Boulder:	**1.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**4.45**	Cobble:	**17.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**44.0 %**	Bed Material:	**Gravel**
2.6 Width/Depth Ratio:	**10.63**	Fine Gravel:	**11.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**14.70**	Sand:	**27.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.27**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**8.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**55**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

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.):	**243.4**	**259.6**
Erosion Height (ft.):	**2.7**	**1.7**
Revetment Type:	**Rip-Rap**	**Multiple**
Revetment Length:	**27.4**	**178.8**

Near Bank Vegetation Type	Left	Right
Dominant:	**Herbaceous**	**Herbaceous**
Sub-dominant:	**Coniferous**	**Coniferous**
Bank Canopy		
Canopy %:	**26-50**	**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	**266**	**560**
Buffer Vegitation Type		
Dominant	**Coniferous**	**Coniferous**
Sub-Dominant	**Herbaceous**	**Herbaceous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Pasture**	**Pasture**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **South Peacham Brook** Reach: **T2.03-B**

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 Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs **None**
Field Ditch: Road Ditch:
Other: Tile Drain:
Overland Flow: Urb Strm Wtr Pipe:
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **0** Point: **3** Side: **1**
Diagonal: **1** Delta: **0** Island: **0** Braiding: **0**

5.2 Other Features
Flood chutes: **0**
Neck Cutoff: **0** Avulsion: **0**

5.3 Steep Riffles and Head Cuts
Steep Riffles: **0**
Head Cuts: **0** Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **Straightening**
Straightening Length (ft.): **815**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type Left Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined** Score	STD	Historic
7.1 Channel Degradation	**13**	**None**	**Yes**
7.2 Channel Aggradation	**13**	**None**	**No**
7.3 Widening Channel	**11**	**None**	**No**
7.4 Change in Planforml	**10**	**None**	**No**
Total Score	**47**		

Geomorphic Rating	**0.59**
Channel Evolution Model	**F**
Channel Evolution Stage	**III**
Geomorphic Condition	**Fair**
Stream Sensitivity	**Very High**

Phase 2 Segment Summary Report Stevens River

Stream:	South Peacham Brook	SGAT Version:	4.56
Reach:	T2.04-A	Organization:	Caledonia County Conservation District
Segment Length(ft):	1,713	Observers:	D Ruddell, C Haynes
Rain:	Yes	Completion Date:	8/18/2010
		Qualtiy Control Status - Consultant:	Passed
		Qualtiy Control Status - Staff:	Provisional

Step 0 - Location: **~400' downstream of Hollow Wood Bridge to ~1400' upstream of woods edge at Roy cornfield.**

Step 5 - Notes: **Entire reach upstream of Bridge has been straightened. Berm on right bank could possibly be a restoration project. Field has been tiled, stream was likely ditched historically. Road beomes valley wall in portions of the segment but causes neglible narrowing of the Very Broad valley.**
Long-standing historical nature of manipulations make it difficult to know what reference conditions may have been: soils in area are fine to very fine sandy loams and silts (but much of it dense till), and reference bedform may have been dune-ripple rather than riffle-pool.

Step 7 - Narrative: **Degradation is historic. Widening impeded by bank toe stabilization and berm. Borderline flood plain access, gaps in berm may allow some additional floodplain access; lacks planform, though some indications of rebuilding riffles.**

Step 1. Valley and Floodplain

1.1 Segmentation: **Channel Dimensions**

1.2 Alluvial Fan: **None**

1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	51	4	611	6
Road:	0		0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Flat	Flat
Continuous w/ Bank:	Always	Always
Within 1 Bankfull W:	Always	Always
Texture:	Boulder	Boulder

1.5 Valley Features

Valley Width (ft):	750
Width Determination:	Estimated
Confinement Type:	VB
In Rock Gorge:	No
Human Caused Change in Valley Width?:	Yes

1.6 Grade Controls: **None**

Stream: **South Peacham Brook**   Reach: **T2.04-A**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**22.40**	2.11 Riffle/Step Spacing:	**90 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**3.20**	2.12 Substrate Composition		Bed:	**5.5** inches
2.3 Mean Depth (tf):	**2.40**	Bedrock:	**0.0 %**	Bar:	**5.3** inches
2.4 Floodprone Width (ft.):	**279.50**	Boulder:	**0.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**3.90**	Cobble:	**45.0 %**	Stream Type:	**E**
Human Elev FloodPln (ft.):	**7.00**	Coarse Gravel:	**16.0 %**	Bed Material:	**Gravel**
2.6 Width/Depth Ratio:	**9.33**	Fine Gravel:	**12.0 %**	Subclass Slope:	**None**
2.7 Entrenchment Ratio:	**12.48**	Sand:	**27.0 %**	Bed Form:	**Riffle-Pool**
2.8 Incision Ratio:	**1.22**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**2.19**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**8.0 %**	Reference Stream Type:	**E**
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**9**	Reference Bed Material:	**Sand**
				Reference Subclass Slope:	**None**
				Reference Bedform:	**Riffle-Pool**

Step 3. Riparian Features

3.1 Stream Banks   Typical Bank Slope: **Steep**

Bank Texture	Left	Right	Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper			Erosion Length (ft.):	**55.8**	**331.8**	Dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Material Type:	**Mix**	**Mix**	Erosion Height (ft.):	**2.0**	**3.1**	Sub-dominant:	**Herbaceous**	**Herbaceous**
Consistency:	**Non-cohesive**	**Non-cohesive**	Revetment Type:	**Rip-Rap**	**Rip-Rap**	Bank Canopy		
Lower			Revetment Length:	**158.3**	**313.9**	Canopy %:	**1-25**	**1-25**
Material Type:	**Boulder/Cobble**	**Boulder/Cobble**				Mid-Channel Canopy:	**Open**	
Consistency:	**Non-cohesive**	**Non-cohesive**						

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**0-25**	**0-25**
Sub-Dominant	**>100**	**None**
W less than 25	**1,328**	**1,712**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Coniferous**	**Coniferous**

3.3 Riparian Corridor

Corridor Land	Left	Right		Left	Right
Dominant	**Crop**	**Hay**	Mass Failures		
Sub-dominant	**Forest**	**None**	Height		
(Legacy)	Amount	Mean Hieght	Gullies Number	**0**	
Failures	**None**		Gullies Length	**0**	
Gullies	**None**				

Stream: **South Peacham Brook** Reach: **T2.04-A**

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 Reg. Use:

Impoundments:

Impoundment Loc.:

4.6 Up/Down Strm flow reg.: **None**

(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs

Field Ditch: **0** Road Ditch: **0**

Other: **0** Tile Drain: **2**

Overland Flow: **0** Urb Strm Wtr Pipe: **0**

4.9 # of Beaver Dams: **0**

Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bridge	**15**	**Yes**	**Yes**	**Yes**	**No**	**Deposition Above,Deposition Below,Scour Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid: **1** Point: **2** Side: **6**

Diagonal: **2** Delta: **0** Island: **0** Braiding: **0**

5.2 Other Features

Flood chutes: **0**

Neck Cutoff: **0** Avulsion: **0** Head Cuts: **0** Trib Rejuv.: **No**

5.3 Steep Riffles and Head Cuts

Steep Riffles: **3**

5.4 Stream Ford or Animal Crossing: **No**

5.5 Straightening: **With Windrowing**

Straightening Length (ft.): **1,702**

5.5 Dredging: **Dredging**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:

6.2 Pool Substrate:

6.3 Pool Variability:

Total Score: **0**

Habitat Rating: **0.00**

Habitat Stream Condition:

6.4 Sediment Deposition:

6.5 Channel Flow Status:

6.6 Channel Alteration:

6.7 Channel Sinuosity:

Stream Gradiant Type — Left — Right

6.8 Bank Stability:

6.9 Bank Vegetation Protection

6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**	Score	STD	Historic
7.1 Channel Degradation	**5**	**None**	**Yes**
7.2 Channel Aggradation	**12**	**None**	**No**
7.3 Widening Channel	**12**	**None**	**No**
7.4 Change in Planforml	**12**	**None**	**No**
Total Score	**41**		

Geomorphic Rating	**0.51**
Channel Evolution Model	**F**
Channel Evolution Stage	**III**
Geomorphic Condition	**Fair**
Stream Sensitivity	**Extreme**

Phase 2 Segment Summary Report Stevens River

Stream: **South Peacham Brook**
Reach: **T2.04-B**
Segment Length(ft): **998**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, C Haynes**
Completion Date: **8/18/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **Upstream end of Roy fields on Barnet-Peacham Rd US of Hollow Woods RD, as fields meet woods edge**

Step 5 - Notes: **Segment is heavily armored and deeply entrenched_not clear if ditching spoils may have been aggregated in this area for a possible bridge_some indications of possible abutments but not at all clear.**

Appears possible that this segment may be on an alluvial fan. Given the extensive nature of dense till in the area, however, and indications of relative stability in the field, gut feeling is this is glacial in origin and not likely to figure prominently in current adjustments; suspect that channel evolution is actually hampered to some extent by lack of sediments, exacerbated by repeated windrowing over time.

Step 7 - Narrative: **Widening and planform change following historic incision and loss of planform.**

Segment may be on an alluvial fan. Given the extensive nature of dense till in the area, and indications of relative stability in the field, gut feeling is this is glacial in origin and not likely to figure prominently in current adjustments; suspect that channel evolution is actually hampered to some extent by lack of sediments, exacerbated by repeated windrowing over time.

Step 1. Valley and Floodplain

1.1 Segmentation: **Channel Dimensions**

1.2 Alluvial Fan: **Yes**

1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	0		0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	0		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Hilly	Flat
Continuous w/ Bank:	Sometimes	Always
Within 1 Bankfull W:	Always	Always
Texture:	Cobble	Cobble

1.5 Valley Features

Valley Width (ft):	800
Width Determination:	Estimated
Confinement Type:	VB
In Rock Gorge:	No
Human Caused Change in Valley Width?:	No

1.6 Grade Controls: **None**

Stream: **South Peacham Brook** Reach: **T2.04-B**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**21.90**	2.11 Riffle/Step Spacing:	**70 ft.**	2.13 Average Largest Particle on		
2.2 Max Depth (ft.):	**3.55**	2.12 Substrate Composition		Bed:	**8.2**	**inches**
2.3 Mean Depth (tf):	**2.21**	Bedrock:	**0.0 %**	Bar:	**5.8**	**inches**
2.4 Floodprone Width (ft.):	**31.20**	Boulder:	**22.0 %**	2.14 Stream Type		
2.5 Aband. Floodpn (ft.):	**8.85**	Cobble:	**49.0 %**	Stream Type:	**G**	
Human Elev FloodPln (ft.):		Coarse Gravel:	**13.0 %**	Bed Material:	**Cobble**	
2.6 Width/Depth Ratio:	**9.91**	Fine Gravel:	**7.0 %**	Subclass Slope:	**c**	
2.7 Entrenchment Ratio:	**1.42**	Sand:	**9.0 %**	Bed Form:	**Step-Pool**	
2.8 Incision Ratio:	**2.49**	Silt and Smaller:	**0.0 %**	Field Measured Slope:		
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type		
2.9 Sinuosity:	**Low**	Detritus:	**10.0 %**	Reference Stream Type:	**E**	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**3**	Reference Bed Material:	**Cobble**	
				Reference Subclass Slope:	**None**	
				Reference Bedform:	**Riffle-Pool**	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Steep**

Bank Texture	Left	Right
Upper		
Material Type:	**Mix**	**Mix**
Consistency:	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type:	**Boulder/Cobble**	**Boulder/Cobble**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**61.2**	**0.0**
Erosion Height (ft.):	**2.8**	**0.0**
Revetment Type:	**Rip-Rap**	**Rip-Rap**
Revetment Length:	**511.2**	**327.8**

Near Bank Vegetation Type	Left	Right
Dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Sub-dominant:	**Coniferous**	**Deciduous**
Bank Canopy		
Canopy %:	**26-50**	**1-25**
Mid-Channel Canopy:	**Open**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**0-25**	**0-25**
Sub-Dominant	**>100**	**None**
W less than 25	**614**	**730**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Shrubs/Sapling**	**Shrubs/Sapling**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Crop**	**Hay**
Sub-dominant	**Forest**	**None**
(Legacy)	Amount	Mean Hieght
Failures	**None**	
Gullies	**None**	

	Left	Right
Mass Failures		
Height		
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **South Peacham Brook** Reach: **T2.04-B**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:	**Minimal**	4.5 Flow Regulation Type	**None**	4.7 Stormwater Inputs			
4.2 Adjacent Wetlands:	**Minimal**	Flow Reg. Use:		Field Ditch:	**0**	Road Ditch:	**0**
4.3 Flow Status:	**Low**	Impoundments:		Other:	**0**	Tile Drain:	**1**
4.4 # of Debris Jams:	**0**	Impoundment Loc.:		Overland Flow:	**0**	Urb Strm Wtr Pipe:	**0**
		4.6 Up/Down Strm flow reg.:	**None**	4.9 # of Beaver Dams:			**0**
		(old) Upstrm Flow Reg.:		Affected Length (ft):			**0**

4.8 Channel Constrictions: **None**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types		Diagonal:	**0**	5.2 Other Features		Neck Cutoff:	**0**	5.4 Stream Ford or Animal Crossing:	**No**
Mid:	**0**	Delta:	**0**	Flood chutes:	**1**	Avulsion:	**0**	5.5 Straightening:	**With Windrowing**
Point:	**4**	Island:	**0**	5.3 Steep Riffles and Head Cuts		Head Cuts:	**0**	Straightening Length (ft.):	**914**
Side:	**2**	Braiding:	**0**	Steep Riffles:	**2**	Trib Rejuv.:	**No**	5.5 Dredging:	**Dredging**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:		6.4 Sediment Deposition:		Stream Gradiant Type	Left	Right
6.2 Pool Substrate:		6.5 Channel Flow Status:		6.8 Bank Stability:		
6.3 Pool Variability:		6.6 Channel Alteration:		6.9 Bank Vegetation Protection		
Total Score:	**0**	6.7 Channel Sinuosity:		6.10 Riparian Veg. Zone Width:		
Habitat Rating:	**0.00**					
Habitat Stream Condition:						

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**	Score	STD	Historic		
7.1 Channel Degradation	**3**	**E to G**	**Yes**	Geomorphic Rating	**0.41**
7.2 Channel Aggradation	**12**	**None**	**No**	Channel Evolution Model	**F**
7.3 Widening Channel	**7**	**None**	**No**	Channel Evolution Stage	**III**
7.4 Change in Planforml	**11**	**None**	**Yes**	Geomorphic Condition	**Fair**
Total Score	**33**			Stream Sensitivity	**Extreme**

Phase 2 Segment Summary Report Stevens River

Stream: **South Peacham Brook**
Reach: **T2.04-C**
Segment Length(ft): **2,770**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, C Haynes**
Completion Date: **8/12/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **woods edge at US end of Roy fields on Barnet-Peacham Rd to Rd culvert underneath Peacham-Groton Rd in S Peacham village**

Step 5 - Notes: **Both riffle-pools and step-pools. Riffles in lower gradient, steps dominate the segment. Overall segment slope ~3.2 pct.**

Peacham Barnet Road has likely narrowed valley width somewhat near intersection with S. Main Street in South Peacham, though close consideration in the field suggested that a flood would run down the road and to the outside of it in most cases, and the road may present a confinement primarily in lower-level floods. Once the stream passes through the culvert under the Peacham-Groton Rd in South Peacham, however, the stream is more confined for a brief stretch in the vicinity of Mill Trace before having access to floodplain again in the lower portion of the segment; conceivable this stretch should have been segmented out.

The mid-section near Mill Trace does not appear to be a Human Elevated Floodplain – it is likely terraces of suspected glacial origin, and the structures placed on them occurred during historic times on an older geologic feature. No incision was observed, but the stream certainly has less access to floodplain in this area, and widening and planform change are the dominant adjustment processes; hence the stage FIII CEM selected for the reach, despite an Incision Ratio of 1.00.

Beers Atlas indicates a grist mill, car factory, and sash and door company all on this segment, and there are stone walls and various remnants still visible in portions; extensive straightening based on this.

Step 7 - Narrative: **Aggradation and planform change following limited historic incision_limited by grade controls_widening retarded by extensive armoring**

Step 1. Valley and Floodplain

1.1 Segmentation: **Grade Controls**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height
Berm:	0		0	
Road:	1,806	10	605	10
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	389		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Very Steep	Very Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Boulder	Boulder

1.5 Valley Features
Valley Width (ft): **260**
Width Determination: **Measured**
Confinement Type: **BD**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **Yes**

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Ledge	Mid-segment	3.0	1.0	Yes	
Ledge	Mid-segment	5.0	4.0	Yes	
Ledge	Mid-segment	12.0	9.0	Yes	
Ledge	Mid-segment	2.0	1.0	Yes	
Ledge	Mid-segment	17.0	16.0	Yes	
Ledge	Mid-segment	8.0	6.0	Yes	

Stream: **South Peacham Brook** Reach: **T2.04-C**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**32.80**	2.11 Riffle/Step Spacing:	**82.4 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**3.50**	2.12 Substrate Composition		Bed:	**10.9 inches**
2.3 Mean Depth (tf):	**2.39**	Bedrock:	**0.0 %**	Bar:	**8.6 inches**
2.4 Floodprone Width (ft.):	**256.50**	Boulder:	**30.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**3.50**	Cobble:	**32.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**18.0 %**	Bed Material:	**Cobble**
2.6 Width/Depth Ratio:	**13.72**	Fine Gravel:	**9.0 %**	Subclass Slope:	**b**
2.7 Entrenchment Ratio:	**7.82**	Sand:	**11.0 %**	Bed Form:	**Step-Pool**
2.8 Incision Ratio:	**1.00**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**8.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**44**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Steep**

Bank Texture	Left	Right
Upper		
Material Type:	**Mix**	**Mix**
Consistency:	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type:	**Boulder/Cobble**	**Bedrock**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**0.0**	**0.0**
Erosion Height (ft.):	**0.0**	**0.0**
Revetment Type:	**Rip-Rap**	**Rip-Rap**
Revetment Length:	**243.1**	**743.2**

Near Bank Vegetation Type	Left	Right
Dominant:	**Deciduous**	**Deciduous**
Sub-dominant:	**Shrubs/Sapling**	**Shrubs/Sapling**
Bank Canopy		
Canopy %:	**76-100**	**76-100**
Mid-Channel Canopy:	**Closed**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**51-100**
Sub-Dominant	**26-50**	**26-50**
W less than 25	**208**	**586**
Buffer Vegitation Type		
Dominant	**Deciduous**	**Herbaceous**
Sub-Dominant	**Deciduous**	**Deciduous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Residential**
Sub-dominant	**Residential**	**Forest**
(Legacy)	Amount	Mean Hieght
Failures	**Multiple**	**10.0**
Gullies	**None**	

	Left	Right
Mass Failures	**71.79**	**126.76**
Height	**12.0**	**9.0**
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **South Peacham Brook**　　Reach: **T2.04-C**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps: **Abundant**
4.2 Adjacent Wetlands: **Minimal**
4.3 Flow Status: **Low**
4.4 # of Debris Jams: **3**

4.5 Flow Regulation Type **None**
Flow Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs
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**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Bridge	**20**	**Yes**	**Yes**	**Yes**	**No**	**Deposition Below,Scour Above**
Bedrock Outcrops	**27**	**Yes**	**Yes**	**Yes**	**No**	**Deposition Above,Scour Below**
Bridge	**20**	**Yes**	**Yes**	**Yes**	**Yes**	**Scour Below**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **2**　Point: **4**　Side: **9**
Diagonal: **4**　Delta: **0**　Island: **0**　Braiding: **0**

5.2 Other Features
Flood chutes: **1**
Neck Cutoff: **0**
Avulsion: **0**
5.3 Steep Riffles and Head Cuts
Steep Riffles: **6**
Head Cuts: **0**
Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **No**
5.5 Straightening: **Straightening**
Straightening Length (ft.): **2,507**
5.5 Dredging: **None**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type　Left　Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type **Unconfined**

	Score	STD	Historic
7.1 Channel Degradation	**13**	**None**	**Yes**
7.2 Channel Aggradation	**12**	**None**	**No**
7.3 Widening Channel	**13**	**None**	**No**
7.4 Change in Planforml	**11**	**None**	**No**
Total Score	**49**		

Geomorphic Rating **0.61**
Channel Evolution Model **F**
Channel Evolution Stage **III**
Geomorphic Condition **Fair**
Stream Sensitivity **High**

Phase 2 Segment Summary Report Stevens River

Stream: **South Peacham Brook**
Reach: **T2.05-0**
Segment Length(ft): **3,523**
Rain: **Yes**

SGAT Version: **4.56**
Organization: **Caledonia County Conservation District**
Observers: **D Ruddell, C Haynes**
Completion Date: **8/26/2010**
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**

Step 0 - Location: **~300 feet upstream of old mill in Peacham Village, Government Matocks Rd to County Rd Bridge**

Step 5 - Notes: **Possible remnants of animal crossing_ford but not currently used. Road narrows valley slightly. Significant deposition, flood chutes and LWD evident from microbursts earlier this summer.**

Bridge in DS portion is a 24 ft wooden footbridge near old mill site, just US of extensive series of bedrock grade controls, used to access field on side of stream away from road; only has 3.8 ft clearance above stream.

Top of next reach DS (T2.04,just DS of the footbridge) is indicated on Beers Atlas as dammed for a starch factory.

Step 7 - Narrative: **Relatively stable following historical impacts in downstream reach (damming at starch factory in top of reach T2.04), evidence of recent microburst flooding causing minor aggradation and planform change**

Step 1. Valley and Floodplain

1.1 Segmentation: **None**
1.2 Alluvial Fan: **None**
1.3 Corridor Encroachments:

	Length (ft) One	Height	Both	Height
Berm:	0		0	
Road:	3,400	10	0	
Railroad:	0		0	
Imp. Path:	0		0	
Dev.:	244		0	

1.4 Adjacent Side	Left	Right
Hillside Slope:	Extr.Steep	Extr.Steep
Continuous w/ Bank:	Sometimes	Sometimes
Within 1 Bankfull W:	Sometimes	Sometimes
Texture:	Other	Other

1.5 Valley Features
Valley Width (ft): **200**
Width Determination: **Estimated**
Confinement Type: **BD**
In Rock Gorge: **No**
Human Caused Change in Valley Width?: **Yes**

1.6 Grade Controls:

Type	Location	Total Height	Total Height Above Water	Photo Taken?	GPS Taken?
Ledge	Mid-segment	3.0	2.0	Yes	
Ledge	Mid-segment	4.0	2.0	Yes	
Ledge	Mid-segment	6.0	5.0	Yes	
Ledge	Mid-segment	3.0	1.0	Yes	

Stream: **South Peacham Brook** Reach: **T2.05-0**

Step 2. Stream Channel

2.1Bankfull Width (ft.):	**30.50**	2.11 Riffle/Step Spacing:	**38 ft.**	2.13 Average Largest Particle on	
2.2 Max Depth (ft.):	**3.80**	2.12 Substrate Composition		Bed:	**7.5 inches**
2.3 Mean Depth (tf):	**2.31**	Bedrock:	**0.0 %**	Bar:	**6.4 inches**
2.4 Floodprone Width (ft.):	**180.50**	Boulder:	**26.0 %**	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):	**4.40**	Cobble:	**34.0 %**	Stream Type:	**C**
Human Elev FloodPln (ft.):		Coarse Gravel:	**6.0 %**	Bed Material:	**Cobble**
2.6 Width/Depth Ratio:	**13.20**	Fine Gravel:	**11.0 %**	Subclass Slope:	**b**
2.7 Entrenchment Ratio:	**5.92**	Sand:	**23.0 %**	Bed Form:	**Step-Pool**
2.8 Incision Ratio:	**1.16**	Silt and Smaller:	**0.0 %**	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:	**No**	2.15 Sub-reach Stream Type	
2.9 Sinuosity:	**Moderate**	Detritus:	**15.0 %**	Reference Stream Type:	
2.10 Riffles Type:	**Sedimented**	# Large Woody Debris:	**201**	Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope: **Steep**

Bank Texture	Left	Right
Upper		
Material Type:	**Mix**	**Mix**
Consistency:	**Non-cohesive**	**Non-cohesive**
Lower		
Material Type:	**Boulder/Cobble**	**Boulder/Cobble**
Consistency:	**Non-cohesive**	**Non-cohesive**

Bank Erosion	Left	Right
Erosion Length (ft.):	**77.5**	**197.7**
Erosion Height (ft.):	**4.3**	**4.1**
Revetment Type:	**Rip-Rap**	**Multiple**
Revetment Length:	**326.1**	**763.1**

Near Bank Vegetation Type	Left	Right
Dominant:	**Deciduous**	**Deciduous**
Sub-dominant:	**Herbaceous**	**Herbaceous**
Bank Canopy		
Canopy %:	**76-100**	**76-100**
Mid-Channel Canopy:	**Closed**	

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant	**>100**	**26-50**
Sub-Dominant	**26-50**	**>100**
W less than 25	**29**	**196**
Buffer Vegitation Type		
Dominant	**Herbaceous**	**Herbaceous**
Sub-Dominant	**Deciduous**	**Deciduous**

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant	**Forest**	**Forest**
Sub-dominant	**Commercial**	**Pasture**
(Legacy)	Amount	Mean Hieght
Failures	**Multiple**	**11.0**
Gullies	**None**	

	Left	Right
Mass Failures	**85.06**	
Height	**11.1**	
Gullies Number	**0**	
Gullies Length	**0**	

Stream: **South Peacham Brook** Reach: **T2.05-0**

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: **4**

4.5 Flow Regulation Type **None**
Flow Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.: **None**
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs
Field Ditch: **0** Road Ditch: **6**
Other: **0** Tile Drain: **0**
Overland Flow: **0** Urb Strm Wtr Pipe: **0**
4.9 # of Beaver Dams: **0**
Affected Length (ft): **0**

4.8 Channel Constrictions:

Type	Width	Photo Taken?	GPS Taken?	Channel Constriction?	Floodprone Constriction?	Problems
Instream Culvert	**7**	**Yes**	**Yes**	**Yes**	**Yes**	**Deposition Above,Scour Above,Scour Below**
Instream Culvert	**15**	**Yes**	**Yes**	**Yes**	**No**	**Deposition Above,Scour Below**
Bridge	**24**	**Yes**	**Yes**	**Yes**	**No**	**Alignment**

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Mid: **8** Point: **7** Side: **11**
Diagonal: **3** Delta: **0** Island: **4** Braiding: **4**

5.2 Other Features
Flood chutes: **8**
Neck Cutoff: **0**
Avulsion: **0**
5.3 Steep Riffles and Head Cuts
Steep Riffles: **4**
Head Cuts: **0**
Trib Rejuv.: **No**

5.4 Stream Ford or Animal Crossing: **Yes**
5.5 Straightening: **With Windrowing**
Straightening Length (ft.): **2,819**
5.5 Dredging: **Dredging**

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score: **0**
Habitat Rating: **0.00**
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type | Left | Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	**Unconfined** Score	STD	Historic
7.1 Channel Degradation	**14**	**None**	**Yes**
7.2 Channel Aggradation	**13**	**None**	**No**
7.3 Widening Channel	**14**	**None**	**No**
7.4 Change in Planforml	**13**	**None**	**No**
Total Score	**54**		

Geomorphic Rating **0.68**
Channel Evolution Model **F**
Channel Evolution Stage **III**
Geomorphic Condition **Good**
Stream Sensitivity

Phase 2 Segment Summary Report Stevens River

Stream: **Jewett Brook**
Reach: **T2.S1.06-0**
Segment Length(ft):
Rain:

SGAT Version: **4.56**
Organization:
Observers:
Completion Date:
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**
Why Not Assessed: **Other (to be explained in comments)**

Step 0 - Location: **Jewett Brook not included in 2010-11 Phase 2**

Step 5 - Notes: **Not included in 2010-11 Phase 2**

Step 7 - Narrative:

Step 1. Valley and Floodplain

1.1 Segmentation:
1.2 Alluvial Fan:
1.3 Corridor Encroachments:

	Length (ft)	One	Height	Both	Height
Berm:					
Road:					
Railroad:					
Imp. Path:					
Dev.:					

1.4 Adjacent Side	Left	Right
Hillside Slope:		
Continuous w/ Bank:		
Within 1 Bankfull W:		
Texture:		

1.5 Valley Features
Valley Width (ft):
Width Determination:
Confinement Type:
In Rock Gorge:
Human Caused Change in Valley Width?:

1.6 Grade Controls:

Stream: **Jewett Brook** Reach: **T2.S1.06-0**

Step 2. Stream Channel

2.1Bankfull Width (ft.):		2.11 Riffle/Step Spacing:		2.13 Average Largest Particle on	
2.2 Max Depth (ft.):		2.12 Substrate Composition		Bed:	
2.3 Mean Depth (tf):		Bedrock:	%	Bar:	
2.4 Floodprone Width (ft.):		Boulder:	%	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):		Cobble:	%	Stream Type:	
Human Elev FloodPln (ft.):		Coarse Gravel:	%	Bed Material:	
2.6 Width/Depth Ratio:	**0.00**	Fine Gravel:	%	Subclass Slope:	
2.7 Entrenchment Ratio:	**0.00**	Sand:	%	Bed Form:	
2.8 Incision Ratio:	**0.00**	Silt and Smaller:	%	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:		2.15 Sub-reach Stream Type	
2.9 Sinuosity:		Detritus:	%	Reference Stream Type:	
2.10 Riffles Type:		# Large Woody Debris:		Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope:

Bank Texture	Left	Right	Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper			Erosion Length (ft.):			Dominant:		
Material Type:			Erosion Height (ft.):			Sub-dominant:		
Consistency:			Revetment Type:			Bank Canopy		
Lower			Revetment Length:			Canopy %:		
Material Type:						Mid-Channel Canopy:		
Consistency:								

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant		
Sub-Dominant		
W less than 25		
Buffer Vegitation Type		
Dominant		
Sub-Dominant		

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant		
Sub-dominant		
(Legacy)	Amount	Mean Hieght
Failures		
Gullies		

	Left	Right
Mass Failures		
Height		
Gullies Number		
Gullies Length		

Stream: **Jewett Brook** Reach: **T2.S1.06-0**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:
4.2 Adjacent Wetlands:
4.3 Flow Status:
4.4 # of Debris Jams:

4.5 Flow Regulation Type
Flow Reg. Use:
Impoundments:
Impoundment Loc.:
4.6 Up/Down Strm flow reg.:
(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs **None**
Field Ditch: Road Ditch:
Other: Tile Drain:
Overland Flow: Urb Strm Wtr Pipe:
4.9 # of Beaver Dams:
Affected Length (ft):

4.8 Channel Constrictions:

Step 5. Channel Bed and Planform Changes

5.1 Bar Types
Diagonal:
Mid:
Delta:
Point:
Island:
Side:
Braiding:

5.2 Other Features
Neck Cutoff:
Flood chutes:
Avulsion:
5.3 Steep Riffles and Head Cuts
Head Cuts:
Steep Riffles:
Trib Rejuv.:

5.4 Stream Ford or Animal Crossing:
5.5 Straightening:
Straightening Length (ft.): **0**
5.5 Dredging:

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:
6.2 Pool Substrate:
6.3 Pool Variability:
Total Score:
Habitat Rating:
Habitat Stream Condition:

6.4 Sediment Deposition:
6.5 Channel Flow Status:
6.6 Channel Alteration:
6.7 Channel Sinuosity:

Stream Gradiant Type Left Right
6.8 Bank Stability:
6.9 Bank Vegetation Protection
6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type	Score	STD	Historic
7.1 Channel Degradation			
7.2 Channel Aggradation			
7.3 Widening Channel			
7.4 Change in Planforml			
Total Score			

Geomorphic Rating
Channel Evolution Model
Channel Evolution Stage
Geomorphic Condition
Stream Sensitivity

Phase 2 Segment Summary Report   Stevens River

Stream: **Jewett Brook**
Reach: **T2.S1.06-A**
Segment Length(ft):
Rain:

SGAT Version: **4.56**
Organization:
Observers:
Completion Date:
Qualtiy Control Status - Consultant: **Passed**
Qualtiy Control Status - Staff: **Provisional**
Why Not Assessed: **Other (to be explained in comments)**

Step 0 - Location: **Jewett Brook not included in 2010-11 Phase 2**

Step 5 - Notes:

Step 7 - Narrative:

Step 1. Valley and Floodplain

1.1 Segmentation:
1.2 Alluvial Fan:
1.3 Corridor Encroachments:

Length (ft)	One	Height	Both	Height

Berm:
Road:
Railroad:
Imp. Path:
Dev.:

1.4 Adjacent Side   Left   Right
Hillside Slope:
Continuous w/ Bank:
Within 1 Bankfull W:
Texture:

1.5 Valley Features
Valley Width (ft):
Width Determination:
Confinement Type:
In Rock Gorge:
Human Caused Change in Valley Width?:

1.6 Grade Controls:

Phase 2 Segment Summary Report **Stevens River**

Stream: **Jewett Brook** Reach: **T2.S1.06-A**

Step 2. Stream Channel

2.1Bankfull Width (ft.):		2.11 Riffle/Step Spacing:		2.13 Average Largest Particle on	
2.2 Max Depth (ft.):		2.12 Substrate Composition		Bed:	
2.3 Mean Depth (tf):		Bedrock:	%	Bar:	
2.4 Floodprone Width (ft.):		Boulder:	%	2.14 Stream Type	
2.5 Aband. Floodpn (ft.):		Cobble:	%	Stream Type:	
Human Elev FloodPln (ft.):		Coarse Gravel:	%	Bed Material:	
2.6 Width/Depth Ratio:	**0.00**	Fine Gravel:	%	Subclass Slope:	
2.7 Entrenchment Ratio:	**0.00**	Sand:	%	Bed Form:	
2.8 Incision Ratio:	**0.00**	Silt and Smaller:	%	Field Measured Slope:	
Human Elevated Inc. Rat.:	**0.00**	Silt/Clay Present:		2.15 Sub-reach Stream Type	
2.9 Sinuosity:		Detritus:	%	Reference Stream Type:	
2.10 Riffles Type:		# Large Woody Debris:		Reference Bed Material:	
				Reference Subclass Slope:	
				Reference Bedform:	

Step 3. Riparian Features

3.1 Stream Banks

Typical Bank Slope:

Bank Texture	Left	Right	Bank Erosion	Left	Right	Near Bank Vegetation Type	Left	Right
Upper			Erosion Length (ft.):			Dominant:		
Material Type:			Erosion Height (ft.):			Sub-dominant:		
Consistency:			Revetment Type:			Bank Canopy		
Lower			Revetment Length:			Canopy %:		
Material Type:						Mid-Channel Canopy:		
Consistency:								

3.2 Riparian Buffer

Buffer Width	Left	Right
Dominant		
Sub-Dominant		
W less than 25		
Buffer Vegitation Type		
Dominant		
Sub-Dominant		

3.3 Riparian Corridor

Corridor Land	Left	Right
Dominant		
Sub-dominant		
(Legacy)	Amount	Mean Hieght
Failures		
Gullies		

	Left	Right
Mass Failures		
Height		
Gullies Number		
Gullies Length		

Stream: **Jewett Brook** Reach: **T2.S1.06-A**

Step 4. Flow & Flow Modifiers

4.1 Springs / Seeps:

4.2 Adjacent Wetlands:

4.3 Flow Status:

4.4 # of Debris Jams:

4.5 Flow Regulation Type

Flow Reg. Use:

Impoundments:

Impoundment Loc.:

4.6 Up/Down Strm flow reg.:

(old) Upstrm Flow Reg.:

4.7 Stormwater Inputs **None**

Field Ditch: Road Ditch:

Other: Tile Drain:

Overland Flow: Urb Strm Wtr Pipe:

4.9 # of Beaver Dams:

Affected Length (ft):

4.8 Channel Constrictions:

Step 5. Channel Bed and Planform Changes

5.1 Bar Types

Mid: Point: Side:

Diagonal: Delta: Island: Braiding:

5.2 Other Features

Flood chutes:

5.3 Steep Riffles and Head Cuts

Steep Riffles:

Neck Cutoff:

Avulsion:

Head Cuts:

Trib Rejuv.:

5.4 Stream Ford or Animal Crossing:

5.5 Straightening:

Straightening Length (ft.): **0**

5.5 Dredging:

Step 6. Rapid Habitat Assessment Data

6.1 Epifaunal Substrate - Avl.:

6.2 Pool Substrate:

6.3 Pool Variability:

Total Score:

Habitat Rating:

Habitat Stream Condition:

6.4 Sediment Deposition:

6.5 Channel Flow Status:

6.6 Channel Alteration:

6.7 Channel Sinuosity:

Stream Gradiant Type Left Right

6.8 Bank Stability:

6.9 Bank Vegetation Protection

6.10 Riparian Veg. Zone Width:

Step 7. Rapid Geomorphic Assessment Data

Confinement Type Score STD Historic

7.1 Channel Degradation

7.2 Channel Aggradation

7.3 Widening Channel

7.4 Change in Planforml

Total Score

Geomorphic Rating

Channel Evolution Model

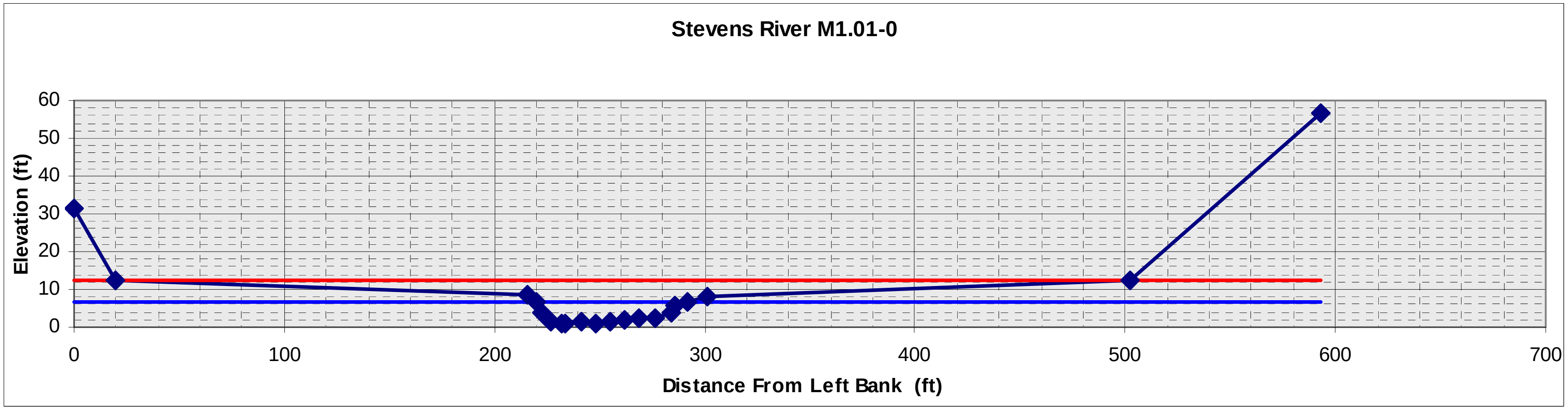
Channel Evolution Stage

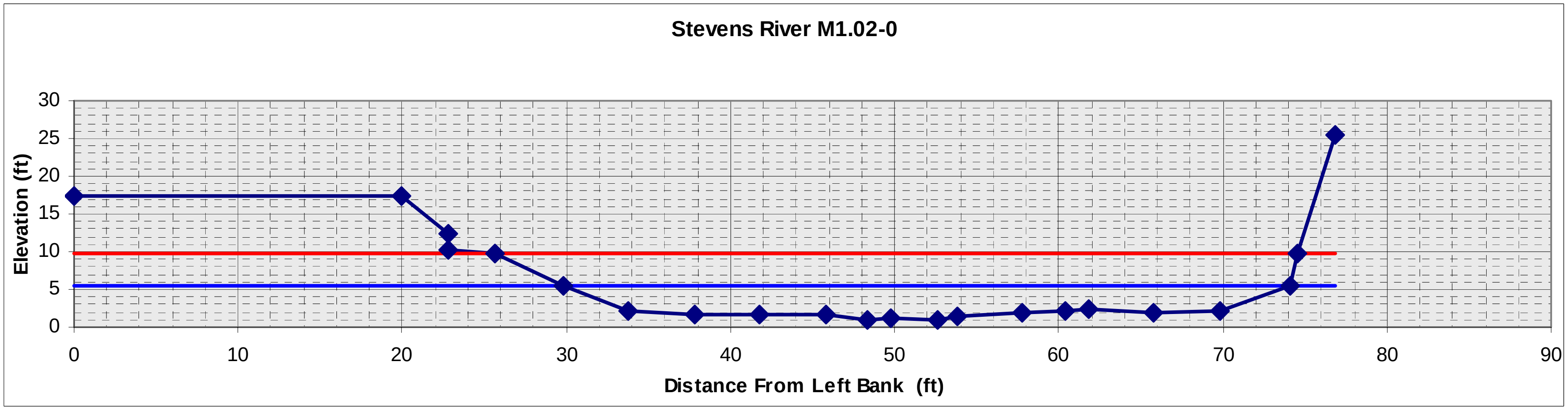
Geomorphic Condition

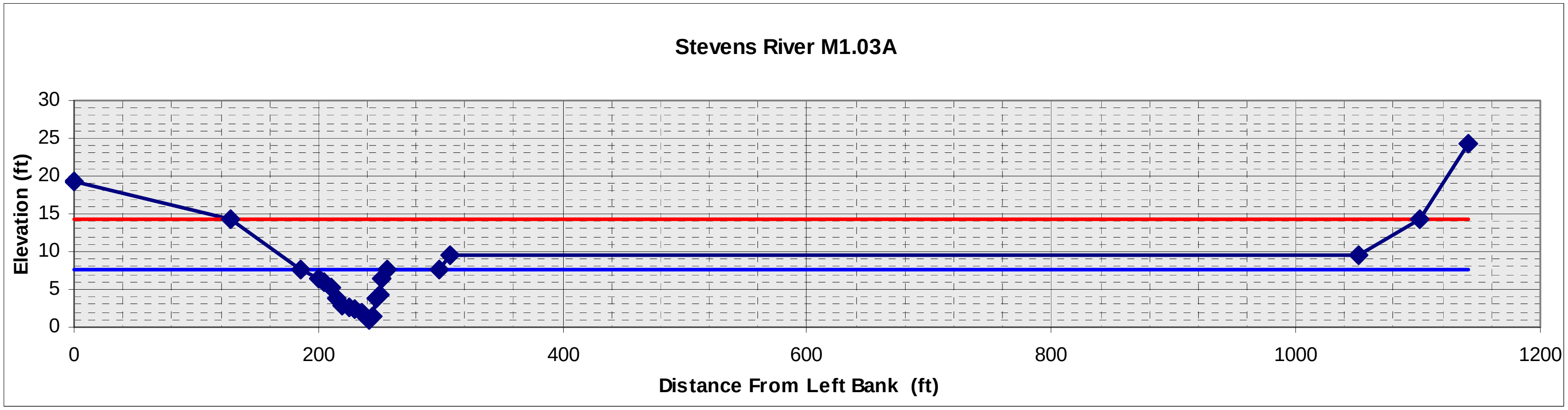
Stream Sensitivity

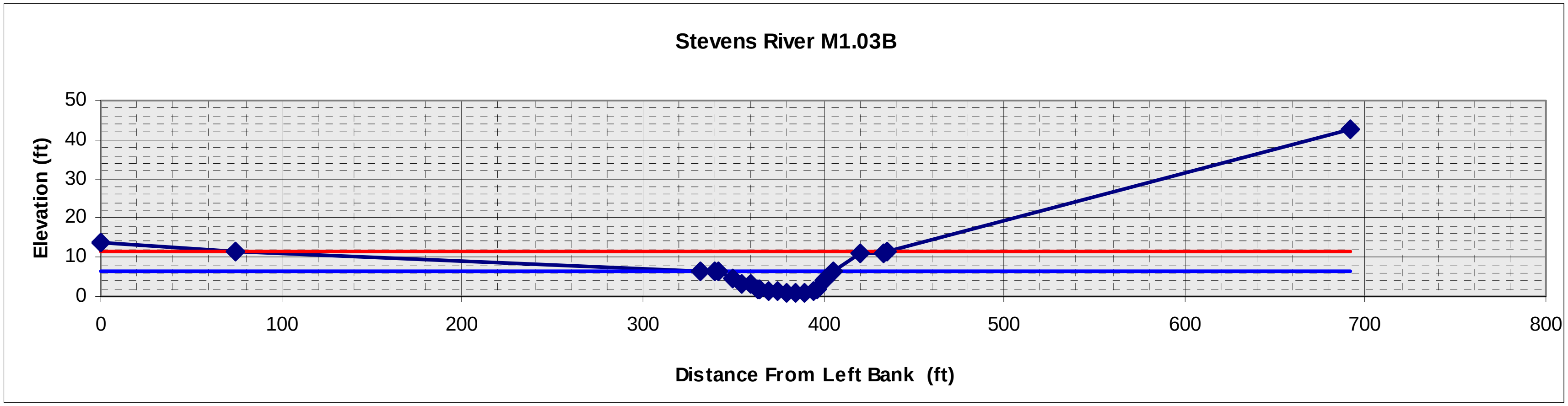
- Appendix 4 -

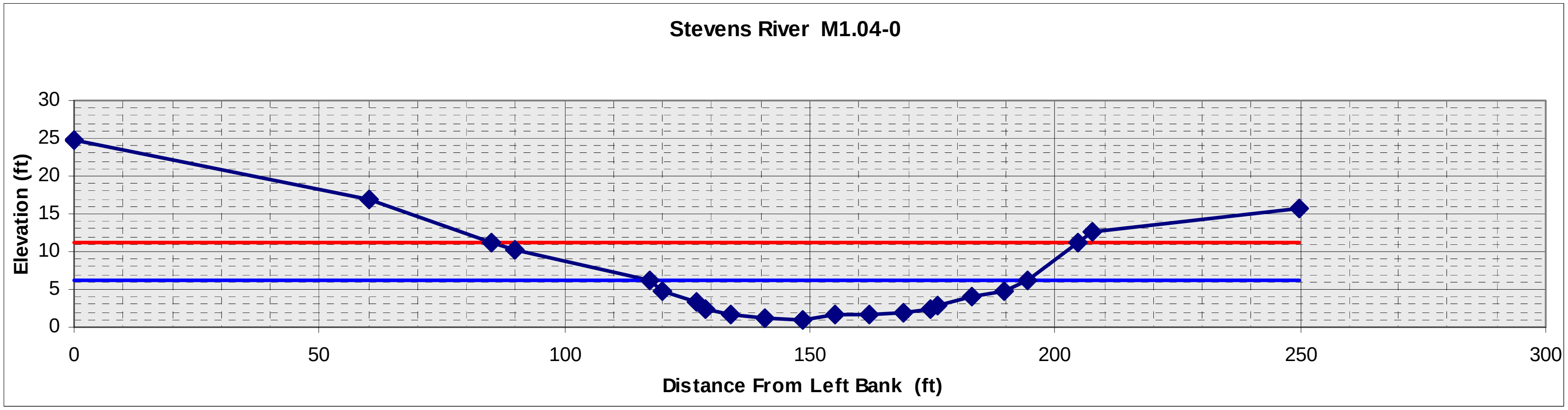
Phase II Cross-section data

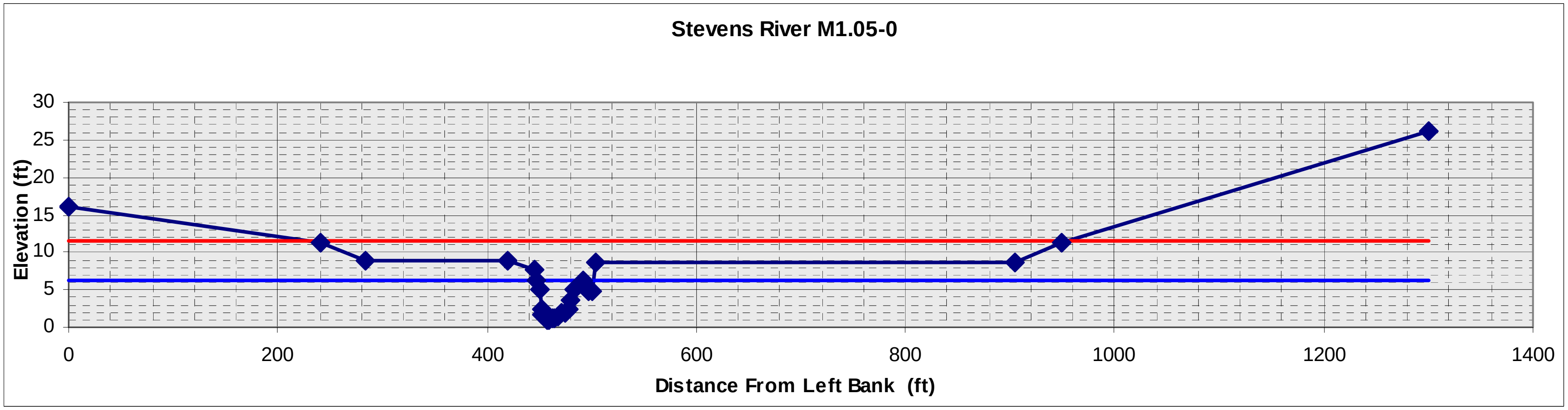

Stevens River M1.01-0
Elevation (ft)
60
50
40
30
20
10
0
0
100
200
300
400
500
600
700
Distance From Left Bank (ft)

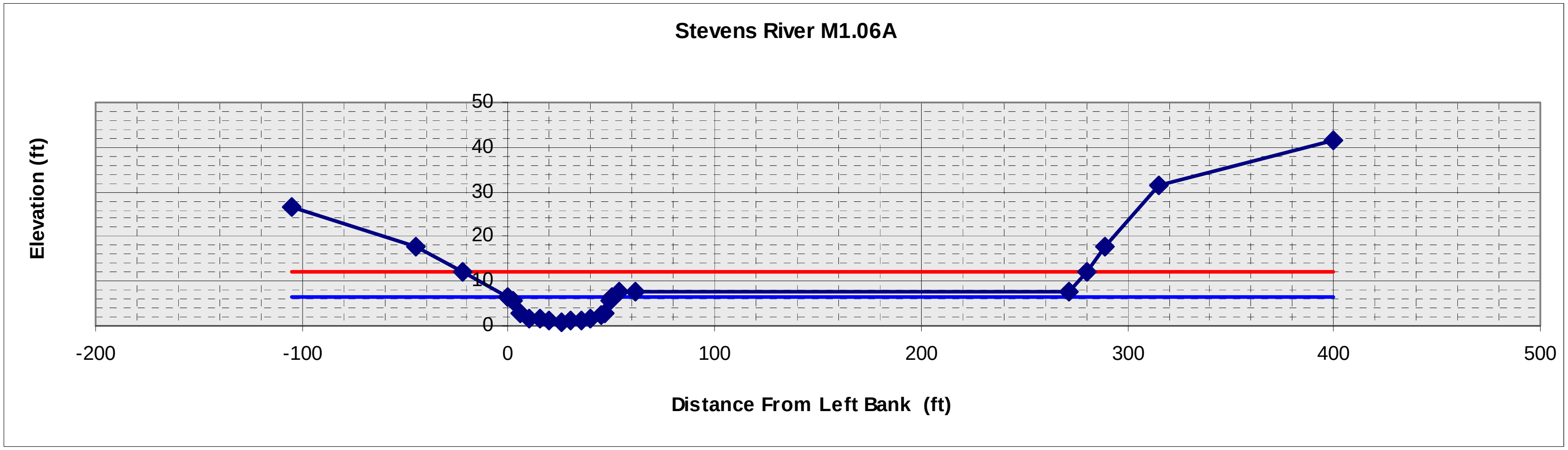

Stevens River M1.02-0
Elevation (ft)
30
25
20
15
10
5
0
0
10
20
30
40
50
60
70
80
90
Distance From Left Bank (ft)

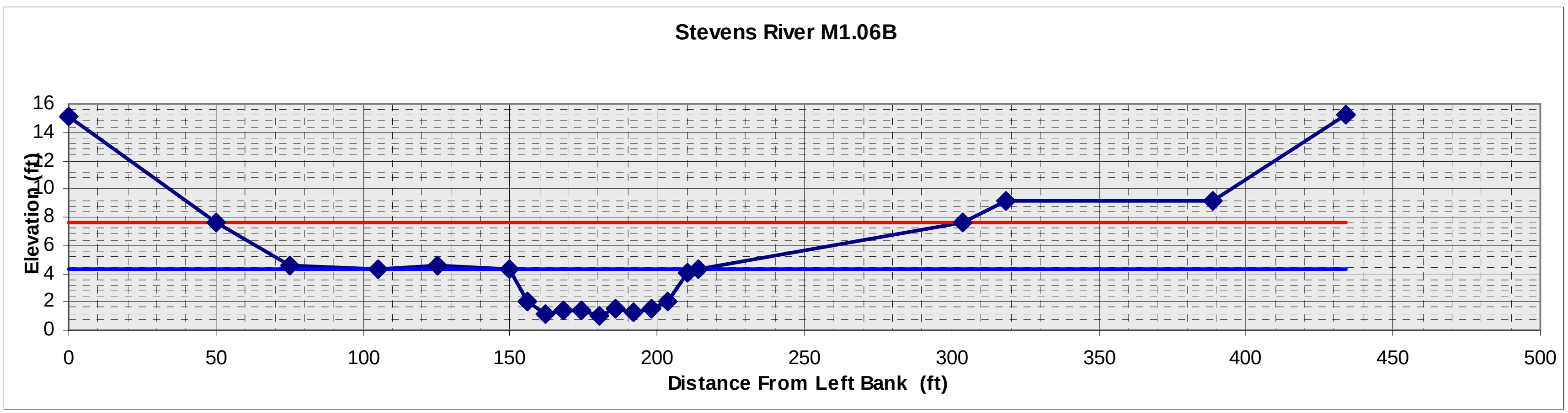

Stevens River M1.03A
Elevation (ft)
30
25
20
15
10
5
0
0
200
400
600
800
1000
1200
Distance From Left Bank (ft)

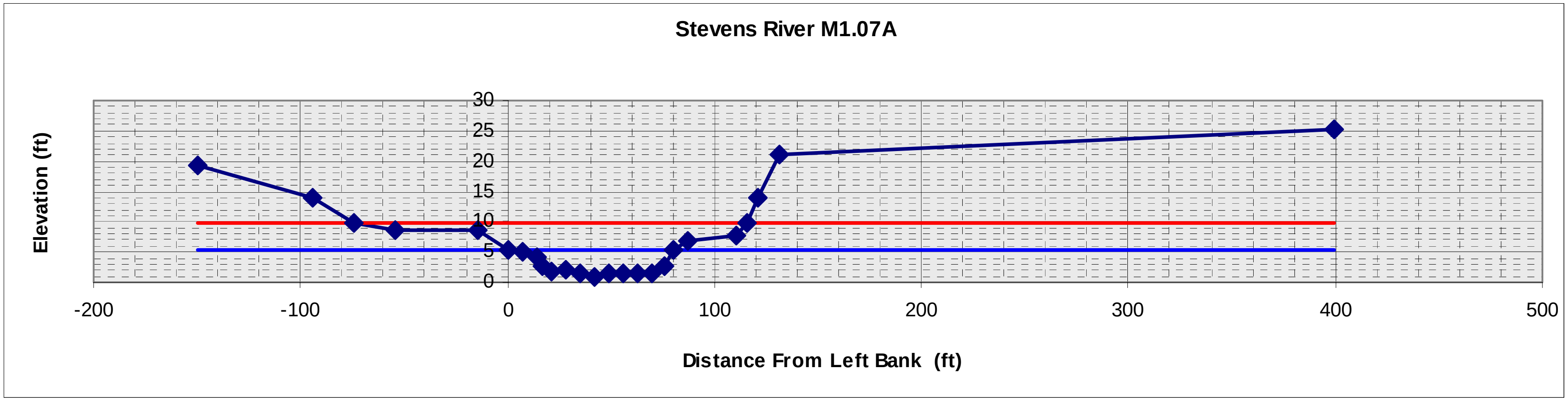

Stevens River M1.03B
Elevation (ft)
50
40
30
20
10
0
0
100
200
300
400
500
600
700
800
Distance From Left Bank (ft)


Stevens River M1.04-0
Elevation (ft)
30
25
20
15
10
5
0
0
50
100
150
200
250
300
Distance From Left Bank (ft)

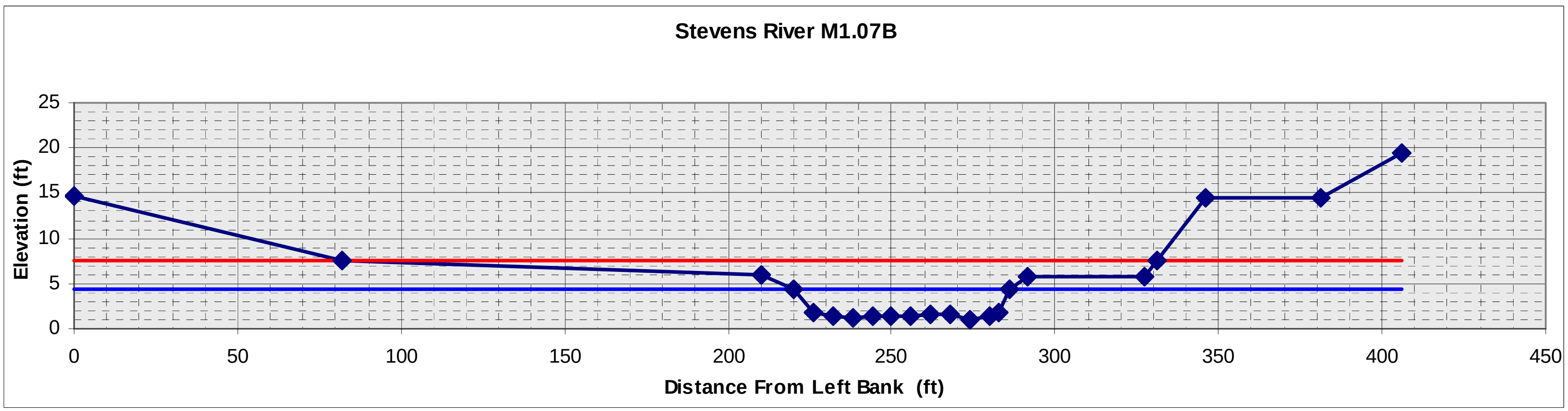

Stevens River M1.05-0
Elevation (ft)
30
25
20
15
10
5
0
0
200
400
600
800
1000
1200
1400
Distance From Left Bank (ft)


Stevens River M1.06A
Elevation (ft)
50
40
30
20
10
0
-200
-100
0
100
200
300
400
500
Distance From Left Bank (ft)

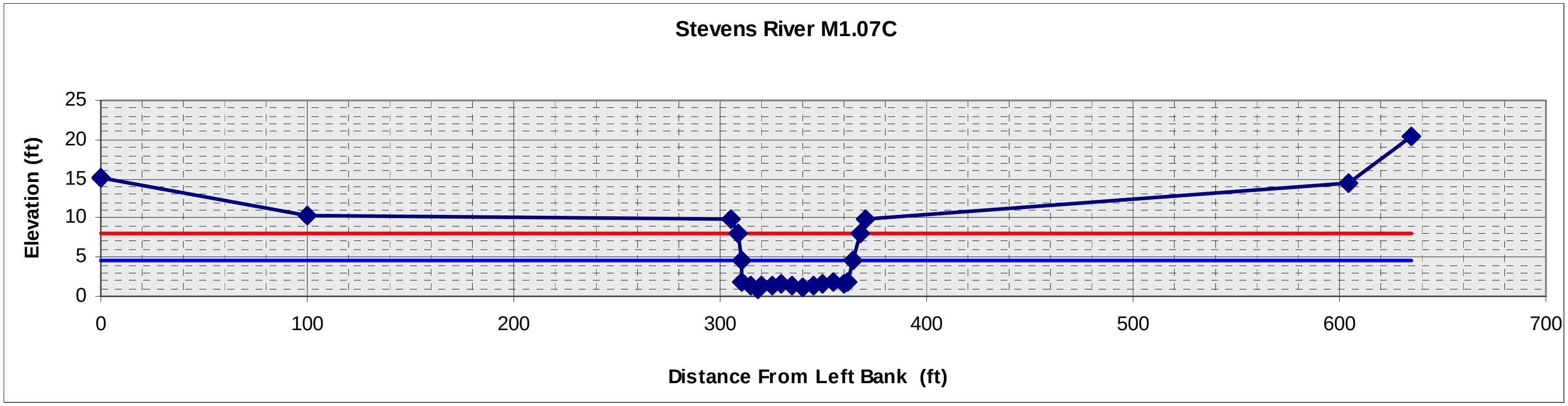

Stevens River M1.06B
Elevation (ft)
16
14
12
10
8
6
4
2
0
0
50
100
150
200
250
300
350
400
450
500
Distance From Left Bank (ft)

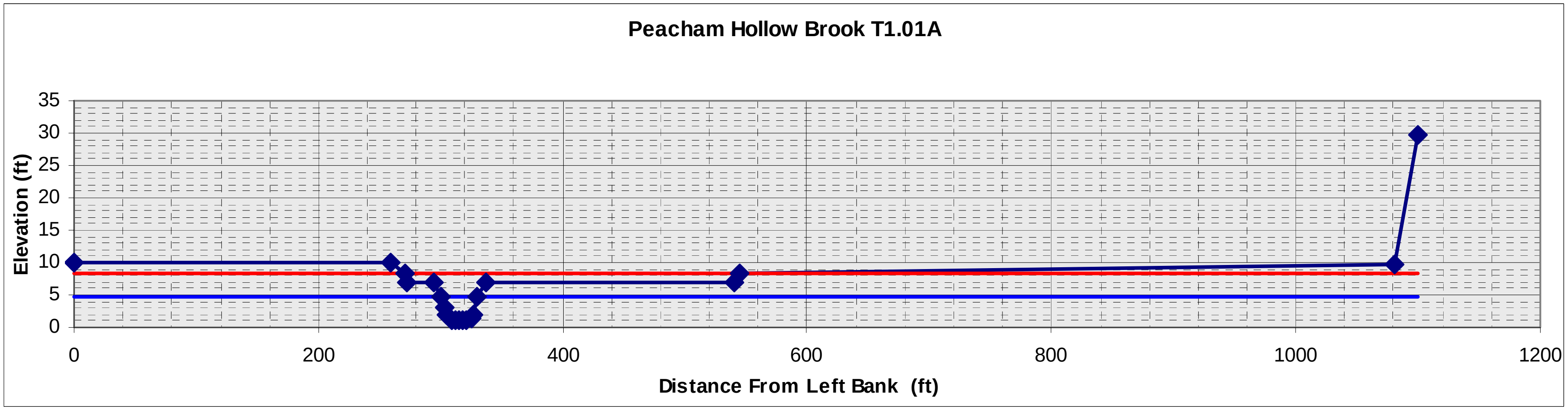


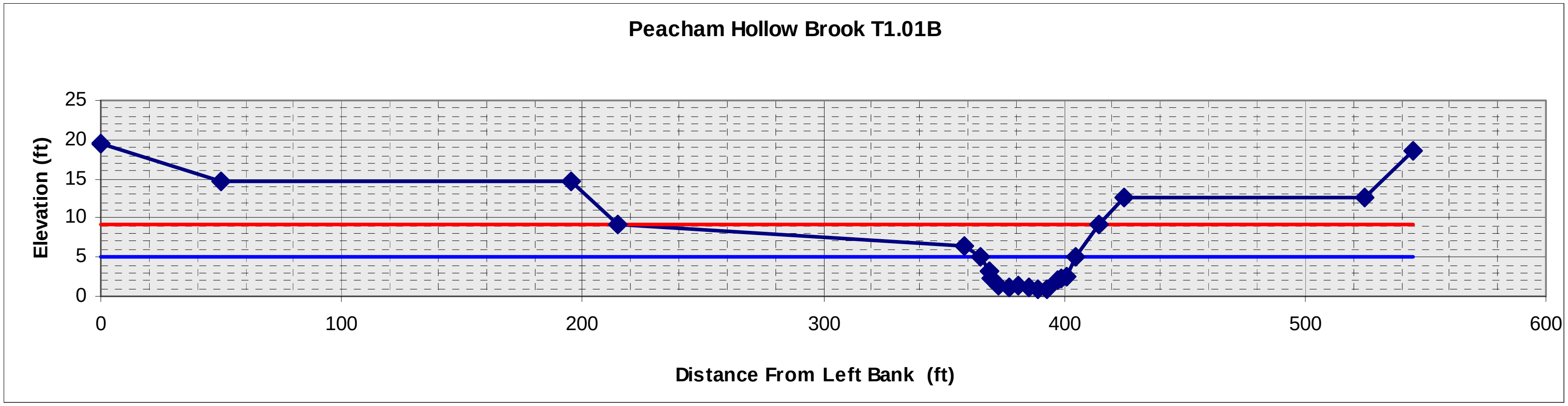
Stevens River M1.07A
Elevation (ft)
30
25
20
15
10
5
0
-200
-100
0
100
200
300
400
500
Distance From Left Bank (ft)

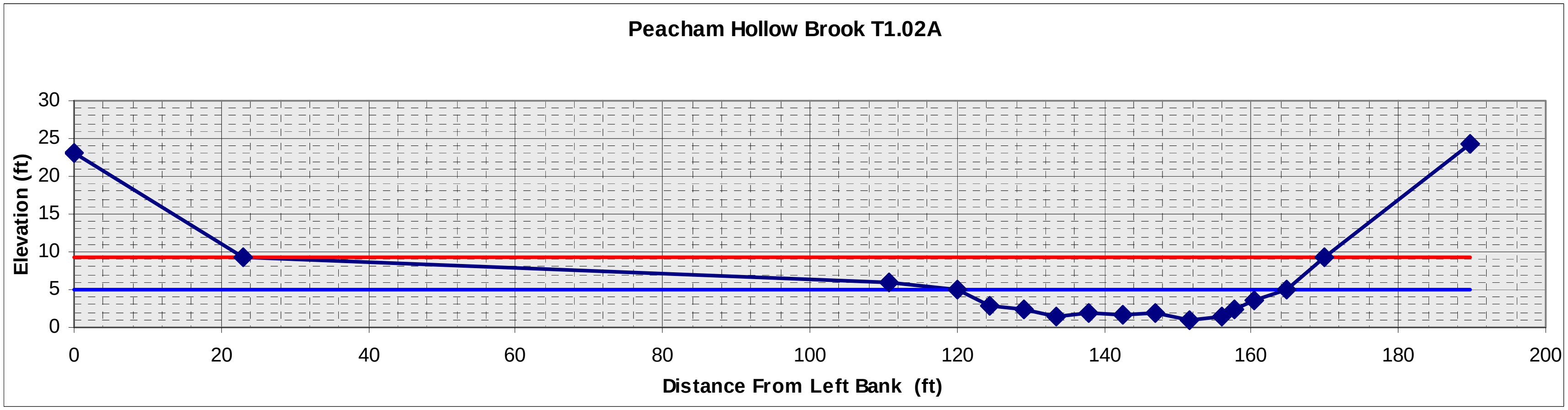


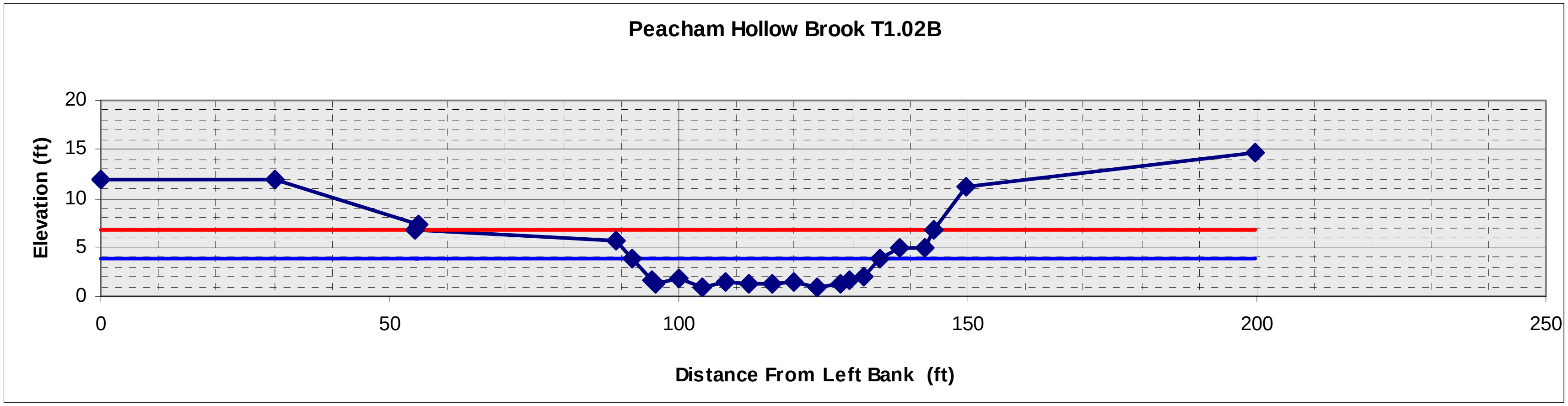
Stevens River M1.07B
Elevation (ft)
25
20
15
10
5
0
0
50
100
150
200
250
300
350
400
450
Distance From Left Bank (ft)

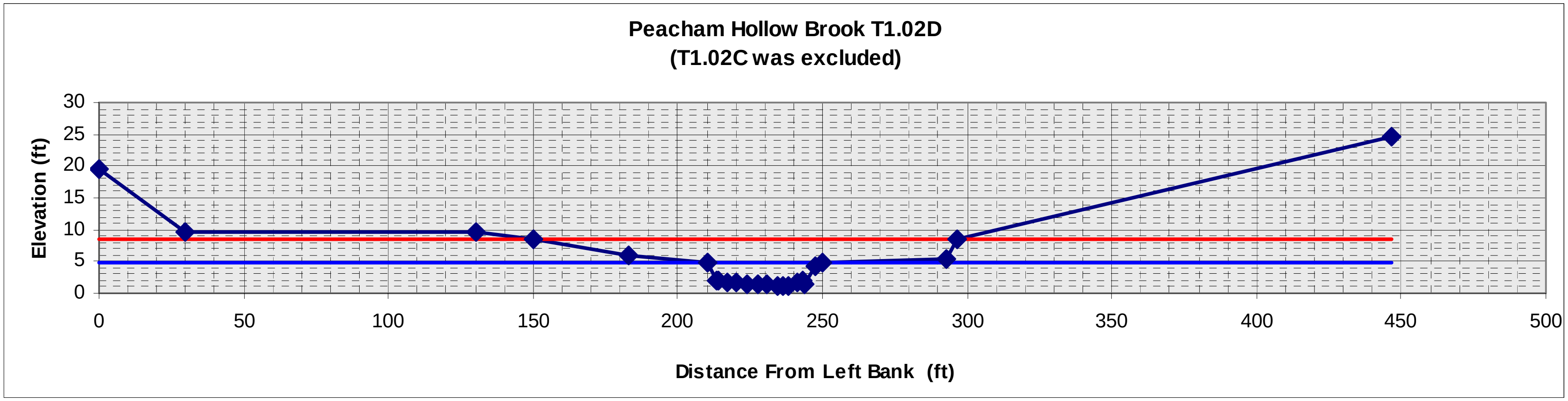

Stevens River M1.07C
Elevation (ft)
25
20
15
10
5
0
0
100
200
300
400
500
600
700
Distance From Left Bank (ft)

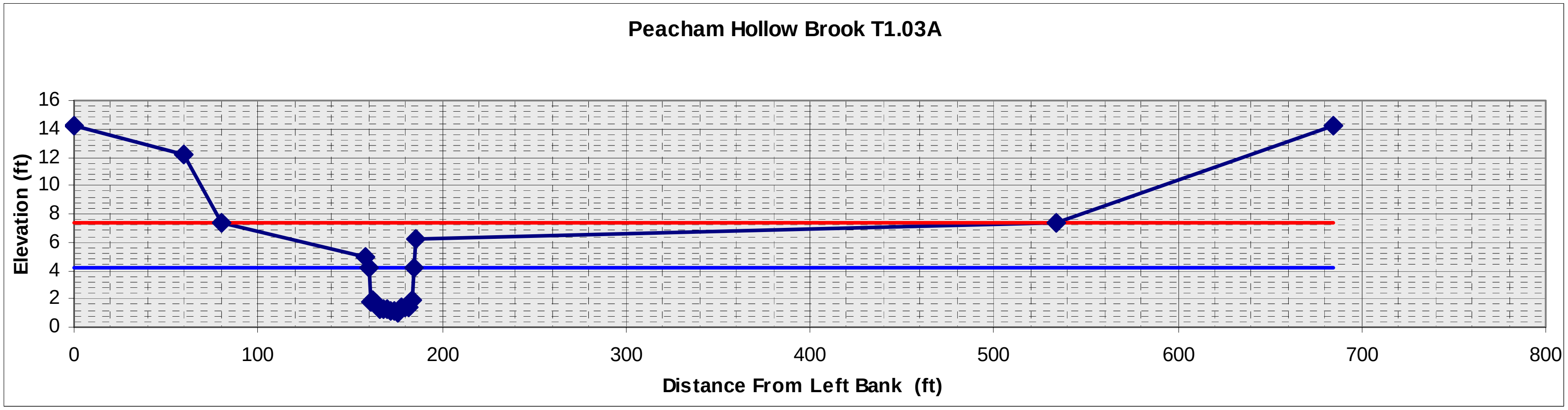

Peacham Hollow Brook T1.01A
Elevation (ft)
35
30
25
20
15
10
5
0
0
200
400
600
800
1000
1200
Distance From Left Bank (ft)

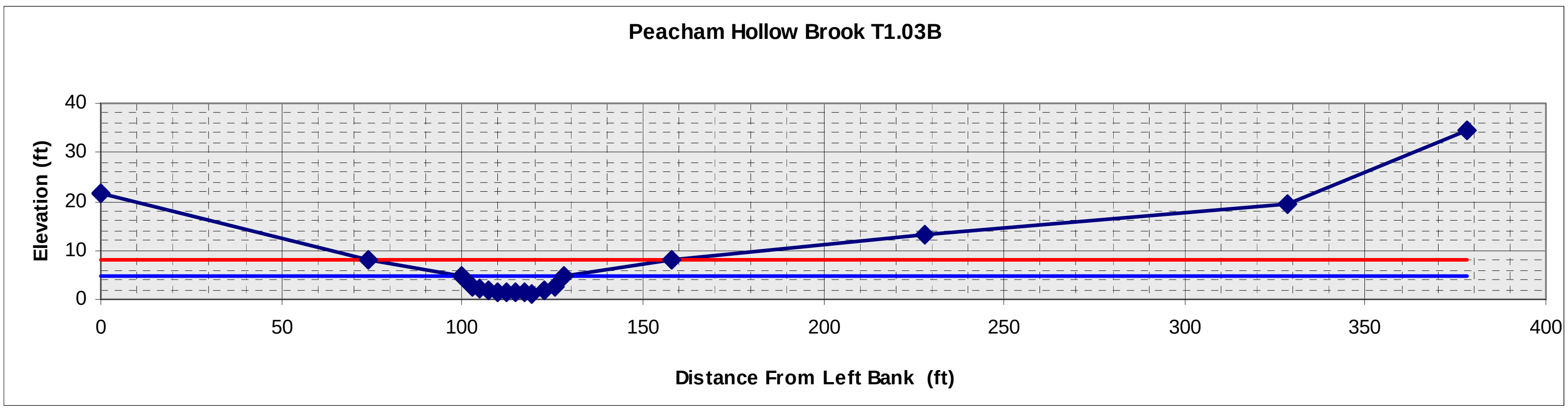

Peacham Hollow Brook T1.01B
Elevation (ft)
25
20
15
10
5
0
0
100
200
300
400
500
600
Distance From Left Bank (ft)

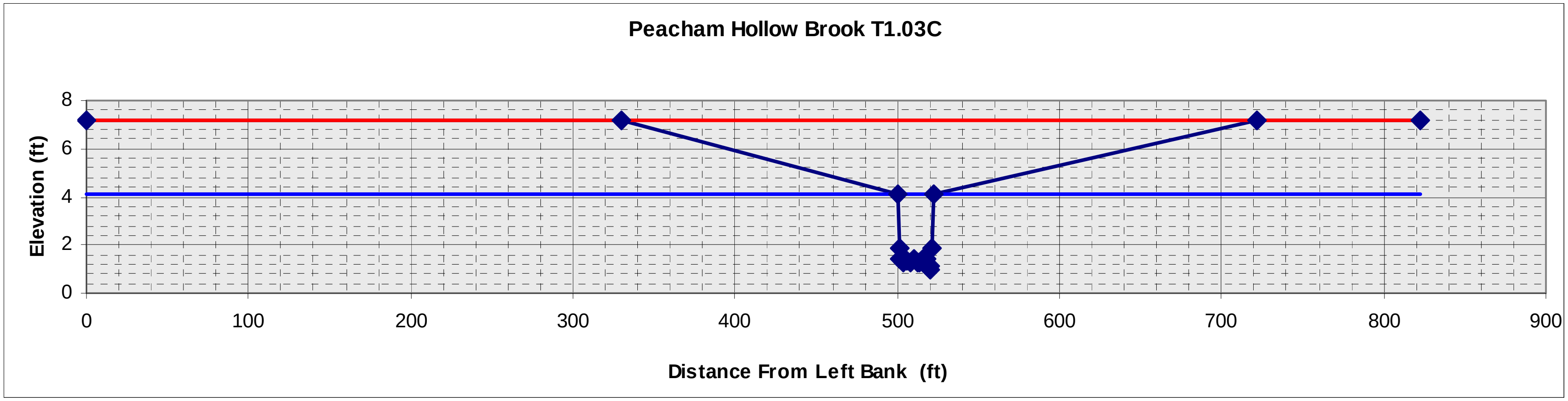

Peacham Hollow Brook T1.02A
Elevation (ft)
30
25
20
15
10
5
0
0
20
40
60
80
100
120
140
160
180
200
Distance From Left Bank (ft)

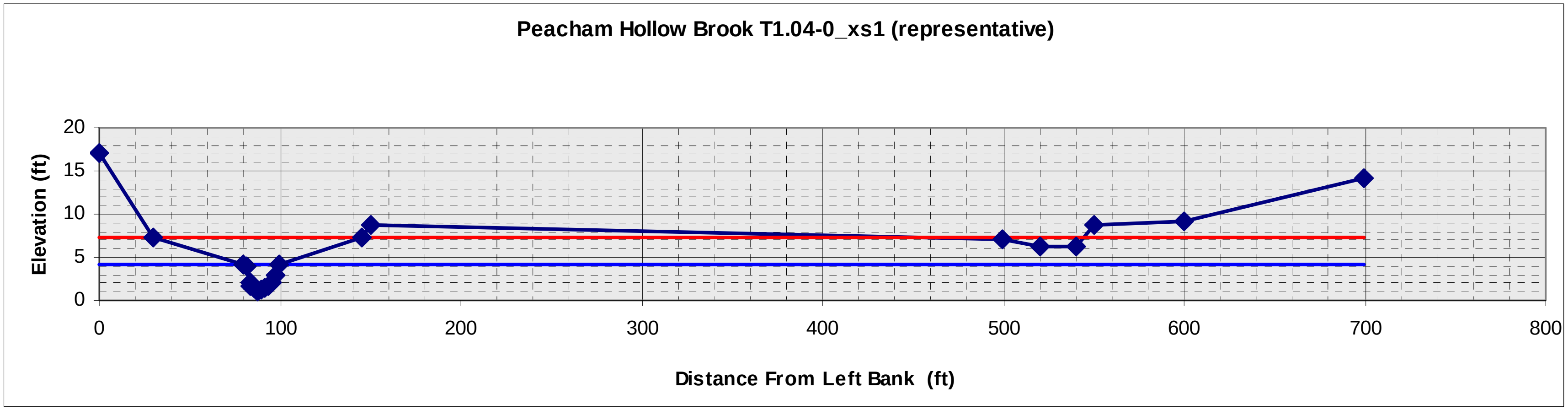

Peacham Hollow Brook T1.02B
Elevation (ft)
20
15
10
5
0
0
50
100
150
200
250
Distance From Left Bank (ft)

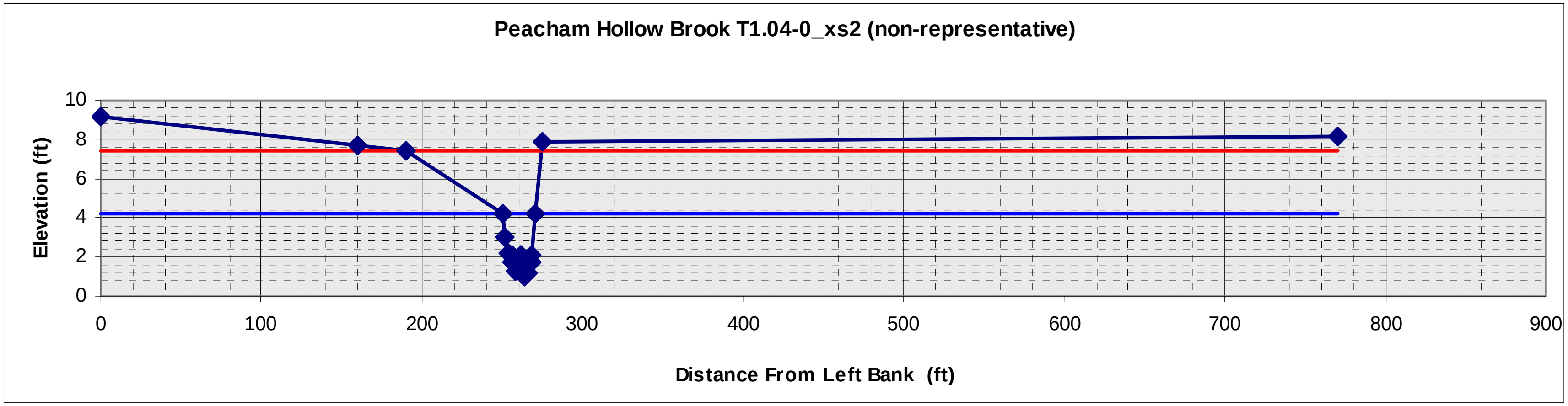

Peacham Hollow Brook T1.02D
(T1.02C was excluded)
Elevation (ft)
30
25
20
15
10
5
0
0
50
100
150
200
250
300
350
400
450
500
Distance From Left Bank (ft)

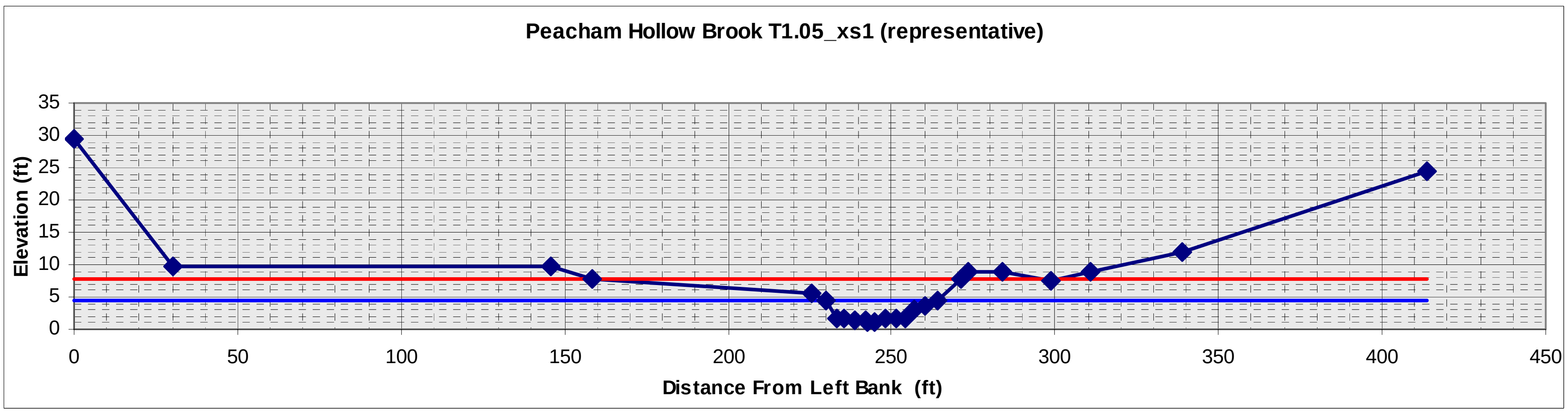

Peacham Hollow Brook T1.03A
Elevation (ft)
16
14
12
10
8
6
4
2
0
0
100
200
300
400
500
600
700
800
Distance From Left Bank (ft)

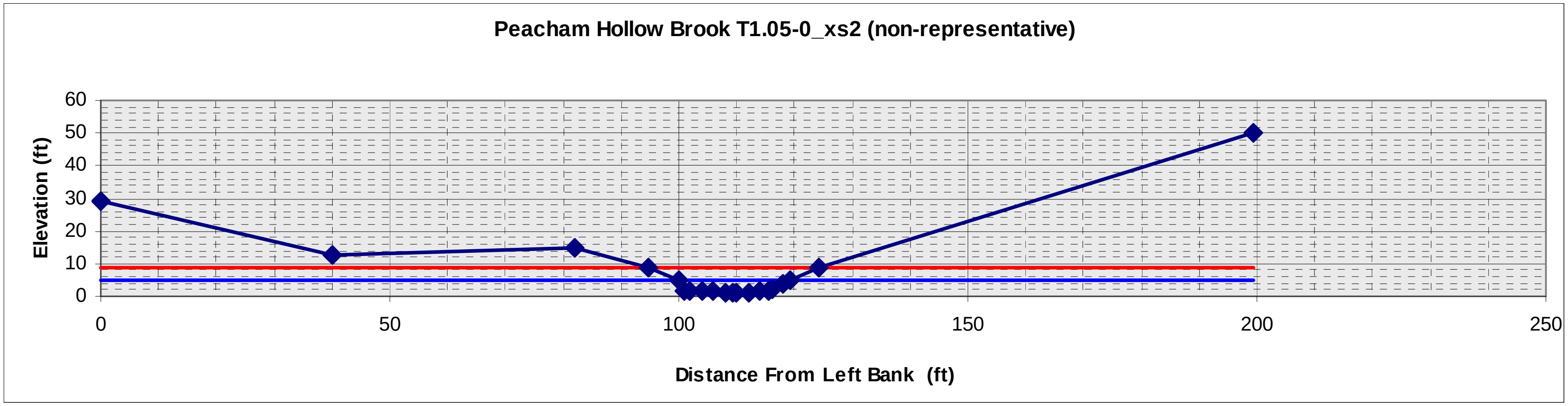

Peacham Hollow Brook T1.03B
Elevation (ft)
40
30
20
10
0
0
50
100
150
200
250
300
350
400
Distance From Left Bank (ft)

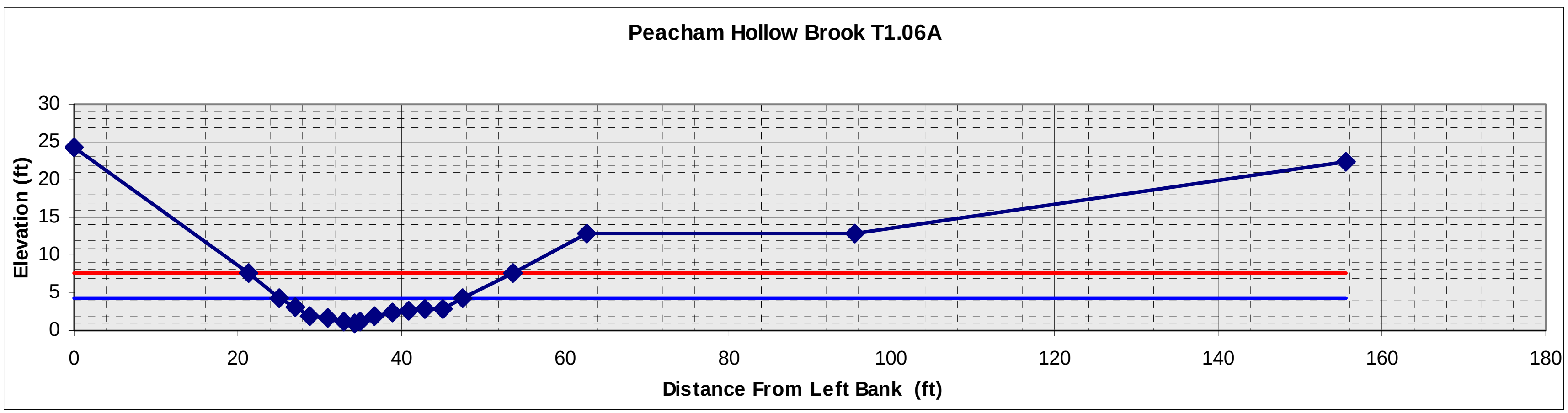

Peacham Hollow Brook T1.03C
Elevation (ft)
0
2
4
6
8
0
100
200
300
400
500
600
700
800
900
Distance From Left Bank (ft)

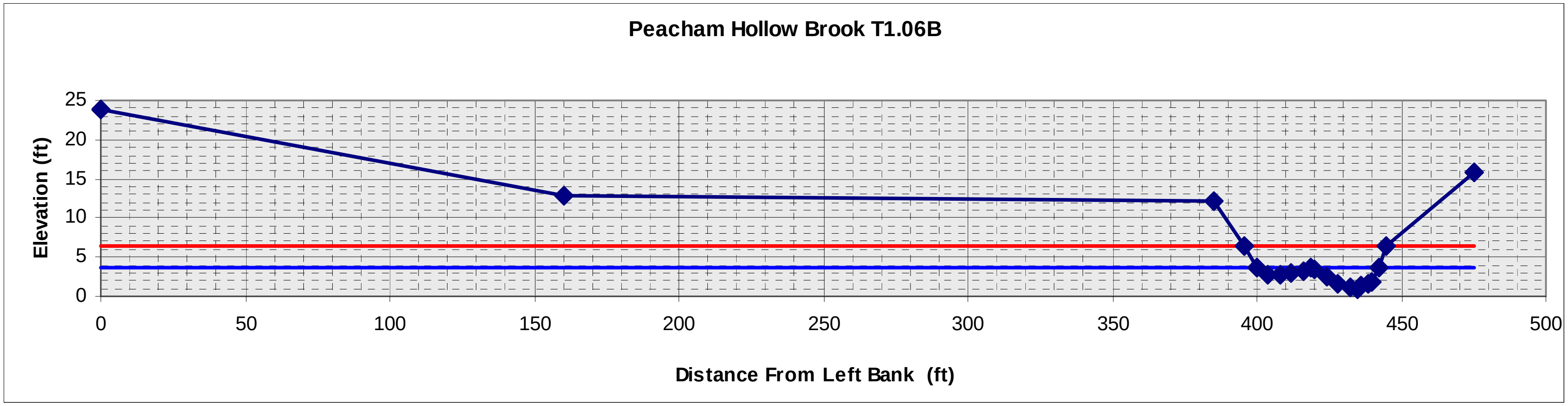

Peacham Hollow Brook T1.04-0_xs1 (representative)
Elevation (ft)
0
5
10
15
20
0
100
200
300
400
500
600
700
800
Distance From Left Bank (ft)

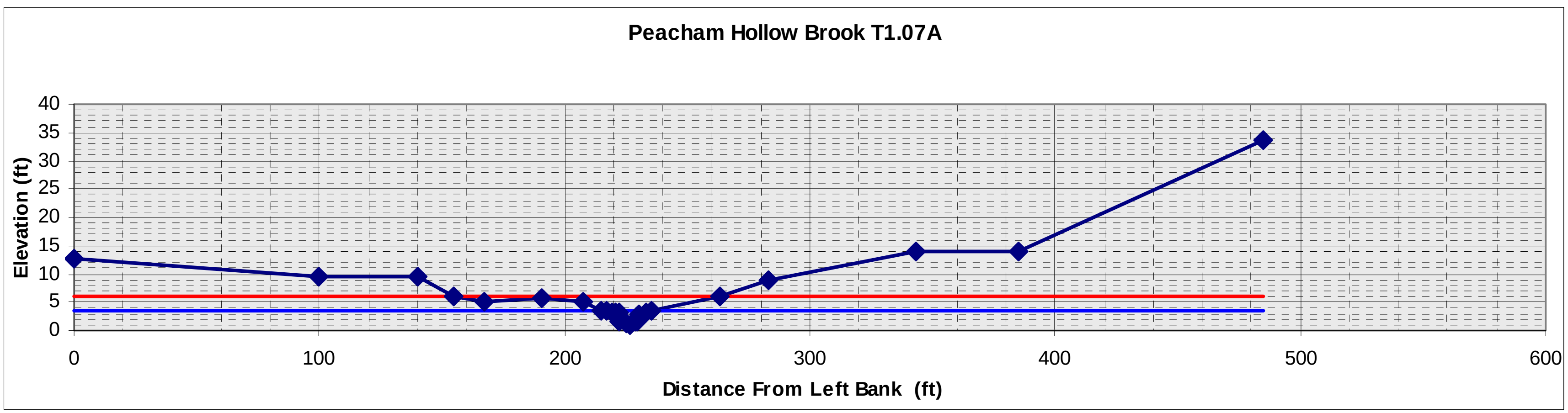

Peacham Hollow Brook T1.04-0_xs2 (non-representative)
Elevation (ft)
10
8
6
4
2
0
0
100
200
300
400
500
600
700
800
900
Distance From Left Bank (ft)

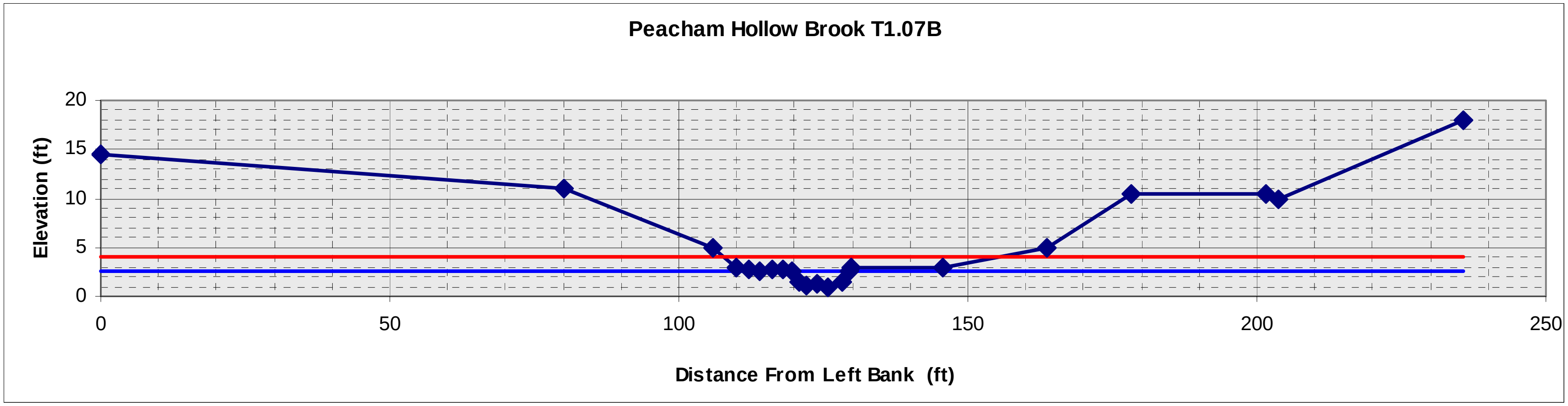

Peacham Hollow Brook T1.05_xs1 (representative)
Elevation (ft)
35
30
25
20
15
10
5
0
0
50
100
150
200
250
300
350
400
450
Distance From Left Bank (ft)

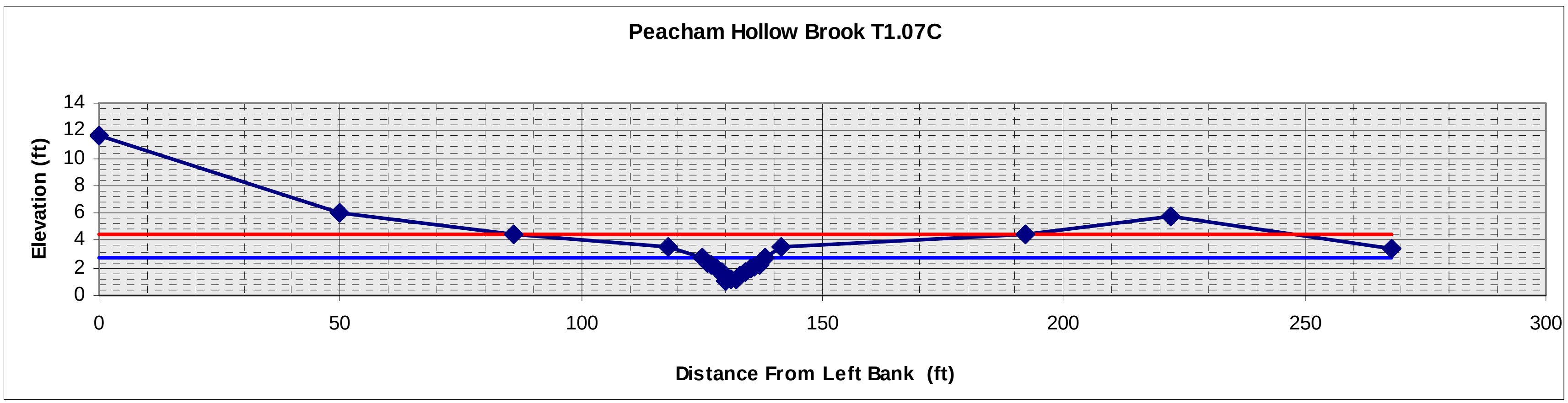

Peacham Hollow Brook T1.05-0_xs2 (non-representative)
Elevation (ft)
60
50
40
30
20
10
0
0
50
100
150
200
250
Distance From Left Bank (ft)

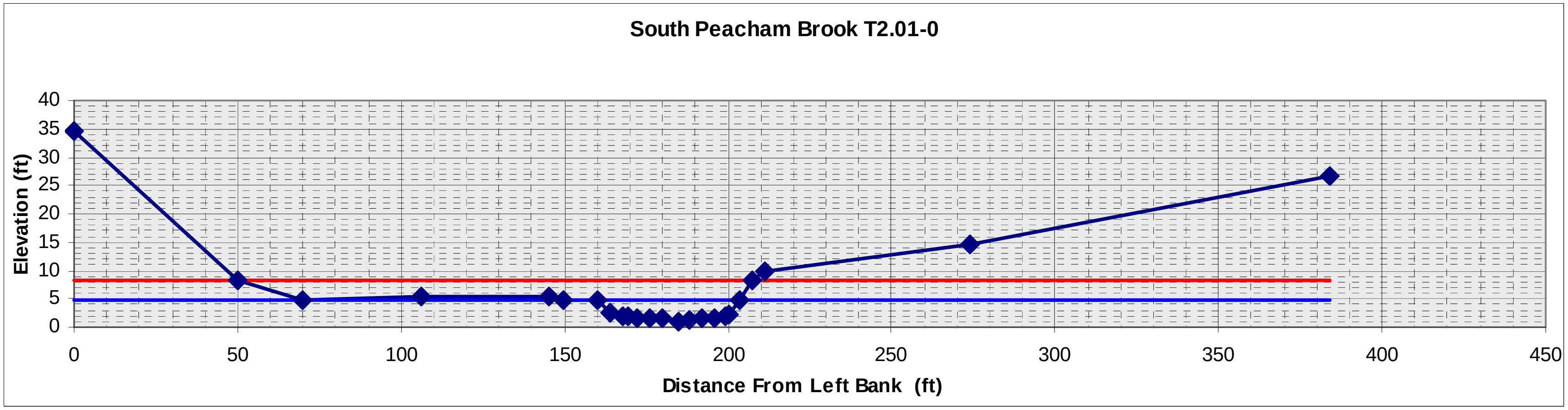

Peacham Hollow Brook T1.06A
Elevation (ft)
30
25
20
15
10
5
0
0
20
40
60
80
100
120
140
160
180
Distance From Left Bank (ft)

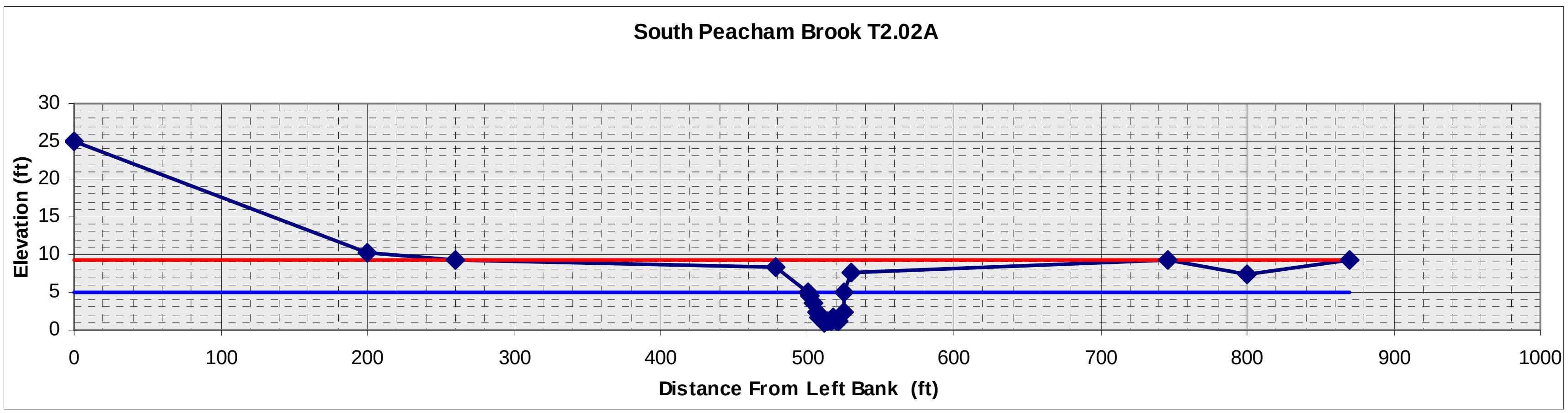

Peacham Hollow Brook T1.06B
Elevation (ft)
25
20
15
10
5
0
0
50
100
150
200
250
300
350
400
450
500
Distance From Left Bank (ft)

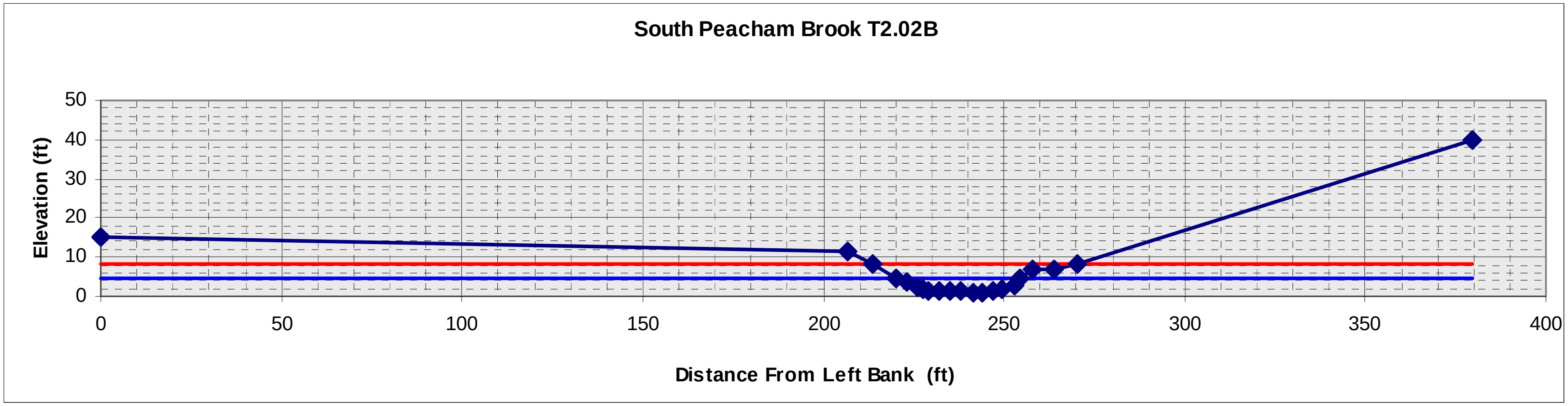

Peacham Hollow Brook T1.07A
Elevation (ft)
40
35
30
25
20
15
10
5
0
0
100
200
300
400
500
600
Distance From Left Bank (ft)

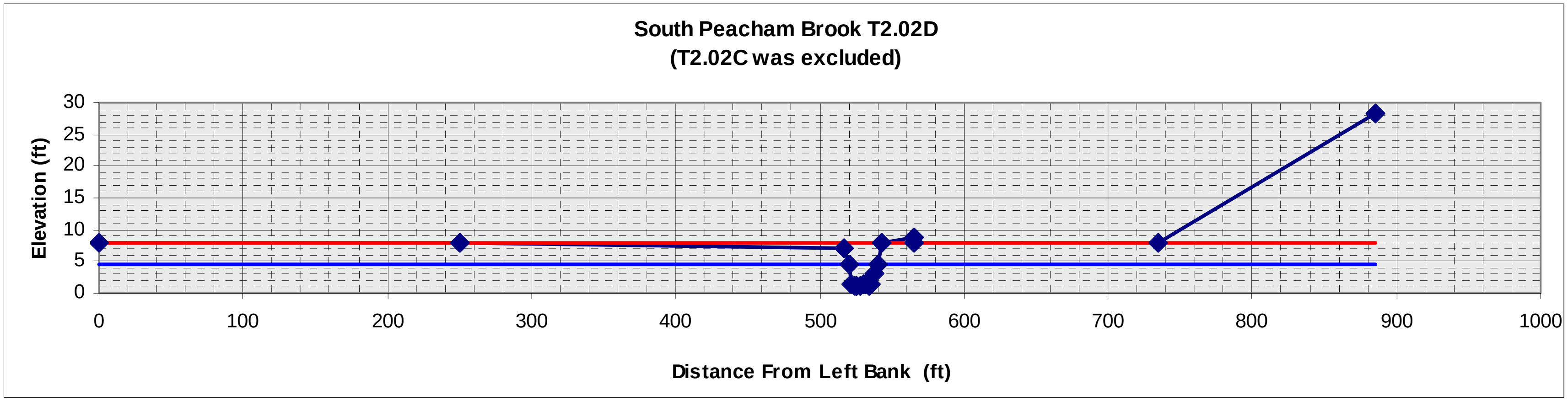

Peacham Hollow Brook T1.07B
Elevation (ft)
20
15
10
5
0
0
50
100
150
200
250
Distance From Left Bank (ft)

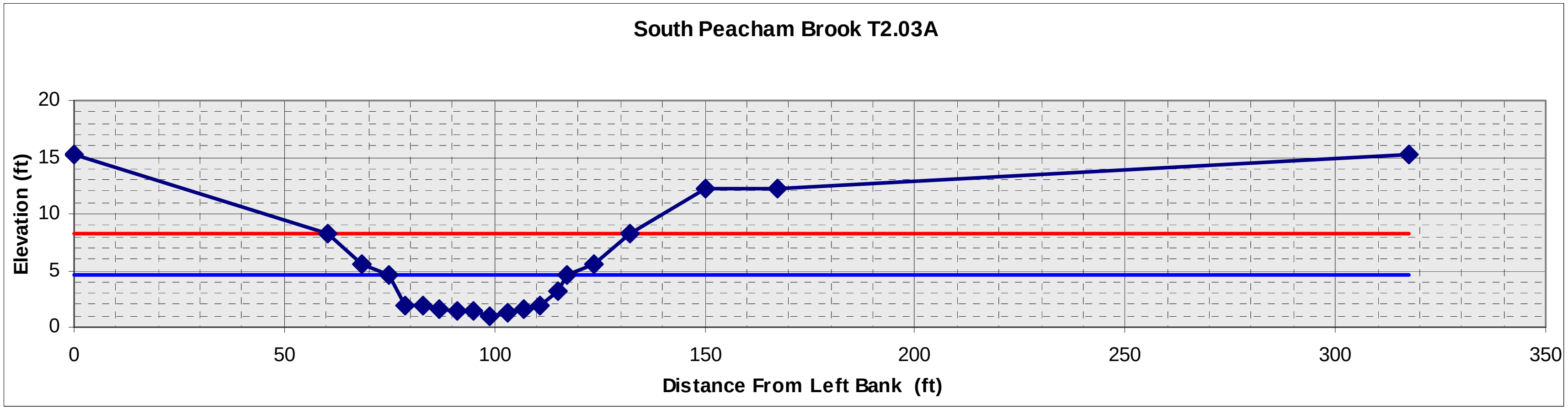

Peacham Hollow Brook T1.07C
Elevation (ft)
14
12
10
8
6
4
2
0
0
50
100
150
200
250
300
Distance From Left Bank (ft)

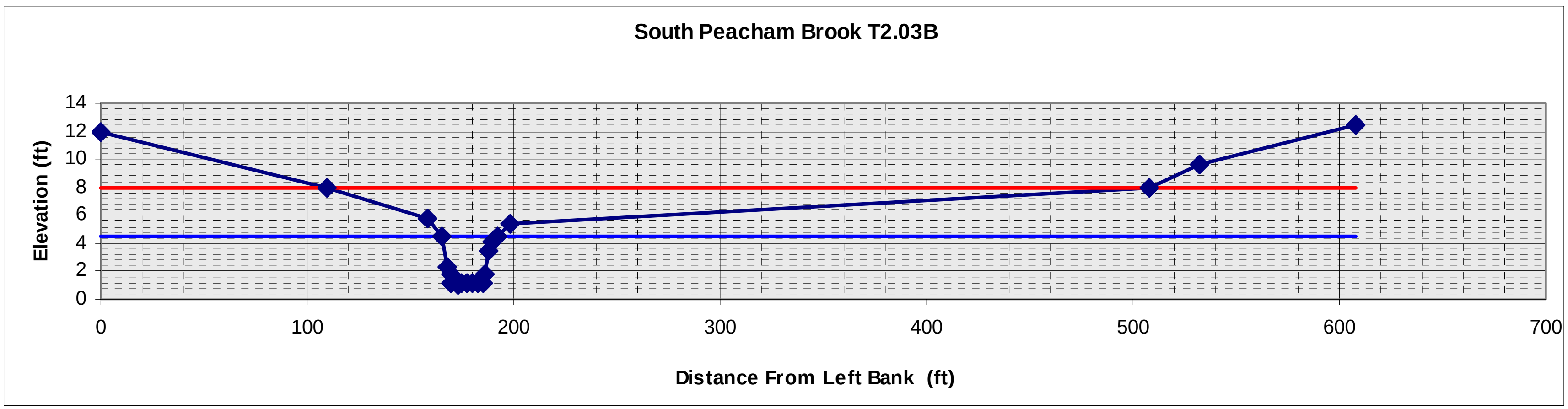

South Peacham Brook T2.01-0
Elevation (ft)
40
35
30
25
20
15
10
5
0
0
50
100
150
200
250
300
350
400
450
Distance From Left Bank (ft)

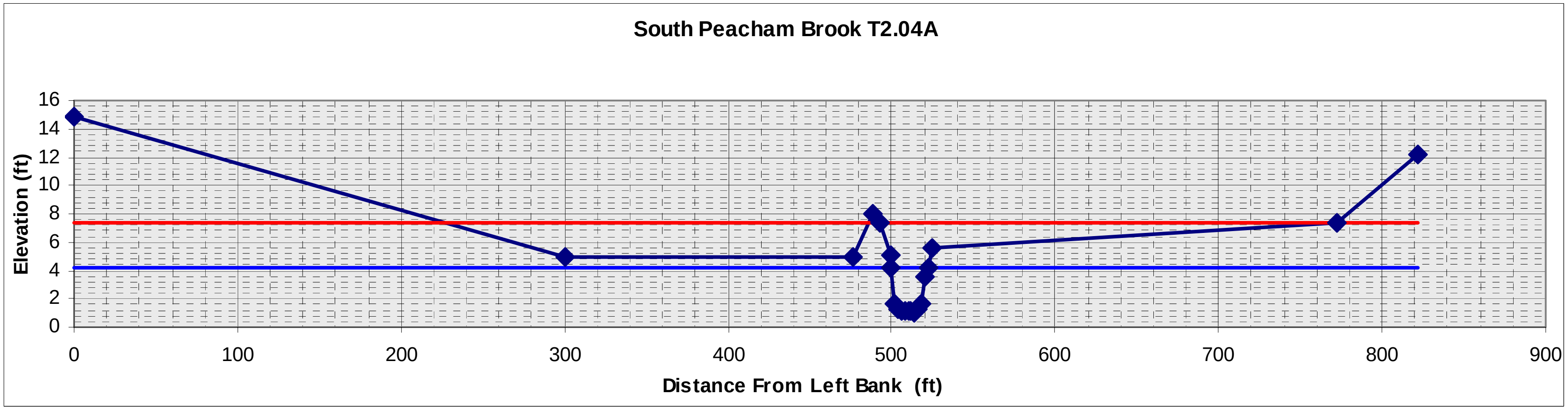

South Peacham Brook T2.02A
Elevation (ft)
30
25
20
15
10
5
0
0
100
200
300
400
500
600
700
800
900
1000
Distance From Left Bank (ft)

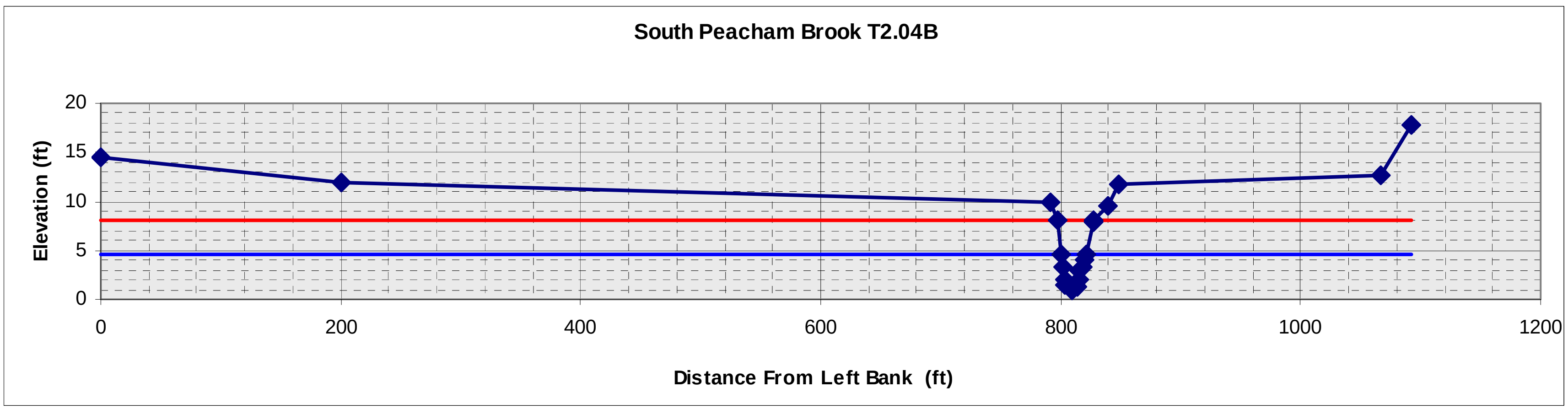

South Peacham Brook T2.02B
Elevation (ft)
0
10
20
30
40
50
0
50
100
150
200
250
300
350
400
Distance From Left Bank (ft)

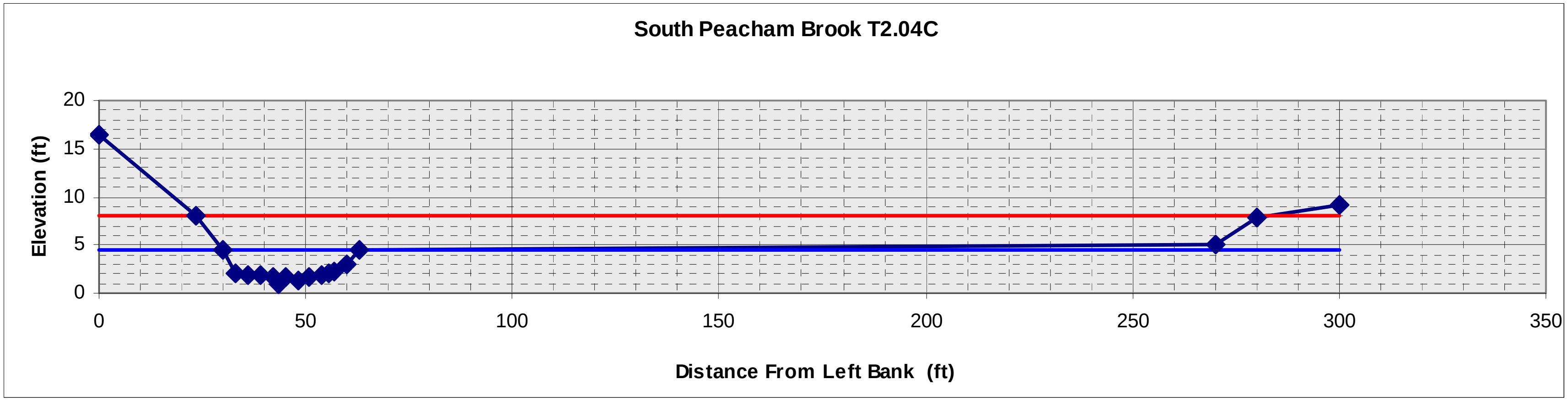

South Peacham Brook T2.02D
(T2.02C was excluded)
Elevation (ft)
0
5
10
15
20
25
30
0
100
200
300
400
500
600
700
800
900
1000
Distance From Left Bank (ft)

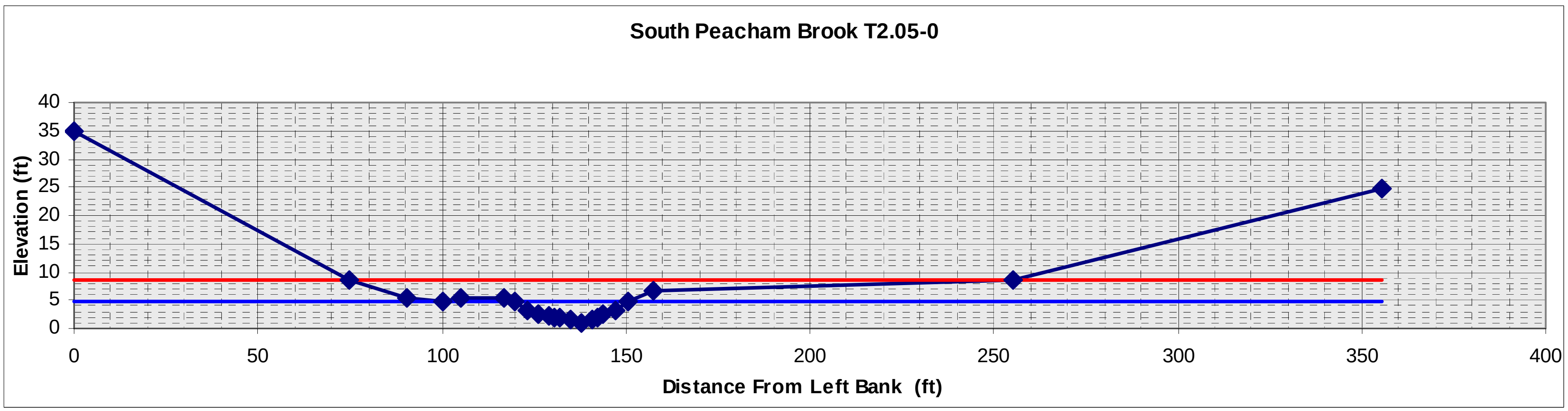

South Peacham Brook T2.03A
Elevation (ft)
20
15
10
5
0
0
50
100
150
200
250
300
350
Distance From Left Bank (ft)


South Peacham Brook T2.03B
Elevation (ft)
14
12
10
8
6
4
2
0
0
100
200
300
400
500
600
700
Distance From Left Bank (ft)


South Peacham Brook T2.04A
Elevation (ft)
16
14
12
10
8
6
4
2
0
0
100
200
300
400
500
600
700
800
900
Distance From Left Bank (ft)


South Peacham Brook T2.04B
Elevation (ft)
20
15
10
5
0
0
200
400
600
800
1000
1200
Distance From Left Bank (ft)


South Peacham Brook T2.04C
Elevation (ft)
20
15
10
5
0
0
50
100
150
200
250
300
350
Distance From Left Bank (ft)


South Peacham Brook T2.05-0
Elevation (ft)
40
35
30
25
20
15
10
5
0
0
50
100
150
200
250
300
350
400
Distance From Left Bank (ft)

- Appendix 5 -
Quality Assurance/Quality Control Documentation

Notes: T1.02C, T1.06C and T2.02C were excluded segments in Phase 2
(due to beaver and human dam impoundment influences); some parameters could not be assessed

T1.03-0, T2S1.06-0 and T2S1.06A were mistaken entries
(not assessed reaches) that could not be cleared from reports

Phase 2 - Quality Control - X.1 Null Fields

Stevens River

Step Number	0	1.3	1.6	2.11	2.13	2.14	3.1			3.3		4.5	4.8	4.9	5.1
Description -> Reach	Assessed	Encroa-chments	Grade Controls	Riffle Spacing	Largest Particle	Stream Type	Texture	Erosion	Revet-ment	Failure Height	Gully Height	Impound-ment	Constrictions	Beaver Dams	Bar Type
M101-0	Yes														
M102-0	Yes														
M103-A	Yes														
M103-B	Yes														
M104-0	Yes														
M105-0	Yes														
M106-A	Yes														
M106-B	Yes														
M107-A	Yes														
M107-B	Yes														
M107-C	Yes														
T1.01-A	Yes														
T1.01-B	Yes														
T1.02-A	Yes														
T1.02-B	Yes														
T1.02-C	No			X	X	X									
T1.02-D	Yes														
T1.03-0	No	X	X	X	X	X	X					X	X	X	
T1.03-A	Yes														
T1.03-B	Yes														
T1.03-C	Yes														
T1.04-0	Yes														
T1.05-0	Yes														
T1.06-A	Yes														
T1.06-B	Yes														
T1.06-C	No			X	X										
T1.07-A	Yes														

Step Number	0	1.3	1.6	2.11	2.13	2.14	3.1			3.3		4.5	4.8	4.9	5.1
Description -> Reach	**Assessed**	**Encroa-chments**	**Grade Controls**	**Riffle Spacing**	**Largest Particle**	**Stream Type**	**Texture**	**Erosion**	**Revet-ment**	**Failure Height**	**Gully Height**	**Impound-ment**	**Constrictions**	**Beaver Dams**	**Bar Type**
T1.07-B	Yes														
T1.07-C	Yes														
T2.01-0	Yes														
T2.02-A	Yes														
T2.02-B	Yes														
T2.02-C	No			X	X	X							X		X
T2.02-D	Yes														
T2.03-A	Yes														
T2.03-B	Yes														
T2.04-A	Yes														
T2.04-B	Yes														
T2.04-C	Yes														
T2.05-0	Yes														
T2.S1.06-0	No	X	X	X	X	X	X					X	X	X	
T2.S1.06-A	No	X	X	X	X	X	X					X	X	X	

x = Failed Test, blank = Passed Test

Phase 2 - Quality Control

Stevens River

X.2 Null Field Check and X.4 Conflicting Phase 1 vs Phase 2 Data

X.2 Null Fields Check **Status** Provisional

Reach v Step >	0	1	2	3	4	5
M101-0						
M102-0						
M103-A						
M103-B						
M104-0						
M105-0						
M106-A						
M106-B						
M107-A						
M107-B						
M107-C						
T1.01-A						
T1.01-B						
T1.02-A						
T1.02-B						
T1.02-C			X	X		X
T1.02-D						
T1.03-0	X	X	X	X	X	X
T1.03-A						
T1.03-B						
T1.03-C						
T1.04-0						
T1.05-0						
T1.06-A						
T1.06-B						
T1.06-C		X	X			X
T1.07-A						

X.4 Conflicting Phase 1 - Phase 2 data **Status** Provisional

Reach v Step >	P1 2.4 P2 0	P1 2.9 P2 1.5	P1 2.10 P2 1.5	P1 3.1 P2 1.2	P1 5.1 P2 4.5	P1 5.5 P2 5.5	P1 7.1 P2 2.14
M101-0							
M102-0							
M103-A							
M103-B							
M104-0							
M105-0							
M106-A							
M106-B							
M107-A							
M107-B							
M107-C							
T1.01-A							
T1.01-B							
T1.02-A							
T1.02-B							
T1.02-C							
T1.02-D							
T1.03-0					X		
T1.03-A							
T1.03-B							
T1.03-C							
T1.04-0							
T1.05-0							
T1.06-A							
T1.06-B							
T1.06-C							

Reach v Step >	0	1	2	3	4	5
T1.07-B						
T1.07-C						
T2.01-0						
T2.02-A						
T2.02-B						
T2.02-C			X		X	
T2.02-D						
T2.03-A						
T2.03-B						
T2.04-A						
T2.04-B						
T2.04-C						
T2.05-0						
T2.S1.06-0	X	X	X	X	X	X
T2.S1.06-A	X	X	X	X	X	X

Reach v Step >	P1 2.4 P2 0	P1 2.9 P2 1.5	P1 2.10 P2 1.5	P1 3.1 P2 1.2	P1 5.1 P2 4.5	P1 5.5 P2 5.5	P1 7.1 P2 2.14
T1.07-A							
T1.07-B							
T1.07-C							
T2.01-0							
T2.02-A							
T2.02-B							
T2.02-C							
T2.02-D							
T2.03-A							
T2.03-B							
T2.04-A							
T2.04-B							
T2.04-C							
T2.05-0							
T2.S1.06-0	X	X	X	X	X	X	X
T2.S1.06-A	X	X	X	X	X	X	X

x = Failed Test, blank = Passed Test

Phase 2 - Quality Control - X.3 Conflicting Phase 2 data

Stevens River

Passed X.3 Test: **Provisional**

Step Numbers	1.3 - 3.3	1.3 - 1.5	1.5 - 2.1	2.14 - 2.11	2.10 - 5.3	2.10 - 5.3	5.3 - 5.3	2.14 - 2.14	3.2 - 3.3	4.1 - 5.3
Reach v Description >	Encroachments Industriall Land Use	Encroachments Human Caused Change	Valley Width Bankfull Width	Riffle Spacing Plane Bed	Riffle Type Steep Riffles	Riffle Type Head Cutts	Steep Riffles Head Cuts	Dune Ripple Bed Material	Buffer Type Industrial Land Use	Springs/Seeps Tributary Rejuvenation
M101-0										
M102-0										
M103-A										
M103-B										
M104-0										
M105-0										
M106-A										
M106-B										
M107-A										
M107-B										
M107-C										
T1.01-A										
T1.01-B										
T1.02-A										
T1.02-B										
T1.02-C			X	X				X		
T1.02-D										
T1.03-0			X	X	X	X	X	X		X
T1.03-A										
T1.03-B										
T1.03-C										
T1.04-0										
T1.05-0										
T1.06-A										
T1.06-B										

Step Numbers	1.3 - 3.3	1.3 - 1.5	1.5 - 2.1	2.14 - 2.11	2.10 - 5.3	2.10 - 5.3	5.3 - 5.3	2.14 - 2.14	3.2 - 3.3	4.1 - 5.3
Reach v Description >	Encroachments Industriall Land Use	Encroachments Human Caused Change	Valley Width Bankfull Width	Riffle Spacing Plane Bed	Riffle Type Steep Riffles	Riffle Type Head Cutts	Steep Riffles Head Cuts	Dune Ripple Bed Material	Buffer Type Industrial Land Use	Springs/Seeps Tributary Rejuvenation
T1.06-C										
T1.07-A										
T1.07-B										
T1.07-C										
T2.01-0										
T2.02-A										
T2.02-B										
T2.02-C			X	X				X		
T2.02-D										
T2.03-A										
T2.03-B										
T2.04-A										
T2.04-B										
T2.04-C										
T2.05-0										
T2.S1.06-0			X	X	X	X	X	X		
T2.S1.06-A			X	X	X	X	X	X		X

x = Failed QC Test, blank = passed QC Test

Phase 2 X.1 - X.4 Quality Control Comments   Stevens River

T1.06- B	X.2, Step 2 contains null values
	Current LVW is a high terrace (11 ft above thalweg) that appears likely to be of glacial origin; was originally accounted as LTER but reassessed as current LVW. RAF in step 2 is blank because of difficulty in determining if this feature is of glacial origin, or represents historic (i.e., post-glacial) incision.

Stevens River
Phase 2 Quality Assurance
To: Sacha Pealer, VT DEC River Management
From: Daniel Ruddell, Redstart Forestry and Consulting
Date: 6/14/2011

Note: This Quality Assurance document relates to phase 2 segments of **M1.01to M1.07 (Stevens River), T1.01 to T1.07 (Peacham Hollow Brook), and T2.01 to T2.05 (South Peacham Brook).**

Responses from Redstart, 6/6/11, in blue.

SP: Notes for RMP added on 6/10/11 in green.

Redstart 6/12/11 in dark red. Redstart 6/15/11 in orange, based on further discussion and assessment of items so denoted.

General Comments:

- Straightening with windrowing generally suggests some dredging. You can FIT dredging w/general location. See M1.03B, M1.07C, T1.01A & B, T1.03B, T1.04, T2.02B OK, done

Comments by Reach:

M1.01-0

- Step 4.6. If CT River dam is affecting this segment, then suggest selecting "Downstream" for this step. done
- XS: Please check labels for errors and fix. What is "fbf"? Should this be RBF for right bankfull? Also, how can right top of bank be lower than bankfull? Not possible? fbf changed to rbf; noted RTOB is actually a slump feature
- Step 7.1. If incision is no longer active (as reach is now in stage III), then it should be "yes" for historic.done
- Step 6 indicates existing bedform is planebed, but step 2 says bedform is riffle pool. Which is correct? These two bedforms should be the same. Step 6 plane bed changed to riffle-pool
- Also changed valley width and confinement to Broad – RR embankment confines reach under all but highest flows – but highest flows are likely to go to CT River floodplain at Carter/Creamery St

M1.02-0

- This reach was excluded in ph. 1, probably because of steep waterfall and hydropower facilities. Why did you decide to assess it in ph. 2? I recommend not using xsection for RGA. It is located above the outflow for a diversion/turbine, and its reduced x-sectional area and channel width reflect that. This type of reach is probably not suitable for full ph. 2 assessment, although the data you collected can still be useful. I'm thinking it would be better only partially assessed, ie, do not complete RGA. XS can be descriptive, and you can add explanation to DMS addressing why it could't be fully assessed. Excluded reach in Step 0, added comments to Steps 5 and 7 but did not actually remove Step 7 RGA scores from DMS; step 7 scores seem to still be accessible through DMS even though reach is excluded; do they need to be removed?.

SP: Thinking on this one more, I think we might as well use your data to the extent possible. I have "un-excluded" M1.02 in phase 1 and in phase 2 (partly so I could view the data more easily!). Suggest revising step 5 comments to describe very limited confidence in XS and RGA (given flow diversion), but keep both in place. Some points to clarify or reconcile: XS shows no incision, but step 7 suggests historic incision. How certain are you about this? Is there an HEF? Perhaps you can enter an HEF for the IR, since we don't know where bankfull is, and I'd hate to leave data suggesting there is floodplain access given armoring and potential fill. I would also be very surprised if stream is in stage IV, given encroachment. Any deposition in channel (e.g., steep riffles) may be due to reduced stream power with flow diversion. Can you just revisit some of these phase 2 data? OK, think this has all been addressed. Re-uploaded more detailed x-sec to show walls and fill on LB that account for HEF. Also fixed step 4 to show upstream flow reg (the sluice for the turbine is actually at the base of M1.03) and FIT: the small bypass is hydro-electric (it was showing 'drinking' ; not sure how I missed that previously).

M1.03A

- Are you sure there hasn't been dredging to maintain the dam? Actually seems highly likely; added 'general location'
- XS: Feature currently labeled as RAF is narrow for a floodplain (42', less than 1 channel width). The distinct, broad floodplain feature on the right (RTER) may be the RAF, abandoned within historic times. This is the type of feature to key in on for RAF. Have you considered that the bench on the right bank could be a bankfull feature (at 7.6')? I wonder if lower bench on left bank could be a bar, or influenced by lawn-scaping. Bankfull may be at feature (256.8, 7.6) now labeled as RTOB, and (307.8, 9.6) may be RAF, making incision ratio = 8.6/6.6 =1.30. What do you think? Did you have some other reason to call bankfull lower? Making these changes would provide xs area and channel width closer to expected (albeit, watershed may generally have lower xsectional areas, but impoundment could mean channel enlargement), and would make more sense with xs shape (from what I can see). Please consider, comment, and revise xs spreadsheet, step 2, and step 7 if you agree. Yes, this makes sense; the complicating factor in the field was the lack of a corresponding height LTOB – easily influenced (obscured) by the obvious grading done in the lawn area. Revised x-s spreadsheet, Step 2, and Step 7.
- Step 7.1. Incision ratio and CEM indicate incision, and step 7.1 says No for Historic. Is degradation still active (doesn't make sense with dam)? Or should Historic be changed to Yes? Historic changed to Yes

M1.03B

- Step 5 and xs notes suggest xsection location is less incised than other parts of segment. However, you found IR=1.68 at xs, which is moderately incised. How incised do you think other portions of segment may be? Does this mean XS is not representative? My impression from a windshield survey on 3/25/11 is that the segment was not that incised near Anderson St. bridge. After reviewing this and next two comments several times, along with field maps and photos, revised x-section and indexed a berm in FIT on LB; believe that next comment is correct read on dynamics.

- Looking at your spreadsheet, I wonder if bankfull (without windrow) would have been at the "dip" or (332, 6.2). This would make HEF incision ratio lower (1.19) and RAF incision ratio would be 1.00. Also, it would result in a xsectional area (217.9) and channel width (60.93') that could fit with M1.03A (if changed) and M1.04. Yes, agreed; revised x-sec.
- If there is an HEF, then step 2 should have both an HEF incision ratio and an RAF incision ratio. The HEF field is blank, so no HEF incision ratio is calculated by DMS. In this case, you need to enter an RAF incision ratio in step 2, based on abandoned floodplain elevation (if berm were not present), and then enter a human elevated floodplain. In spreadsheet, entering the HEF in the "Elevation RAF" field is correct. done
- Photos and notes portray windrowing. If windrows are raised piles of material, then please index in FIT as berms. Windrow was elevated by 1 ft at the x-sec, something that was extremely difficult to tell through the scrub-shrub in this area until actually doing the x-sec measurements; after reconsideration and discussion, did FIT the left bank as a berm beyond the small house at edge of stream, DS to point where slope becomes continuous with berm (making it just riprap, since its not elevated above FP beyond).
- Step 1.5 confinement type should be Narrow rather than Broad. Use ph. 1 channel width for calculation. done
- Step 2.10 Riffle Type should be evaluated for plane bed, as long as plane bed isn't reference. In this case, riffles are probably eroded or sedimented. Riffle/step spacing should also be evaluated if possible. Choose Not Evaluated if you don't have enough information. Had the info, but hadn't entered it because in the past this triggered an error message because it was Plane Bed; data is entered.
- RHA field notes. Please check percentages for shrubs/saplings. Invasive, coniferous, and deciduous should sum to 100. fixed

M1.04-0

- Ph. 1, step 7 comment contradicts other stream type data. Please fix. done
- XS: Please label left and right bankfull (LBF, RBF) and RAF, if incised. What is "frpw"? Should it be RFPA? Please use codes on xs field form when possible. codes changed; fixed
- What is going on with incision in xs? First glance at spreadsheet says stream is not incised (IR=1.00). There is a flat, wide floodplain feature on right that is at same elevation as what looks to be right bankfull. When I look at photo P1010155, though, I am not sure if I can see this flat area, because of vegetation—or, does it slope upward near bank? Is spreadsheet missing a feature? During a windshield survey on 3/25/11, reach did not appear very incised near Anderson St. bridge (I didn't see xs location). xs was missing a feature and has been fixed. RAF (or low bank) was not a convincing feature on either side; changed former low bank to Bkf (dist 117.2 and 194.5), which put xsec area at 25% over ref (had been 20% under ref); made note in x-sec spreadsheet comments that there had been a flash flood one week previous to x-section measurement which may be affecting read.
- If stream is not incised, then reconsider CEM stage and step 7.1 Historic degradation. Changed to stage I and 'No' historic degradation (step 7.1) ; left as F-model as incision seems unlikely but not impossible in parts of reach

- RHA field notes. Please check percentages for shrubs/saplings. Invasive, coniferous, and deciduous should sum to 100. fixed

M1.05-0

- I agree ph. 1 reference stream type is likely E rather than C. Valley setting, materials, high banks, <1% slope, and sinuosity suggest this possibility. Please update ph. 1 data. done
- Step 7.1 says "Other" for STD, referring to change from E to C. Such a change in channel dimensions is usually from widening or aggradation, rather than degradation. The STD would go with one or both of those processes (7.2, 7.3). Please fix/comment.
  SP: Step 5 notes widening process, but looks like step 7.1 still notes STD. Did you miss this one? Probably, incision led to widening, which meant change in stream type due to widening. Yes, missed it; now fixed, with 'Other' STD noted for widening.
  For what it's worth, step 7.2 row 4, Fair, in DMS reads '[12 < (W/D R) <= 15] for E channels.'; Poor skips to ' >20'; w/d for this seg was 19.
  Step 7.3 Row 1 (same assessment), Fair, already has '[12 < (W/D R) <= 20] for E'.
- Why 100% straightening? Planform shows meanders. Remember, some irregularities in meandering could be due to heterogeneous materials, e.g., clay lenses. What info did you have for dredging? Added comments in step 5 – extensive bank toe stabilization basis of straightening, dredging based on observations of apparent excavation at clay lenses
- XS spreadsheet reports 2 RAF features. Looks like second one on left bank is an error, and label should be removed. Please fix. Removed 'RAF' label on lower feature on LB.
- Step 5. I'm surprised there are no flood chutes, considering lateral adjustment signs such as diagonal bars and erosion. XS suggests there *is* a flood chute, although none are mapped in FIT. Please explain. added FC at x-sec to FIT, already had a note in step 5 comments about unmowed fields and high banks likely obscuring others as absence was unexpected.

M1.06

- Please update phase 1 reference stream type, bedform, and bed material. done

M1.06-A

- DMS indicates M1.05 xs data has been applied to this segment, in lieu of its own xs. A field cross section for this segment might be a good idea, considering segment is >2100' long, and there are changes in buffers, more signs of lateral migration than downstream, and possible differences in reference stream type. Given uncertainty in ph.2 xs data, RMP highly recommends *at least* one xs per segment, if not more than one. **Let's flag this one for the future; perhaps RMP can go out and do a xs this spring.** OK; I'll see if I can carve out some time as well.
- Comments suggest incision is historic, but step 7.1 says No to historic. Which is correct? Changed step 7.1 to historic

M1.06-B

- XS_ Please label left and right bankfull (LBF and RBF). done
- XS shows road; I assume this is for pit access road mapped as an encroachment in FIT downstream of xs. Should it be indexed along stream at xs location, as well? No, the pit

access is off the LB; rd in x-sec spreadsheet is along the valley wall off the RB; I have indexed the short portion that is within the reference valley wall; the rd very slightly narrows the valley by the way it was cut out of the valley wall.

- Comments and step 7.1 historic degradation suggest there has been some incision process. However, incision ratio is 1.00 and XS doesn't show RAF feature. What evidence did you see for historic degradation? Do you think grade control may have prevented degradation and/or high aggradation may have cancelled out/ overwhelmed any bed degradation? Believe historic incision has been cancelled out by significant aggradation following breach of Ben's Mill dam, sometime in the early 1980s according to documentation posted inside Ben's Mill. Added comments in Step 7 and 5.
- If no incision, then FIII doesn't fit. Have you thought of CEM D as a possibility? With addition of comments noted in previous item, and presence of recent neck cut-off, believe that F-model stage III still seems appropriate.

M1.07

- Both segment A (step 3.2) and ph. 1 data suggest buffers are <25' in places, but FIT only shows buffers <25' on segment C. Please reconcile. Segment A (step 3.2) changed to'None' as subdominant, and FIT for <25 ft was added in segment B, where it had been missing; it was not the subdominant, though, as 26-50 was.

M1.07-A

- Please fix step 1.5 valley width and confinement. Using your verified valley wall shapefile, I measure average ph.2 width as 317', and dividing by ph.1 channel width, I get Narrow confinement. done
- You did not do a x-section on this segment, but substituted xs on M1.06B. I can see that the reach point may be poorly placed, and that M1.07A is more similar in valley setting to M1.06B. However, the 2 segments have different RGA conditions and CEM stages, which another xs would support. Please comment. Lumped primarily because segment was short (700 ft) and so similar in terms of setting; will try to revisit and measure at same time as M106A.
- RHA field notes. Please check data entry on left near bank shrubs/saplings. Invasives, WADs, and saplings should sum to 100%. fixed
- RHA questions 6.5.1, 6.7.1, and 6.8.3 are blank. Please fix. done

M1.07-B

- Please check ph.2 valley width and confinement. I get 250' and Semi-confined from verified valley shapefile. OK, I get ~260 and high end of semi-confined when using reference channel width; changed to semi-confined and changed Step 7.1 scoring to account change to confined.

M1.07C

- In XS spreadsheet, please label RAF feature. done
- Sensitivity should be "Extreme" for F4 with STD. fixed
- Suggest choosing "Poor" for RGA, considering STD and very high incision ratio. Remember, protocol allows for discretion in assigning condition; condition does not have to abide strictly to step 7 question/scores. See page 83 under step 7.6 of ph.2 handbook. Yes, agreed; changed to Poor.

T1.01A

- Why not call ph.2 stream type E, given W/D ratio of 10.78? XS certainly shows E-shaped channel. Primary reason was low sinuosity for an E stream , which certainly could be related to the extensive armoring; secondary reason was cobble substrate. This could also be related to the straightening and modifications to transport regime, but the combination led me to believe the reference – and the current stream type of this segment, using the ±2 factor for w/d, is C.
- Do you think there was an STD from C to E due to channelization/ straightening/ armoring and degradation? Or do you think reference stream type could be E? It's hard to tell why ph. 2 channel width is low relative to curve on both this segment and segment B—because of natural E width or because of channelization practices. What are your thoughts? See notes to previous item; I'm hesitant to call this an STD and lean toward the low w/d being due to channelization. That said, the reach is within the extent of Glacial Lake Hitchcock which might lend to possible E type; if anything I would think segment A might be a reference E and segment B a reference C: slopes: T1.01 overall = 1.05%; T1.01A = 0.8%; T1.01B = 1.2%. Added a note to Step 5 and Step 7 comments that note possibility of reference E and STD, but did not call it that way because of sinuosity and substrate.
- Step 2.9. I would say sinuosity is moderate, in spite of straightening. 4 point bars. Yes, field sheet notes actually said Low-Mod; done.
- RHA, Field Notes: Please make sure percentages for right near bank herbs sum to 100%. done
- RHA, Field Notes: Are there adjacent wetlands? Blank field. 'altered'

T1.01B

- Are you sure there is no human caused change to valley width from East Peacham Road? Step 5 notes say, "upstream portion confined by road." Changed to 'yes' for human-caused change.
- Please include Ferguson Road bridge in step 4.8 constrictions. If not channel or floodprone constriction, then say no. entered
- With lots of armoring and windrowing, incomplete riffles, and possibly higher incision, are you sure RGA is "good"? Reviewed scoring – particularly because of armoring and fact that Ferguson Rd bridge had been counted in seg A originally (it's on seg break); revised scoring indicates a high Fair (0.63). This also changes Sensitivity to High, which was entered in DMS as well.

T1.02A

- Step 1.5. Did you mean to say "no" to human caused change in valley width? Comments in step 5 and 7 suggest road is changing valley. Comments accurate; changed to 'yes'.
- Please fix step 2 RAF and incision ratio. It's calculating as 0.23. fixed; had been entered without addition of thalweg depth.
- Given flood chutes, braiding, islands, diagonal bars, and other signs of planform adjustment, have you considered stage FIV? Agreed, and changed to stage IV.
- Narrative mentions historic incision but step 7.1 says "No" to historic. Please reconcile. Fixed; checked historic.

T1.02B

- Step 1.5. Did you mean to say "no" to human caused change in valley width? Looks like road is changing valley. Fixed; checked historic.
- Step 2.14/2.15. Please enter subreach reference subclass slope. done
- XS: Please fix labels in spreadsheet. LFPA is labeled at elevation 7.3', but it should be 6.8'. LTOB should be at 5.7', I think, and LBF should be at 3.9'. LEW should be at 1.7'. Also, label RAF and correct its elevation (it now says 6.8', but shouldn't it be 5.7' as LTOB?). If incision ratio changes, then adjust step 7 as needed. Yes, agreed; originally had raf on RB but that feature (at 4.9') is only 4.5 ft wide. Fixed. Adjusted step 7 scores, which changes rating to Fair and sensitivity to High.
- Please double check Wfpa. If 2x max depth is 6.8', then Wfpa would be 89.8'. Yes, fixed.
- Please reconcile step 2 channel dimensions with xs spreadsheet. RAF and incision ratio are different. fixed
- RHA question 6.5.1 is blank. Please fix. done

T1.02C

- Step 3.2. Please choose right subdominant buffer width, since buffers<25' are mapped in FIT. done

T1.02D

- According to pebble count entered in step 2.12, d50 is coarse gravel. This data conflicts with bed material entered in step 2.14. Please reconcile. Yes, changed ph 2 to gravel (C4); left ph 1 as cobble, though, as it seems likely the current gravel D50 may be related to mass failures. Also changed Step 7 Sensitivity to Very High.
- Confinement is Semi-confined with no human caused change in valley width, and yet you used Unconfined RGA form. Please explain. Confined RGA form is geared to step-pool systems. Although this segment is in a semi-confined valley, it is clearly a riffle-pool system with relatively low slope (1.5 pct), no steps, and point bar sediment storage. RGA scoring on the confined sheet came out the same. Entered Step 7 comment to explain the choice of unconfined RGA scoring.
- XS: Please fix labels. There are 2 "vw toe" labels on right side. Also, shouldn't LVW be at (30, 9.55)? The feature currently called vw is shaped like a low terrace. Also, please label RBF and LBF (top of bank does not necessarily mean bankfull). fixed
- Signs of planform adjustment and xs shape (developed benches as juvenile floodplain) suggest CEM stage could be IV—have you thought about that, instead of stage III? Agreed and changed to stage IV

T1.03

- Why does DMS contain both T1.03-0 and segments for T1.03? Please remove T1.03-0. DMS won't allow deletion, unless there is a trick I don't know about; have repeatedly tried to delete with no luck.
  SP: Hmm, don't want to delete anything inadvertently; will see if Tim can help. Don't worry about it for QA.

T1.03A

- Step 3.2. Are you sure there is no subdominant buffer width? Fixed; 26-50 both sides
- Did you mean to say sand on left lower bank is cohesive? fixed

- XS: Please label LBF, RBF, and RAF. Top of bank is not necessarily bankfull. Also, please fix Wfpa in spreadsheet (it appears incorrect and doesn't match step 2 in DMS). fixed
- Why did you call ph. 2 stream type C? Dimensions indicate E with low W/D ratio. Note low channel width, shape of xs, fine bank sediments, silt/clay. Suggest also changing ph. 1 reference stream type to E, as segment C is also an E type by reference. Yes, agreed; had originally leaned in this direction but shied away due to gravel substrate and riffle-pool form (rather than ripple-dune) – likely these may be signs of departure from reference; changed this segment and ph 1 reference to E
- Are you sure straightening is so high (~82%)? Think so; based on extensive nabnk toe stabilization and rirap, which have limited planform adjustments; added step 5 comment
- RHA, Field Notes: Please make sure percentages for right near bank shrubs sum to 100%. Fix also herbs on near left bank. done

T1.03B

- Is ph.2 valley width (84') correct? XS has vw of 154', and shapefile agrees with xs. Please check confinement. Changed to 154; field sheet indicated 160
- In step 7, you used Unconfined form and said there is a change in valley type, and that there is no change from Unconfined to Confined. However, in step 1.5, confinement is SC. Do you think reference valley was unconfined? Has there been a change from unconfined to confined because of road? Perhaps there is an issue with reference channel width affecting confinement. Please reconcile. Reference should have been Narrow, and road impacts have changed to SC; changed scoring in Step 7.1.4; Unconfined should be correct by reference
- Why do you think segment B is so incised (2.00) but segments A and C have very little incision, when there are no grade controls or headcuts? Is this related to possible dam structure noted for segment C? If so, please add comments to step 5 in DMS. Glacial? Very peculiar geologic formation thru here as stream makes bend; terraces very high; possible Lake Hitchcock/quechee gorge scenario? Added step 5 comments
- RHA, question 6.2.3 is blank. Please fix. done
- RHA, field notes. Please get left near bank and buffer herbs to sum to 100%. done

T1.03C

- Step 2.14. Removed subreach data since phase 1 was updated to E.
- Step 3.2. Are you sure there is no subdominant buffer width on left bank? Changed to 26-50. Field sheets for new habitat assessments include categories for '<5' and '5-25'; both banks had been entered with 5-25 domimant and <5 SD; recommend reconciling the field sheets and the DMS on this item so it doesn't have to be reassessed later due to fact that one category is missing in the DMS.
  SP: Technically, the buffer cover evaluation for the RHA is different anyway, because it is not cover from a bird's eye view (as veg. cover *usually* is in vegetation sampling!) like in step 3. Rather, the RHA evaluates cover looking at the banks horizontally from the stream (% reflects how much of horizontal space taken up). So they are not meant to be transferrable. However, I agree this may be an unneeded layer of complexity, and

relates to differences in protocol development efforts. Thanks for the feedback. Got it, thanks for the explanation.

- Did you mean to say No to step 1.5 human caused change in vw? Road causes change? You note drop to wetland opposite road. Update 7.1 if needed. Road does narrow valley; changed to 'Yes'
- If incision ratio is 1.00, then CEM FIII does not make sense. Suggest DIId. Agree; changed to DIId.
- Suggest scoring lower for planform, given bars, islands, erosion, and straightening. OK, agreed and changed; had been marked as 'low' on the thresholds to begin with
- RHA field notes, please check/correct percentages for near bank and buffers, so appropriate values sum to 100%. Done
  SP: Still off--can you check these numbers again? I don't have field sheets. Looks like I missed this; sorry. Fixed.
- Suggest noting possible alluvial fan on tribs (coming in from south) in comments. OK, noted in step 5 comments but not entered in FIT; also wondered if this might be related to glacial activity noted for T1.03B; technically this might make it glaciolacustrine, though the soil maps indicate alluvial.
  SP: Good.

T1.04

- Suggest noting possible alluvial fan on tribs (coming in from south) in comments. Done, as well as additional comments on alternative possibilities.
- XS1: What is dip on right side of valley, just below vw toe? Is this trib coming in? Please label. done
- XS1: Where is road in plot? Is there a natural terrace at (150, 8.7)? Please label. done
- Why did you choose ph.2 stream type C? W/D is within E range. Sometimes straightening/channelization results in "C to E" STD, due to degradation. However, I wouldn't be surprised if E reference is appropriate here, given lack of incision and xs 2 showing E shape also. Please consider changing ph.1 and ph.2 stream types to E (edit step 5 comments). OK, agreed; the channelization makes it challenging to make a clear call but changed ph 2 and ph 1 reference to E; the fact that the US (non-representative) x-sec was also E shape does lend further backing.
- Did you mean to enter HEF in step 2? It looks like a mistake. Mistake; removed HEF
- Please reconsider CEM of FIII. F model doesn't make sense if IR=1.00. Agreed; changed to D IIc.
- If you are scoring RGA with departure to plane bed, then maybe you should have plane bed as dominant bedform and riffle pool as subdominant. This would warrant a SHTD in step 6. Added notes to clarify that riffle-pool appears dominant though not well-formed; did not feel it warrants SHTD.
- Sensitivity for fair E4 should be Extreme. done

T1.05

- Please update ph. 1 valley width. Also, bed material. Entered a valley width, which had been missing. Did not update reference bed material as the gravel noted in the 'representative' x-section for Phase 2 appeared to be an adjustment process, and the tally hit 51 for gravel; second x-sec in a more confined portion of the reach was decidedly cobble.

- Step 4.8. Please include 4th structure (bridge) even if it is not a FP or CW constriction. Added, and fixed another culvert that had length entered instead of width (20.4 →6) SP: Thanks, good catch.
- XS: Please label RAF. Also, what are "frpa" and "fter"? done

T1.06A

- In step 5 notes, did you mean to say valley is Narrow by reference? Or did you mean Narrowly Confined? Looks like road is acting as valley wall, and ph. 2 confinement is either NC or SC. Changed phrasing to 'Semi-confined by reference'; narrow was intended with a small 'n'. Field notes specifically state that rd encroachment did not appear to change valley type.
- Why did you use Plane Bed RGA form if bedform is cascade (with some step-pool)? Looks like you need Confined RGA form. OK, switched to confined – slightly lower scores, still Good condition
- Step 6 also says Plane Bed for reference bedform (I see cascade is not a choice—enter step-pool since they share RHA forms). RHA questions are blank (maybe bedform was accidentally reset?). Please fix. OK, changed forms and re-entered scores.
- XS makes it look like road is new vw, due to height. Do you agree? Yes, agreed; this was the basis for 'human-caused change' in valley width – but not enough to change confinement
- Why did you say Yes to Historic degradation if there is no incision and CEM DI? Changed to stage III, D-model

SP: Hmm, still does not make sense to me. DIII suggests there is no historic incision and no potential for incision. In contradiction, step 7.1 says yes for historic incision. Perhaps you meant to change this to No? IR=1.00. DI seemed plausible to me, and I'm not sure what prompted you to change it to DIII. Just because there have been some adjustments or events "to handle" does not mean stream has gone through channel evolution. Hmm… I assumed that DI would indicate there was no potential for incision, i.e., the stream never had the chance to incise. I thought DIII meant that the stream had incised historically and had now evolved back to a pre-adjustment form :

Stage III Channel adjustment process is complete (back to a B, C or E stream type). Channel dimension,pattern, and profile are similar to the pre-adjustment form. May or may not be at a lower elevation in the landscape.

Primary thinking was that with extensive, significant mill history in this area, it seems likely that the stream incised and/or had significant planform changes at some point, particularly given the apparent incision upstream and the likelihood of significant adjustments when the upstream dam at Still Run and/ or dams at Ewells Mills in top of reach T1.05 were breached. Given our discussion of the likely glacial time frame of the upstream (Still Run) incision, however, and the nearly continuous presence of bedrock in this segment, it seems quite feasible adjustments (post-glacial) in this segment were more likely to be widening and planform change if they ever happened; have still left stage DIII ("May or may not be at a lower elevation in the landscape"). Added Step 5 comments to explain this.

After further discussion and evaluation, believe stage DI is probably most appropriate; changed back to DI, adjusted Step 5 comments. Thanks for walking through the DI and III discussion, it was helpful for better understanding nuances of the distinctions.

T1.06B

- XS: Are you sure LTER feature is not reference vw? IR ratio of 4.05 is extreme, even with old dam history. Ledge grade control below. Geology of area is unique, with broad, flat wetland area draining in two directions (stream to east is our stream, stream on west re-enters in T1.05). Both streams plunge steeply off of broad flat area. Could relate to glacial history. Please comment/revise valley width and ph. 2 confinement. Yes, agree this is likely due to glacial history, similar to T1.03 and T.104; revised ph 2 valley width and confinement, and added Step 5 comments.
- XS area, channel width, entrenchment, etc. are all being affected by what appears to be a floodchute on left. Is this a flood chute, accessible at bankfull flows? If not, then xs may need floodplain edits. Do you think it is an old channel, occupied prior to incision? It appears to have a width of about 20', as does the current channel and the downstream segment. RAF elevation may be somewhere between "LTER" and bankfull. If we use the same max depth, added to the bottom of flood chute, then RAF elevation would be ~5.4, making IR=1.60. Such a change might result in stream type B. Would this fit your field observations? This hypothesis can't be confirmed (without additional field work). We can estimate/make notes. **Let's discuss.** Field notes specifically state that this flood chute is accessed at bkf, and this is representative of reach (it was difficult to find a x-sec spot due to migration and debris jams). After our helpful discussion, believe this is in fact a Cb reference type stream, with Cb to F STD; removed LTER as RAF (leaving IR=1.0), and changed CEM to stage IV, with note that good buffers are important to bank stability.

  SP: Now incision ratio in step 2 of DMS says 4.1 and xs spreadsheet says 1.00. Please make these match. I think we decided we could not determine RAF because the terrace feature was too high to be within historical period and no other features were captured. RGA is still based on high incision, presumably to reflect inferred historic incision, right? Please document in step 5 comments the uncertainty of RAF. Suggest not entering any RAF in step 2 (leave field blank), so IR=0.00. Fill out QC explanation if needed. OK, left RAF field in Step 2 blank; added Step 5 and Step 7 comments; and put comments in QC explanation field.

T1.07

- Reach was excluded in phase 1. Please update ph.1 DMS so reach is not excluded (go to Exclude Reaches area). Be sure step 2, ph.1 is completed. done

T1.07A

- Data entry error on step 2.13 largest particles? Very large. Yes, data entry error; fixed.
- Roads look high enough in xs to be ph.2 valley walls. Could affect confinement type. Field notes specifically indicate that road narrows valley slightly but not enough to change confinement, scoring was based on this; also, intermittent portions in seg are much wider; left as VB.

- Shouldn't step 7.1 be Yes for historic? I'm not sure it should; indications are that recent land use changes are playing a large role here, and Step 7 comments are accurate in noting field assessment that recent incision is being masked by aggradation/ washouts from very recent microburst impacts.
- Have you considered stage IV, given signs of planform and juvenile floodplain benches? See previous comment; believe that these adjustments are indicative of the very recent microburst impacts, and that the reach is actually still sensitive and disposed to widening as further evolution takes place. Added Step 7 and Step 5 comments to highlight recent microburst activity.

T1.07B

- Data state B to F STD, due to degradation, but this change usually occurs due to widening, as entrenchment ratio is decreasing. Consider adjusting step 7.
- Further, no RAF was identified. Did you consider that bankfull could be at 2.5 and RAF at 3 (2' above TW)? Would mean IR=1.33. Channel would be narrower, although it may fit, given that xs location may not be one of the blown out areas. If you go with these changes, ph. 2 stream type may be different (Cb? Reference Cb okay after all?). Please comment and/or **let's discuss.** yes, this makes sense - widening predominant, but scouring to bedrock said incision as well - this happened in storm this summer, so very fresh; bkf was hard to read due to recent impacts. Redid x-sec to show bkf at 2.5, RAF at 3; re-uploaded. Redid Step s 2,6,7.

T1.07C

- Are structures shown in photos DSCN1509, DSCN1512, and P1010581 located in segment B? Photos are in segment C file. If they are in seg. C, then please include in step 4.8 and FIT. These were on trib that is actually larger than T1.07C; we accidentally went up this first, and the structures are all located on that trib. The trib and the fact that it's larger than the mapped stream are noted in Step 5 comments.

T2.01-0

- This reach is 5,816' long, with notable changes in confinement. The downstream 1050' appears to be <1.9% slope and shares a valley with T1.01A, which is Very Broad. Suggests T2.01 should have at least one segment break above W. Barnet Road xing, where valley is broader (possibly another ~900' from upper reach break where valley broadens again). Such segmentation could mean data differences such as C3b step-pool upstream and C4 riffle pool downstream. Please explain why you did not segment. It's really only downstream of the bridge that has access to the valley; possible, or even likely, that portion US of the Barnet Center Rd bridge is historically incised, but it really belongs with upstream (more confined) portion at this point - so didn't segment because DS of bridge (and high armoring) is < 700 ft. Upper section of valley beneath T2.02 reach break also does not widen until US of the private bridge, <600 ft DS of T2.02 reach break (this is not apparent on topos).Added Step 5 comments to this effect.
- Check step 1.5 confinement type. Did you mean to enter NC? If segmented, "segment B" would be SC. Please sort out valley widths and confinement types and update ph.1 as needed. No, meant to enter Narrow (220 by ref channel width of 52 = 4.2); entered Narrow in Ph2 Step 1.5; Ph1 and Ph2 now congruent.

- Does old dam site with "low stone structure for recreational pool" provide any grade control? No; the "structure" is more like a beaver dam, and is visible in pictures P1010351 and P1010380.
- FIT has 3 bridges/culverts, but only two appear in constrictions in step 4.8. Please enter all bridges/culverts in constrictions; if they are not constrictions, then say no to floodplain or channel constriction questions. One missing; now entered.
- I find it hard to evaluate RGA and CEM data when reach should probably be segmented, but I noticed step 5 indicates a high level of aggradation and planform adjustment and stage III, whereas xs indicates decent floodplain access. Please explain how RGA and CEM are supported by these data. I wonder if the downstream "segment" would be more unstable than the xs location (at xs, forest and confinement may make stream less sensitive to adjustment). Based on comments above – only short sections of DS and US ends of reach are less confined – I would probably still not segment the reach, though the situation certainly appears different when I look at the topos; one of the more striking discrepancies I have come across between the topo and field observations. If anything, it's conceivable I should adjust the valley walls (narrower) drawn for these areas. Aggradation and planform adjustment are relatively evenly distributed throughout the reach, and as noted in the Step 7 comments field observations suggest that channel evolution in this reach is slow due to 'pulse' flows (suspect this is related to the large amount of water attenuated in Harvey's Lake and the annual impoundment cycles; added Step 4.6 Flow Reg). Sediment slugs and debris jams contribute to frequent channel migrations, but also trap a good bit of sediment; is the suggestion that this should actually be stage IV?

  SP: No, stage III seems best.

T2.02

- Segments A, B, and D: Do any of these segments have step 4.6 upstream or downstream flow effects? All say "None" currently. Omission error; each of these now has flow regs entered.

  SP: There maybe DMS bug that is not saving step 4.6 properly. Can you check them/tell me what they should be, and I'll see that they're entered. Weird; fairly sure I entered these, and they were still showing 'Store and release' when I opened – but not the upstream/downstream, and the 'store and release' didn't show out of editing mode until the US/DS was entered. Appears fixed now but just in case: Segs A and B have Upstream impacts ('Store and release') and Seg D has Downstream ('Store and release').
- Does ph. 1 **valley width** need to be updated, based on field observations? Yes, updated to 600 ft based on rough avg width prorated by segment length and width

T2.02A

- Ph. 2 bedform is riffle pool and yet riffle type and spacing both say Not Applicable. Maybe the dominant bedform should be dune ripple? Or if it is plane bed due to anthropogenic disturbance (now dominated by runs), then you should still evaluate or enter Not Evaluated. Please explain. Remember, you can also have a subdominant bedform. If you change bedform, be sure to change in step 6, also. OK, added a riffle spacing, notes that the riffles are concentrated at US end of seg with continuous pool DS, and adjusted Step 6.3 score to reflect the shift.

- Please check step 2 width of floodprone area, as it looks too low and is resulting in a low entrenchment ratio (not suitable for an E stream). Please also enter Wfpa in xs spreadsheet. Done

  SP: Step 2 done, but xs spreadsheet still missing Wfpa. fixed
- Sensitivity should be "Extreme" for E4 in fair or poor condition. fixed
- Step 6 Field Notes: Please proof buffer vegetation percentages for shrubs on both sides. Percentages for invasives, WADs, and saplings should add up to 100%. done
- Step 7.4. Please answer question 2; it's blank. done

T2.02B

- Near XS location of ph.2 verified valley shapefile (xs is black triangle above), I measure the valley as ~360' wide in GIS, but step 1.5 and xs spreadsheet suggest 270' wide. Which is correct? The field measurements should be pretty accurate; adjusted the valley wall to be congruent with those, which was mostly a matter of adding vertices on the LVW and tightening the distance from the stream on the RVW.
- Step 1.5 also indicates no human caused change in valley width. I disagree. On field visit 3/25/11, it seemed to me there was minor change from W. Main Street mid segment (~200 stream feet upstream from xs) for ~400'. This is one of those hard calls on drawing the valley wall to show current influence on stream dynamics vs valley wall for FEH. I can see this if it is assumed that this road would be repaired after a flood; I'm not convinced the road itself will hold in a flood, and the fill of the pullout on the US end of that 400 ft stretch is very soft and will not hold even in a minor flood (I entered the

stream over this bank). I have gone ahead and drawn the valley wall tighter to the stream in this area, and checked off the minor change in valley width.
SP: Okay, thank you. You are correct the change is minor. In this case, we are highlighting that the road is impinging on channel dynamics.

- XS: Where is RAF? It should be labeled on spreadsheet diagram. I'm guessing you were calling RTER the RAF. However, this is not a very wide feature (only 6'). In addition, LTER shows in spreadsheet as a broad flat area. Do you think this area acted as floodplain in last ~200 years? If so, incision ratio would be extremely high (2.81). I suspect floodplain fill may make LTER appear to be higher than naturally formed, or a dam downstream of xs (e.g., W. Barnet Creamery) was removed, leading to this high incision level… or some combination of these alterations. What do you think? Highly manipulated grades in this area, and fill does raise LTER – virtually entire segment is filled along LB - hard to determine what original grade may have been. That said, it also seems feasible that removal of the DS dam led to some elevated levels of incision as well. Added notes to spreadsheet comments and Step 5 DMS comments, but have not changed apparently more recent IR based on RB, which has not been filled.
SP: Yes, that makes sense. Good call.
- XS: Is there an undercut on left bank (not necessarily meeting RHA definitions of undercut)? If so, please label in spreadsheet. If not, is there a data entry error in plot? Yes, data entry error (no undercut) on the distance conversion sheet (dropped "-" sign); fixed
- Did you mean to say No to step 7.1 historic when segment is in stage FIII? Is degradation still active? Changed to 'Yes' for historic
- Step 6 Field Notes: Please check near bank vegetation percentages for shrubs and herbs on left side and buffer vegetation shrubs on left side. Percentages for invasives/WADs/saplings should add up to 100%; same with percentages for invasives/grasses/forbs. fixed

T2.02C

- Shouldn't there be a flow regulation indexed on this segment? Yes, the dam was indexed as a grade control and the flow reg is now entered as well
- Ph. 2 valley width looks like typing error. Maybe it should be 1000' instead of 100'? Yes, added the extra '0'.

T2.02D

- Please index development on this segment. done
- Are you sure bedform has not changed to plane bed, or that plane bed is not a subdominant bedform? Photos, straightening, incision, and pebble count support sedimentation of bed features. Added SD plane bed, though the seg is short and scour pools were frequently interspersed; sedimentation was heavy on point bars and there were some large MCBs and steep riffles - riffle-pool appeared dominant though not yet to stage IV.
- Sensitivity should be "Extreme" for E4 in fair or poor condition. Yes, fixed

- Step 6 Field Notes: Please check near bank vegetation percentages for trees and shrubs on left side. Percentages for invasives/WADs/saplings should add up to 100%; same with percentages for invasives/conifer/deciduous. fixed

T2.03

- Please update ph. 1 dominant bed material. Have not changed this; field sheet had specific notes that seg A (the longer segment of the reach, by 2.5x) should have been cobble, and gravel was a departure from reference – pebble count was 51 at coarse gravel, barely putting it in that D50, and x-sec was closer to top of seg than would have been preferred (very difficult to find any good x-sec spots further DS).

T2.03A

- Please map bridge in FIT (one bridge is listed in step 4.8 constrictions, presumably for W. Main Street). done
- Step 1.5. Please check confinement and ph. 2 valley width. Did you mean to say Narrowly Confined, or did you mean Narrow? In any case, average valley width may be > 220'. Use ph. 1 channel width of 39.1 to calculate confinement ratio. Should have been Narrow, confinement ratio ~5.6
- Step 2.13. Average largest particles are huge. Data entry error? Fixed; the embededness percentages had been entered mistakenly
- If "loss of planform" and ~100% straightened, has dominant bed form become plane bed? Or maybe plane bed is subdominant? No areas of plane bed noted on field maps, likely because of lots of LWD_debris jams (many of which were partial DJs), scour pools, and failed riprap in the stream. Side bars were common, and it's possible tha plane bed stretches were masked because of elevated flow levels (recent rainstorms)
- You note STD of C to B, and yet ph. 2 stream type in step 2.14 says C. Channel dimensions point to Bc, so you should enter Bc as ph. 2 stream type. Also, comments under step 6 refer to C channel; please reconcile these conflicts. Note that in windshield survey on 3/25/11, valley appeared to me to support C reference type. Yes, the STD was borderline and I went back and forth a bit about it (see note below regarding step 5 comments). Entered Bc as Ph 2 stream type, and fixed step 6 comments.
- XS: What is "wbf"? Should this be LBF for left bankfull? Yes, lbf; fixed
- In step 5 comments, you discuss entrenchment ratio. Of course, entrenchment should include old road. Is the old road bed raised, so that there is a drop between the right side of the old road bed, and the left side of the new road? This is not shown in xs, but I was confused why you were trying to calculate entrenchment as if old road is not present. Please explain. No drop in between; the old road was slabbed out of hillside, never ditched along uphill side, and really is just a break in the slope – but it does push the elevated portion closer to the stream in a critical area in terms of entrenchment. The STD noted is borderline, which is what the note was intended to explain; tried to clarify the Step 5 comment.
- I'm wondering if your bankfull elevation is too high (~ ½ to 1 foot high?) because 1) photos suggest over-widened channel with eroded undercuts (non-habitat), exposed roots, leaning trees, and flat bed, which drives bankfull height down 2) xsectional area (114.84) is 143% higher than curve predicted area (79.8) and generally other xsections

on this stream have been lower, 3) downstream xs on E type channel has about the same bankfull elevation, when we would expect E channels to have a higher bankfull elevation by definition, 4) presence of 6 road ditches in combination with the fact that just upstream of ditches (seg. B), the channel is much smaller. However, the current W/D ratio of 15.65 is considered within reference range for C by reference streams. Please comment. Yes, conceivable that this is true. The x-sec was taken a day after the second microburst flash flood that hit the area in a week, and the 6 stormwater inputs carry water from an adjacent wetland on the other side of the road from the stream. Added comments to Step 5 and the x-sec sheet comments to note this.

- RHA question 6.2.5. Can you answer this question? It's blank. done

T2.03B

- There are no buffers <25' indexed on the left bank, yet 0-25 is subdominant width entered for step 3.2. Please reconcile. Indexed now, as well as a couple small areas of T2.03 buffers>25 that had been missed; the stream is actually closer to the road than mapped in the SGAT stream layer.
- Why did you use Confined RGA form for Very Broad valley? Mistake on DMS pull-down menu; fixed. Scores double checked and verified (one change in Step 7.4).
- Please explain why you chose ph.2 stream type of C rather E (using Rosgen variation in W/D ratio). Could be an STD from C to E due to straightening/degradation, or could be E by reference (subreach). Have you considered these possibilities? Decision was based primarily on low sinuosity, which probably is related to historical manipulation and location DS of the bridge; it also was based in part on general channel dimensions (similar to graphics for C stream in Rosgen 1994 Catena article) and the reducing valley confinement. Added Step 5 comments to mention the possibilities you have denoted here, which are certainly possible but difficult to determine based on current nature of stream. Also added note to x-sec comments section.
  SP: Okay. Keep in mind, though, that a straightened stream that is C by reference can exhibit E dimensions. Therefore, higher sinuosity is not necessarily a characteristic of an existing E (where there has been a departure). Noted, and will bear this in mind; thanks.

T2.04A

- Step 2.13. Usually bed particles are larger than bar particles. Maybe values were entered in reverse? Yes, fixed.
- XS and incision ratios: This xs situation is similar to example B in Ph. 2 Incision Ratio Addendum. Use berm height to calculate HEF incision ratio, enter HEF in step 2, and use this incision in step 7 RGA. Enter berm height in xs spreadsheet as "Elevation RAF" field (misleading field name), so spreadsheet calculates IRHEF. Also, calculate IRRAF, and enter RAF in step 2. RAF would be feature at (476.7, 4.9). Have made these changes, but want to note that berm height is not continuous along full length, appears likely that stream may have fp access in some areas; still use HEF?
  SP: Yes, thank you. Rarely do our segments stop and start on a continuous berm line. In this case, the berm follows a significant portion of the segment, and is characteristic of the segment. It is important to highlight from a restoration standpoint, whether passive or active. There will be some segments where a berm is present but is not

necessarily extensive enough to use the HEF (requires some judgment); here you captured the berm well in xs.

- XS: Please label valley wall toe, RAF, and right and left bankfull. done
- Step 2.14. Did you mean ph.2 stream type C? W/D ratio indicates E stream type, as does shape of xs. Agreed, fixed (changed to E).
- Although an STD from C to E is possible (due to channelization and berming), I suggest based on my 3/25/11 windshield survey, valley setting, and early attempts at regaining sinuosity, that reference stream type could be E for this segment. If you agree, please add subreach stream type E4. Yes, agreed; changed to E and added subreach.
- Reconsider RGA rating of "good" because of ~100% straightening, berming, riprap, HEF incision, steep riffles, and stretches of plane bed. Yes, went through all scoring and fixed.
- Sensitivity rating for E4 should be Extreme for STD and if RGA falls to fair or poor. Fair; Extreme.
- Step 6 RSI. Is RSI really 25%? Not sure about your largest particle on bar data, but if it is around 5.3 to 5.5 inches (large cobble), then *at least* 55% of the pebble count is smaller. Also, RHA question 6.2.3 suggests RSI >70%. Should have been 75; fixed.
- Step 6 Field Notes. Please proof Near Bank vegetation percentages; be sure the necessary fields sum to 100%. fixed

T2.04B

- From soils and topo data, and my 3/25/11 windshield survey, it looks like this segment could be on an alluvial fan. Ph. 2 data may support this, with strong channelization and bank armoring preventing more planform expression. What do you think? If you agree, then please index in FIT. Does glacial count? If so, definitely; not sure this fan is historic though. Given the extensive nature of dense till in the area, and indications of relative stability in the field, have noted the possibility of an alluvial fan in the Step 5 comments but not indexed in FIT. My gut feeling is this is glacial in origin and not likely to figure prominently in current adjustments; suspect that channel evolution is actually hampered to some extent by lack of sediments, exacerbated by repeated windrowing over time.

  SP: Okay; good to document more prehistoric feature, as you did, because it still describes geologic setting, and could be helpful to understanding reach later.

  After our discussion and looking more at impacts of recent flooding in this area, have gone ahead and FIT'd the alluvial fan; I still tend to think it's a primarily glacial feature, and its not entirely clear to me what happened in that area during the Memorial Day 2011 flooding (the DS bridge also plugged), but it should at least be flagged. Did not change Step 5 and 7 comments, as they already reflected these thoughts.

- Step 2.14. W/D ratio is too low for F stream type. Suggest ph.2 stream type is Gc. Although you called sinuosity "low", I measured an approximate sinuosity of 1.34 in GIS. G channels have sinuosity >1.2. See excerpt from Rosgen table, describing G below:

Type	Description	ER	W/D	Sinuosity	Slope	Landform/soils/features
G	Entrenched "gully" step-pool and low width/depth ratio on moderate gradients	<1.4	<12	>1.2	.02 to .039 (can have subclass slope c)	Gullies, step/pool morphology w/moderate slopes and low width/depth ratio. Narrow valleys, or deeply incised in alluvial or colluvial materials, i.e. fans or deltas. Unstable, with grade control problems and high bank erosion rates.

From just xs photos, I don't get much view of the channel, but it looks like it could be step-pool, or close. Please comment and update data as needed. Yes, good call and agreed. Field sheet had "low-moderate" sinuosity, but that's not an option on the pull-downs. Had several steps on field map and have changed to dominant step-pool with SD riffle-pool. Gc seems appropriate; I had calculated slope at ~1.06%. Rosgen's part about stability makes me think again that this may be of primarily glacial origin, though it would certainly help explain extensive historic armoring - some of it with really large stone, which was what led to questions about whether there were bridge abutments.

- Have you considered subreach reference stream type of E3? An F CEM involving G types is E-C-G-F-C-E. This would also make sense given the very broad valley and sinuosity. See Appendix C. The result would be E to G STD due to degradation, with Extreme sensitivity. Please comment and update data as needed. Yes, agreed. Changed to E to G STD, Extreme sensitivity; updated scores in Steps 6 and 7, added comments in Steps 5 and 7.
- Step 2.14 also notes riffle-pool bedform as dominant and step-pool as subdominant. Do you still think this is the case, given changes in stream types proposed? Step-pool dominant, riffle-pool SD.
- XS: Please label left and right bankfull (LBF, RBF). done
- RAF in XS does not agree with RAF entered in step 2. In either case, RAF is too narrow; the upper feature at (839.2, 9.55) probably corresponds with the obviously broad, flat feature on stream left, (791.5, 9.85). I would use the feature on the left to calculate incision ratio, because it is the most established flat area, and it is still within one channel width from LBF. Please update XS and step 2. OK; field on RB is recently cultivated, hard to get a read on – note 'plow ridge' feature. Used feature on left as RAF, updated spreadsheet, updated step 2. Scoring not really affected as IR was already >2 (scoring had previously used value in spreadsheet – IR = 2.4 – rather than incorrect one in Step 2 in DMS).
- RHA, step 6.1. Woody debris should probably score lower than 10 if <25 pieces/mile and little buffer. Don't answer question 2 if <10 pieces are present (tally reports just 3). Can't remove the check box for question 2 without clearing everything, but took it into account as NA in scoring.
- RHA, question 6.4.1. Isn't W/D 9.9? Please fix. done

T2.04C

- Step 1.5 says no human caused change in valley width. However, when I did windshield survey on 3/25/11, it looked to me like Peacham Barnet Road has changed valley width near intersection with S. Main Street in South Peacham. considered this carefully in the field and walked and eyeballed that section pretty closely; feel that flood would run down the road and to the outside of it in most cases – questionable as to whether it confines the stream. Have checked off human-caused change in valley width but also added step 5 comment.
  SP: Okay.
- Step 3.2 says subdominant buffer width for left bank is 0-25' but there are no buffers<25' in FIT for left bank. Please fix. There should have been some 0-25 indexed, which is done now, but the data entry also was incorrect; SD should have been 26-50; fixed.
- I agree slope on this segment is higher, warranting subclass slope b. C reference stream type fits better on this segment than downstream E segments. Suggest updating ph. 1 data with stream type Cb. done
- XS: Please label left and right bankfull (LBF, RBF). Also, please check Wfpa in spreadsheet and step 2. Based on LFPA and RFPA locations, I get 256.5' for Wfpa. done
- Narrative and step 7.1 indicate "limited historic incision". You also chose F model for channel evolution, stage III. However, incision ratio is 1.00, suggesting channel did not incise. Why did you think there had been incision? Is xs less representative of segment? Did you consider segment could be in stage I or in CEM D (grade control)? These are possible, but my feeling is that there was limited historic incision that has been offset by subsequent aggradation. The grade controls limit further incision, but the fact that the historic incision may have led to exposure of the grade controls is the basis of using F-model.
  SP: If stream currently has access to floodplain (IR=1.00), then we don't want to use stage F III. Stage III flags a loss of floodplain access. Either cross section is not the most representative (it's at a bend and just upstream of grade controls) or a different process is going on here. Does the segment predominantly have floodplain access? If so, perhaps it is in stage IV or V and the RAF was not discovered in the field? Perhaps upstream and downstream of grade controls have different incision ratios?
  US and DS portions have fp access. After seeing pictures of the recent flood damage I wish we had gotten another x-sec at a minimum, or possibly have segmented further; where the stream is closer to the road (mid-segment, in vicinity of Mill Trace) should probably be assessed with HEF and would show some incision; US and DS portions are better represented by the x-sec. Added step 5 comments on this, but have left stage III.

  In discussing and assessing this further, want to clarify belief that the mid-section near Mill Trace is not a Human Elevated Floodplain (i.e., HEF noted above is not accurate) – it is likely terraces of suspected glacial origin, and the structures placed on them occurred during historic times on an older geologic feature. I'm actually not sure an additional x-section in this area would show incision, but the stream certainly has less access to floodplain in this area, and widening and planform change are the dominant adjustment processes; hence the stage FIII CEM selected for the reach, despite an Incision Ratio of 1.00.

- What made you think almost all of segment has been straightened? Step-pool streams tend to be less sinuous. Perhaps some straightening is associated with bridges or road. Beers Atlas indicates a grist mill, car factory, and sash and door company all on this short segment, and there are stone walls and various remnants still visible in portions. Added step 5 comment to this effect.
  SP: Okay.

T2.05-0

- Please update ph. 1 valley width, confinement type, and reference stream type, bedform, subclass slope, bed material, and groundwater inputs. done
- Step 2.13. Please check data entry. Improbably large particles. Fixed; mean channel and margin embededness had accidentally been entered.
- Step 4.8 constrictions. Please enter bridge. If it is not a channel or floodprone constriction, then say no. done
- Stage FIV may not be the best fit, since negligible incision was found, and no historic incision is noted. With so much grade control, have you thought about CEM D? This model often has planform adjustment and aggradation associated with it. Forgot to check the historic incision, and have done so now. The significant mill history downstream in particular suggests that the stream likely incised historically and has slowly aggraded and evolved (enough to offset historic incision) since that period. After reading through the Appendix C CEM descriptions again, feel F-model stage IV probably is appropriate, although it is true that the grade controls will likely prevent any further incision. Also adjusted Step 7 scores pretty significantly, as the mill impacts had not been adequately accounted (it was actually a starch factory indicated on the Beers atlas at the base of this reach/top of next reach DS).
  SP: Okay. Perhaps xs location is an area of lower incision for the reach, since there the channel has a little more room with respect to road encroachment. Perhaps that is where mobilized sediment has been allowed to store to some extent. If historic incision was greater in the past, then grade controls would not necessarily limit future incision.
  Have changed CEM to stage III, based in part on pix of recent flood damage; feel F-model is still appropriate; agree with your indication here - stream may still have opportunity to incise.
- XS: Please check Wfpa. 180.5' does not agree with distance between LFPA and RFPA. I'm confused by this, as it does seem to match the distance between lfpa and rfpa on both field sheet and uploaded x-sec; not sure where you are noting inconsistency
  SP: Apologies; I don't know where I was looking either.
- RHA field notes: Please fix herbs buffer vegetation percentages to sum to 100%. done

- Appendix 6 -
Consolidated Project Identification

(sorted by priority - watershed priority first, then reach, then river segment;
11x17 format – digital appendix includes Excel file that can be sorted by field)

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
M1.03B	Protect River Corridor	High	High	Y	Left bank wetland area is important floodplain access point; damming by I-91 and undersized culverts poses possibility of ponding upstream
M1.03B	Remove windrow_berm	High	High	N	Needs corridor protection, then higher resolution survey details and rough cost-benefit analysis of obtainable floodplain access
M1.05-0	Protect River Corridor	High	High	Y	Much of reach may be under limited number of landowners
M1.05-0	Augment stream buffers	High	High	Y	Monitor and augment plantings done by Barnet School and others
T1.01A	Protect River Corridor	High	High	Y	Upstream of confluence, impacts currently being passed downstream; investigate channel management easements
T1.01B	Replace existing bridge	High	High	Y	Undersized bridge at Ferguson Rd. likely contributes to need for repeated windrowing
T1.03A	Protect River Corridor	High	High	Y	Explore possibilities for channel management easements
T1.03C	Protect River Corridor	High	High	Y	wildlife sanctuary downstream of East Peacham village and Willow Brook confluence: determine corridor protection status, explore further options; consider educational signs concerning corridor protection at wildlife observation deck
T1.03C	Plant stream buffers	High	High	Y	Consider shrubs and low trees if visibility is an issue, though stream can use shade; low-cost plantings due to bank instability; reed canary grass may need to be addressed for establishment
T1.07A	Protect River Corridor	High	High	Y	Incorporate FEH zones in local planning; consider road risk in Pre-disaster mitigation planning; gully repair US RB of Bayley-Hazen_Slack St.; knotweed control along Bayley-Hazen
T2.01-0	Protect River Corridor	High	High	Y	Incorporate FEH zones in local planning; consider channel management easements in shared floodplain with T1.01
T2.02A	Protect River Corridor	High	High	Y	Consider channel management easements
T2.02A	Plant stream buffers, fencing and watering options	High	High	Y	Low-cost stock due to high erosion hazards; currently fenced with polywire; cows access stream at ford
T2.02B	Protect River Corridor	High	High	Y	Maintain check dams; incorporate FEH zones in local planning, consider flood risks and risks of headcutting in Pre-disaster mitigation planning
T2.04A	Protect River Corridor	High	High	Y	Seek channel management easements, alternative watering system downstream of Hollow Woods Rd.
T2.04A	Plant stream buffers, fencing	High	High	Y	Likely eligible for CREP, EQIP
T2.04A	Remove berm	High	Unknown	Y	Need higher resolution survey to determine how much more floodplain access would be gained; berm is intermittent may have access in some areas
T2.04B	Protect River Corridor	High	High	Y	Seek channel management easements
T2.04B	Plant stream buffers, possibly fencing	High	High	Y	Likely eligible for CREP; not sure if this area is pastured
T2.04C	Protect River Corridor	High	High	Y	FEH; ensure protection of lot next to old South Peacham store – virtual detention pond for Peacham-Groton-Danville Rd. bridge in a flood
T2.02C	Protect River Corridor	Medium	High	Y	Appears to be in FEMA Special Flood Hazard Area
T2.03B	Plant stream buffers, fencing and watering options	Medium	High	Y	Affects discharges feeding into floodplain at Harvey's Lake
M1.01-0	Protect River Corridor	High	Medium	Y	Assess current protection and ordinances; much of it may lie within FEMA Special Flood Hazard Area; include encroachments in Pre-disaster Mitigation Planning
M1.03A	Protect River Corridor	High	Medium	Y	Right bank important for attenuation of ice jam flooding impacts
M1.03A	Plant stream buffers	High	Medium	Y	Esp. left bank; offers additional flood protection-ice deflection; remove a very limited number of purple loosestrife at x-section location
M1.03B	Plant stream buffers	High	Medium	Y	Tough planting conditions; use Better Backroads designs, leverage opportunity if berm removal happens
M1.06A	Protect River Corridor	High	Medium	Y	Determine extent and protection status of Barnet School Forest
M1.06A	Plant stream buffers	High	Medium	Y	Right bank; erosion pressures likely to increase as downstream sediment movement drives planform changes
T1.02C	Protect River Corridor	High	Medium	Y	Incorporate FEH or belt-width zones in local planning (alternative width for unassessed reaches); explore WHIP project for honeysuckle control
T1.03A	Plant stream buffers, fencing	High	Medium	Y	Augment existing buffers on both banks; active pasture for sheep
T1.04-0	Replace existing bridges, culverts	High	Medium	Y	Assess risks to surrounding area for pre-disaster mitigation planning. None appear at risk of imminent failure, but plugging has likely contributed to repeated windrowing; farm bridge may float or plug, but outflanking for it or next bridge downstream would likely not cause a lot of damage
T1.05-0	Replace existing culvert	High	Medium	Y	All three culverts are 6 ft; E. Peacham Rd. culvert by pond on upstream end may be top priority: perched and scouring, may trigger bank instability beneath pond. VHD MAPPING NOT ACCURATE FOR LOCATION OF THIS CULVERT (Fig. 45)
T1.05-0	Replace existing culvert	High	Medium	Y	Ewells Mills (concrete box culvert) is buried under a lot of fill and is a substantial investment to replace; concrete bottom and skirt hard for AOP passage. Assess risks to surrounding area for pre-disaster mitigation planning at Ewells Mills.
T1.06C	Protect River Corridor	High	Medium	Y	Incorporate FEH zones in local planning, consider road risk in Pre-disaster mitigation planning and capital budgeting

River Segment	*Project*	*Reach Priority*	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
T1.06C	Protect River Corridor	High	Medium	Y	Increasing development pressure; incorporate FEH or belt-width zones in local planning (alternative width for unassessed reaches)
T1.07B	Replace existing culvert, bridge	High	Medium	Y	Undersized culvert at Butternut Farm - scour below, and is slightly perched – reduced AOP; bridge new, no adjustments yet
T1.07C	Protect River Corridor	High	Medium	Y	Incorporate FEH zones in local planning, consider channel management easements if not
M1.01-0	Extend buffers	Medium	Medium	Y	Particularly on right bank
T1.05-0	Protect River Corridor	Medium	Medium	Y	Get more info from landowner on sediment loading history in dredging areas at upstream end of reach. Assess impacts downstream; evaluate channel management options
T1.05-0	Replace existing culvert	Medium	Medium	Y	Private culvert leading to 1558 E. Peacham Rd. may be lowest priority but does present full floodprone blockage; assess risks to E. Peacham village for pre-disaster mitigation planning
T2.01-0	Augment or plant stream buffer	Medium	Medium	Y	Upstream and downstream ends; homesite in upper third of reach may be tough to get funding
T2.03B	Protect River Corridor	Medium	Medium	Y	Incorporate FEH in local planning
T2.04C	Plant stream buffers	Medium	Medium	Y	Tough planting conditions due to road encroachments, but some opportunities; would need creative financing options
T2.04C	Replace existing bridges	Medium	Medium	Y	Neither Peacham-Groton-Danville Rd. nor Mill Trace are structurally problematic currently, but both amplify stream power and sediment discharge impacts downstream. P-G-D bridge is really buried and difficult to replace; consider road and development risks in Pre-disaster mitigation planning and eventual bridge replacements in capital budgeting
T2.05-0	Protect River Corridor	Medium	Medium	Y	Incorporate FEH zones in local planning
M1.07C	Protect River Corridor	High	Low	Y	include encroachments in Pre-disaster Mitigation Planning (esp. campsites and truck shop on upstream end); address Japanese knotweed at Ben's Mill site (one of few invasives locations in watershed)
M1.01-0	Replace existing bridge	Medium	Low	Y	Upstream bridge at Carter St. has low clearance (may plug) but outflanking not a big issue; deposition has probably needed to be dredged periodically, may require less maintenance if sized larger
M1.04-0	Protect River Corridor	Medium	Low	Y	Right bank important for attenuation of ice jam flooding impacts
M1.04-0	Stabilize gully heads	Medium	Low	Y	Town of Barnet may want to assess risk to Patenaude Rd.; sediment was largely intercepted but might not be out of growing season
M1.06B	Protect River Corridor	Medium	Low	Y	Determine extent and protection status of Barnet School Forest
M1.07A	Protect River Corridor	Medium	Low	Y	Short segment has some value but should be treated with M1.06B
M1.07C	Plant stream buffers	Medium	Low	Y	Replace Japanese knotweed at Ben's Mill with trees or shrubs
T1.02A	Protect River Corridor	Medium	Low	Y	Incorporate FEH zones in local planning
T1.02A	Replace existing bridge	Medium	Low	Y	Undersized and misaligned bridge at Peacham-Barnet Rd. likely to build up sediments over time, increase risk for plugging
T1.02B	Protect River Corridor	Medium	Low	Y	Incorporate FEH zones in local planning, consider road risk in Pre-disaster mitigation planning and capital budgeting
T1.02D	Protect River Corridor	Medium	Low	Y	Incorporate FEH or belt-width zones in local planning
T1.04-0	Plant stream buffers	Medium	Low	Y	May be difficult to obtain CREP or other funding
T1.06B	Protect River Corridor	Medium	Low	Y	Incorporate FEH zones in local planning
T1.06B	Replace existing culvert	Medium	Low	Y	Undersized culvert at Still Run building deposition upstream, and is perched – reduced AOP
T1.07A	Augment stream buffer	Medium	Low	Y	Replace clearcut buffer at new development clearing DS of Bayley-Hazen_Slack St.
T2.01-0	Replace existing bridges	Medium	Low	Y	Downstream bridge on Peacham-West Barnet Rd. likely highest priority; alignment reduces effective width and accessibility of floodplain
T2.02B	Plant stream buffers	Medium	Low	Y	Encourage private landowners; funding may be difficult
T2.02D	Protect River Corridor	Medium	Low	Y	Incorporate FEH or belt-width zones in local planning; consider control of Japanese butterbur
T2.02D	Plant stream buffers	Medium	Low	Y	CREP may be possible on right bank, possible left bank downstream of bridge
T2.04A	Replace existing bridge	Medium	Low	Y	Not a floodprone constriction
T2.05-0	Replace existing bridge	Medium	Low	Y	Footbridge upstream of South Peacham village has low clearance, likely to plug; outflanking may not be a big deal
M1.02-0	Protect River Corridor	Medium	Low	Y	Include encroachments in Pre-disaster Mitigation Planning, limit further encroachments (consider FEH development and implementation)
M1.04-0	Augment stream buffers	Low	Low	Y	Power line cut – need low-growing spp, but non-invasive; sumac?
T1.03B	Replace existing bridge	Low	Low	Y	Likely replaced once already; nice bottomless arch culvert but appears to still be undersized; deposition upstream
T2.02D	Replace existing bridge	Low	Low	Y	Undersized, scour noted below but no structural concerns at this time
T2.03A	Replace existing bridge	Low	Low	Y	Effective width reduced by alignments, some deposition upstream and downstream but no pressing structural or flood hazard issues

- Appendix 8 -

Bridge and Culvert Survey Reports

Failure modes: Geomorphic incompatibility
Failure modes: Problem causes
Aquatic organism passage ratings: Passage, geomorphic compatibility, retrofit potential
Wildlife passage
Bridge and culvert summary reports (each structure)

Structure Failure Modes

Stevens River - basin14

Explanation of codes used in table header

Failure Modes		Existing Problems	
F1	Concern for structure due to fluvial condition or process	**P1**	Upstream sediment deposit
F2	Potential failure due to out-flanking	**P2**	Upstream Scour and/or erosion present
F3	Potential failure due to scour	**P3**	Downstream Scour and/or erosion present
F4	Potential failure due to ice or debris jam	**P4**	Inlet obstruction present
F5	Structure related damage due to flooding of adjacent property	**P5**	Poor location or alignment
F6	Structure related damage due to erosion of adjacent property	**P6**	Beaver activity
Width	Structure width divided by channel width as a percent (% bankfull width)	**P7**	Floodplain filled entirely or partially by roadway approaches

X = meets criteria MD = missing data

Town	Road	Stream Name	SgaID / struct_num	Type	F1	F2	F3	F4	F5	F6	P1	P2	P3	P4	P5	P6	P7	Width
Barnet	farm road	Peacham Hollow brook	700000000103013	Bridge	-	-	-	-	-	X	-	-	-	X	-	-	-	85 %
Barnet	LogRd_308 5 W Barnet Rd	South Peacham Brook	700000000203013	Bridge	-	X	X	X	-	X	X	-	-	X	-	-	-	57 %
Barnet	DW_3613 W Barnet Rd	South Peacham brook	700000000303013	Bridge	-	X	X	X	X	X	X	-	-	X	-	-	X	52 %
Barnet	FarmRd_3 871 W Barnet Rd	South Peacham Brook	700000000403013	Bridge	-	X	-	X	-	-	-	-	-	-	-	-	-	39 %
Barnet	Pvt_113 W Main St	South Peacham Brook	700000000503013	Bridge	-	X	X	X	X	X	X	X	X	X	-	-	X	58 %
Barnet	I-91	Stevens River	200000000103012 200091007203012	Culvert	-	X	X	X	X	X	X	-	-	X	-	-	X	57 %

Town	Road	Stream Name	SgaID / struct_num	Type	F1	F2	F3	F4	F5	F6	P1	P2	P3	P4	P5	P6	P7	Width
Barnet	WACR_CT River Line	Stevens River	700000000003013	Bridge	-	X	X	X	X	X	-	-	-	X	-	-	X	59 %
Barnet	ANDERSON ST	Stevens River	100000000203011 100301004703011	Bridge	-	X	X	X	X	X	X	X	X	X	X	-	X	64 %
Barnet	BARNET CENTER RD	Stevens River	100000000403011 100301004503011	Bridge	-	X	X	X	X	X	X	-	-	X	-	-	X	47 %
Barnet	CARTER ST	Stevens River	100000000003011 100301004103011	Bridge	-	X	X	X	X	X	-	-	X	X	-	-	X	45 %
Barnet	CHURCH ST	Stevens River	100000000103011 100301001103011	Bridge	-	-	-	X	-	X	-	-	-	X	X	-	X	125 %
Barnet	E PEACHAM RD	Peacham Hollow Brook	100000000603011 100301000503011	Bridge	-	-	-	-	-	X	X	-	-	X	X	-	X	101 %
Barnet	FERGUSON RD	Peacham Hollow Brook	100000000503011 100301003903011	Bridge	-	X	X	X	X	X	-	-	-	X	-	-	X	50 %
Barnet	GARLAND HILL	South Peacham Brook	100000000803011 100301004203011	Bridge	-	X	X	X	-	X	X	X	X	-	-	-	X	42 %
Barnet	HARVEY MTN RD	South Peacham Brook	100000000903011 100301003703011	Bridge	-	X	X	X	X	X	-	X	X	X	X	-	X	49 %
Barnet	PATNEAUDE LN	Stevens River	100000000303011 100301004403011	Bridge	-	X	X	X	-	-	X	-	-	-	-	-	X	43 %
Barnet	ROUTE 5 S	Stevens River	200000000003012 200113012103012	Bridge	-	-	X	X	-	X	-	-	-	X	X	-	-	113 %
Barnet	SOMERHILL RD	Peacham Hollow Brook	100000000703011 100301004603011	Bridge	-	X	X	X	X	X	-	X	-	X	-	-	X	56 %
Barnet	W BARNET RD	South Peacham Brook	200000000003011 200216000803012	Bridge	-	X	X	X	X	X	-	-	-	X	-	-	X	58 %
Barnet	W MAIN ST	South Peacham Brook	200000000103011 200216000903012	Bridge	-	-	-	X	-	X	X	-	-	-	X	-	X	133 %

Town	Road	Stream Name	SgaID / struct_num	Type	F1	F2	F3	F4	F5	F6	P1	P2	P3	P4	P5	P6	P7	Width
Peacham	DW_1518 E Peacham Rd	Peacham Hollow Brook	700000000003093	Culvert	-	X	X	X	X	-	X	-	X	-	-	-	X	21 %
Peacham	VAST_Rte 2_corridor	Peacham Hollow Brook	700000000103093	Bridge	-	-	-	-	-	X	-	-	-	X	-	-	-	101 %
Peacham	DW_no address	Peacham Hollow Brook	700000000203093	Culvert	-	X	X	X	-	X	X	-	-	-	-	-	X	17 %
Peacham	DW1_2671 Slack St	Peacham Hollow Brook	700000000303093	Culvert	-	X	X	X	X	X	X	X	X	-	X	-	X	35 %
Peacham	DW2_2671 Slack St	Peacham Hollow Brook	700000000403093	Bridge	-	X	X	X	X	X	-	-	-	X	-	-	X	46 %
Peacham	Back Achers log rd_trail	Unnamed trib to Peacham Hollow Brook	700000000503093	Bridge	-	X	X	X	X	X	X	-	-	X	X	-	X	51 %
Peacham	BAYLEY-HAZEN RD	Peacham Hollow Brook	100000000503091 700008029303093	Culvert	-	X	-	X	X	X	-	-	-	-	X	-	X	33 %
Peacham	COUNTY RD	South Peacham Brook	100000000803091 700006060303093	Culvert	-	X	X	X	-	X	X	X	X	-	X	-	X	24 %
Peacham	E PEACHAM RD	Peacham Hollow Brook	100000000003091 990002001003091	Bridge	-	X	X	X	X	X	-	-	-	X	-	-	X	33 %
Peacham	E PEACHAM RD	Peacham Hollow Brook	100000000203091 700002010603093	Culvert	-	X	X	X	X	X	X	-	-	-	X	-	X	21 %
Peacham	E PEACHAM RD	Peacham Hollow Brook	400000000003091 990002001103091	Bridge	-	X	X	X	-	X	-	X	-	X	-	-	-	58 %
Peacham	GOV MATTOCK S RD	South Peacham Brook	100000000703091 700053058303093	Culvert	-	X	X	X	X	X	X	X	X	X	X	-	X	51 %
Peacham	GOV MATTOCK S RD	South Peacham Brook	700000000603093	Bridge	-	X	X	X	-	X	-	-	-	X	X	-	-	73 %

Town	Road	Stream Name	SgaID / struct_num	Type	F1	F2	F3	F4	F5	F6	P1	P2	P3	P4	P5	P6	P7	Width
Peacham	HOLLOW WOOD RD	South Peacham Brook	400000000103091 990004000803091	Bridge	-	X	X	X	-	X	-	X	-	X	-	-	-	42 %
Peacham	MILL TRCE	South Peacham Brook	100000000603091 100309003903091	Bridge	-	X	X	X	X	X	-	X	X	X	-	-	X	56 %
Peacham	PEACHAM DANVILLE RD	Peacham Hollow Brook	100000000303091 700001008603093	Culvert	-	X	X	X	X	X	X	-	-	-	X	-	X	21 %
Peacham	S MAIN ST	South Peacham Brook	990000000103091 990001001403091	Culvert	-	X	X	X	X	X	-	-	-	X	X	-	X	56 %
Peacham	STEVENS ON RD	Peacham Hollow brook	990000000003091 700044054603093	Culvert	-	X	X	X	X	X	-	-	-	X	-	-	X	54 %
Peacham	STILL RUN	Peacham Hollow Brook	100000000403091 990017002003091	Culvert	-	X	X	X	X	-	-	-	-	-	-	-	X	33 %
Peacham	THADDEUS STEVENS RD	Peacham Hollow brook	100000000103091 700020036203093	Culvert	-	X	X	X	X	X	-	X	X	X	-	-	X	26 %

Failure Modes - Problems and Causes

Stevens River - basin14

Explanation of codes used in table header

Upstream Sediment Deposition		Upstream Scour and Erosion		Downstream Scour and Erosion		Poor Locacation or Aligment	
C1	Opening obstructed by sediment	**C4**	Bank armoring failing	**C7**	Bank armoring failing	**C12**	Stream approach angle is sharp bend
C2	Sediment deposits >= half bankfull	**C5**	Bank erosion high	**C8**	Bank erosion high	**C13**	Located at significant valley break
C3	Steep riffle upstream	**C6**	Scour under structure	**C9**	Scour under structure	**C14**	Avulsion follow road
				C10	Banks higher downstream than upstream		
				C11	Culvert outlet is cascade or freefall		

Yes = Condtion exists No = Condition does not exist MD = missing data

					Bankfull Width	Upstream Sediment Deposition			Upstream Scour and Erosion			Downstream Scour and Erosion					Poor Location or Alignment		
Town	**Road**	**Stream Name**	**SgaID / struct_num**	**Type**	**Percent**	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	**C10**	**C11**	**C12**	**C13**	**C14**
Barnet	farm road	Peacham Hollow brook	700000000103013	Bridge	85 %	No	No	No	No	No	No	No	No	No	No		No	No	No
Barnet	LogRd_308 5 W Barnet Rd	South Peacham Brook	700000000203013	Bridge	57 %	No	No	Yes	No	No	No	No	No	No	No		No	No	No
Barnet	DW_3613 W Barnet Rd	South Peacham brook	700000000303013	Bridge	52 %	No	No	Yes	No	No	No	No	No	No	No		No	No	No
Barnet	FarmRd_3 871 W Barnet Rd	South Peacham Brook	700000000403013	Bridge	39 %	No	No	No	No	No	No	No	No	No	No		No	No	No
Barnet	Pvt_113 W Main St	South Peacham Brook	700000000503013	Bridge	58 %	No	No	Yes	No	No	Yes	No	No	Yes	No		No	No	No

Town	Road	Stream Name	SgaID / struct_num	Type	Bankfull Width Percent	Upstream Sediment Deposition			Upstream Scour and Erosion			Downstream Scour and Erosion					Poor Location or Alignment		
						C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
Barnet	I-91	Stevens River	200000000103012 200091007203012	Culvert	57 %	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No
Barnet	WACR_CT River Line	Stevens River	700000000003013	Bridge	59 %	No	No	No	No	No	No	No	No	No	No		No	No	No
Barnet	ANDERSON ST	Stevens River	100000000203011 100301004703011	Bridge	64 %	No	No	Yes	Yes	No	No	No	No	No	No		No	No	Yes
Barnet	BARNET CENTER RD	Stevens River	100000000403011 100301004503011	Bridge	47 %	No	No	Yes	No	No	No	No	No	No	No		No	No	No
Barnet	CARTER ST	Stevens River	100000000003011 100301004103011	Bridge	45 %	No	No	No	No	No	No	No	No	Yes	No		No	No	No
Barnet	CARTER ST	Stevens River	100000000003011 100301004103011	Bridge	45 %	No	No	No	No	No	No	No	No	Yes	No		No	No	No
Barnet	CHURCH ST	Stevens River	100000000103011 100301001103011	Bridge	125 %	No	No	No	No	No	No	No	No	No	No		No	No	Yes
Barnet	E PEACHAM RD	Peacham Hollow Brook	100000000603011 100301000503011	Bridge	101 %	No	No	Yes	No	No	No	No	No	No	No		No	No	Yes
Barnet	FERGUSON RD	Peacham Hollow Brook	100000000503011 100301003903011	Bridge	50 %	No	No	No	No	No	No	Yes	No	No	Yes		No	No	No
Barnet	GARLAND HILL	South Peacham Brook	100000000803011 100301004203011	Bridge	42 %	No	No	Yes	Yes	No	No	No	No	No	Yes		No	No	No
Barnet	HARVEY MTN RD	South Peacham Brook	100000000903011 100301003703011	Bridge	49 %	No	No	No	Yes	No	No	Yes	No	No	Yes		Yes	No	Yes
Barnet	PATNEAUDE LN	Stevens River	100000000303011 100301004403011	Bridge	43 %	Yes	No	Yes	No	No	No	No	No	No	No		No	No	No
Barnet	ROUTE 5 S	Stevens River	200000000003012 200113012103012	Bridge	113 %	No	No	No	No	No	No	No	No	No	Yes		No	Yes	Yes
Barnet	SOMERHILL RD	Peacham Hollow Brook	100000000703011 100301004603011	Bridge	56 %	No	No	No	No	No	Yes	No	No	No	No		No	No	No

					Bankfull Width	Upstream Sediment Deposition			Upstream Scour and Erosion			Downstream Scour and Erosion					Poor Location or Alignment		
Town	Road	Stream Name	SgaID / struct_num	Type	Percent	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
Barnet	W BARNET RD	South Peacham Brook	200000000003011 200216000803012	Bridge	58 %	No	No	No	No	No	No	No	No	No	No		No	No	No
Barnet	W MAIN ST	South Peacham Brook	200000000103011 200216000903012	Bridge	133 %	Yes	No	No	No	No	No	No	No	No	No		No	No	Yes
Peacham	DW_1518 E Peacham Rd	Peacham Hollow Brook	700000000003093	Culvert	21 %	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No	No	No
Peacham	DW_1518 E Peacham Rd	Peacham Hollow Brook	700000000003093	Culvert	21 %	Yes	No	Yes	No	No	No	No	No	Yes	Yes	No	No	No	No
Peacham	VAST_Rte 2_corridor	Peacham Hollow Brook	700000000103093	Bridge	101 %	No	No	No	No	No	No	No	No	No	No		No	No	No
Peacham	DW_no address	Peacham Hollow Brook	700000000203093	Culvert	17 %	Yes	No	Yes	No	No	No	Yes	No	No	No	Yes	No	No	No
Peacham	DW1_2671 Slack St	Peacham Hollow Brook	700000000303093	Culvert	35 %	No	No	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes
Peacham	DW2_2671 Slack St	Peacham Hollow Brook	700000000403093	Bridge	46 %	No	No	No	No	No	No	No	No	No	No		No	No	No
Peacham	Back Achers log rd_trail	Unnamed trib to Peacham Hollow Brook	700000000503093	Bridge	51 %	No	No	Yes	No	No	No	No	No	No	No		No	Yes	No
Peacham	BAYLEY-HAZEN RD	Peacham Hollow Brook	100000000503091 700008029303093	Culvert	33 %	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
Peacham	COUNTY RD	South Peacham Brook	100000000803091 700006060303093	Culvert	24 %	No	No	Yes	Yes	No	No	Yes	No	No	Yes	Yes	Yes	No	Yes

					Bankfull Width	Upstream Sediment Deposition			Upstream Scour and Erosion			Downstream Scour and Erosion					Poor Location or Alignment		
Town	**Road**	**Stream Name**	**SgaID / struct_num**	**Type**	**Percent**	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	**C10**	**C11**	**C12**	**C13**	**C14**
Peacham	E PEACHAM RD	Peacham Hollow Brook	100000000003091 990002001003091	Bridge	33 %	No	No	No	No	No	No	No	No	No	No		No	No	No
Peacham	E PEACHAM RD	Peacham Hollow Brook	100000000203091 700002010603093	Culvert	21 %	No	No	Yes	No	No	No	Yes	Yes	No	Yes	Yes	No	No	Yes
Peacham	E PEACHAM RD	Peacham Hollow Brook	400000000003091 990002001103091	Bridge	58 %	No	No	No	No	No	Yes	No	No	No	No		No	No	No
Peacham	GOV MATTOCK S RD	South Peacham Brook	100000000703091 700053058303093	Culvert	51 %	No	No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes
Peacham	GOV MATTOCK S RD	South Peacham Brook	700000000603093	Bridge	73 %	No	No	No	No	No	No	No	No	No	No		No	Yes	No
Peacham	HOLLOW WOOD RD	South Peacham Brook	400000000103091 990004000803091	Bridge	42 %	No	No	No	No	No	Yes	Yes	No	No	No		No	No	No
Peacham	MILL TRCE	South Peacham Brook	100000000603091 100309003903091	Bridge	56 %	No	No	No	Yes	No	No	Yes	No	No	Yes		No	No	No
Peacham	PEACHAM DANVILLE RD	Peacham Hollow Brook	100000000303091 700001008603093	Culvert	21 %	No	No	Yes	No	No	No	Yes	No	No	No	No	No	Yes	No
Peacham	PEACHAM DANVILLE RD	Peacham Hollow Brook	100000000303091 700001008603093	Culvert	21 %	Yes	No	Yes	No	No	No	Yes	No	No	No	No	No	Yes	No
Peacham	S MAIN ST	South Peacham Brook	990000000103091 990001001403091	Culvert	56 %	No	No	No	No	No	No	Yes	No	No	No	Yes	No	Yes	No
Peacham	STEVENS ON RD	Peacham Hollow brook	990000000003091 700044054603093	Culvert	54 %	No	No	No	No	No	No	No	No	No	No	No	No	No	No

						Upstream Sediment Deposition			Upstream Scour and Erosion			Downstream Scour and Erosion					Poor Location or Alignment		
Town	Road	Stream Name	SgaID / struct_num	Type	Bankfull Width Percent	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
Peacham	STILL RUN	Peacham Hollow Brook	100000000403091 990017002003091	Culvert	33 %	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No
Peacham	THADDEUS STEVENS RD	Peacham Hollow brook	100000000103091 700020036203093	Culvert	26 %	No	No	No	Yes	No	No	Yes	No	Yes	No	No	No	No	No

Aquatic Organism Passage

Stevens River - basin14

Geomorphic Compatibility

Retrofit Potential

Explanation of codes used in table header

Explanation of data acquisition (link)

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	**Pos2 (Center)**	For moderate swimmers
				Pos 3 (right)	For weak swimmers

Town	Road	Stream Name	SgaID / struct_num	AOP Coarse Screen	AOP Geomorphic Compatibility	AOP Retrofit Potential	Percent Bankfull Width
Barnet	I-91	Stevens River	200000000103012 200091007203012	Reduced AOP	Mostly Compatable	MLL	57 %
Peacham	DW_1518 E Peacham Rd	Peacham Hollow Brook	700000000003093	Reduced AOP	Partially Compatable	LLL	21 %
Peacham	DW_no address	Peacham Hollow Brook	700000000203093	Reduced AOP	Mostly Incompatable	LLL	17 %
Peacham	DW1_2671 Slack St	Peacham Hollow Brook	700000000303093	No AOP Except Adult Salmonids	Mostly Incompatable	MLL	35 %
Peacham	BAYLEY-HAZEN RD	Peacham Hollow Brook	100000000503091 700008029303093	Reduced AOP	Mostly Compatable	MLL	33 %
Peacham	COUNTY RD	South Peacham Brook	100000000803091 700006060303093	No AOP Except Adult Salmonids	Mostly Incompatable	LLL	24 %
Peacham	E PEACHAM RD	Peacham Hollow Brook	100000000203091 700002010603093	No AOP Including Adult Salmonids	Mostly Incompatable	LLL	21 %
Peacham	GOV MATTOCKS RD	South Peacham Brook	100000000703091 700053058303093	Reduced AOP	Partially Compatable	MML	51 %
Peacham	PEACHAM DANVILLE RD	Peacham Hollow Brook	100000000303091 700001008603093	Reduced AOP	Mostly Incompatable	LLL	21 %
Peacham	S MAIN ST	South Peacham Brook	990000000103091 990001001403091	Reduced AOP	Partially Compatable	MLL	56 %
Peacham	STEVENSON RD	Peacham Hollow brook	990000000003091 700044054603093	Full AOP	Mostly Compatable	MML	54 %
Peacham	STILL RUN	Peacham Hollow Brook	100000000403091 990017002003091	No AOP Except Adult Salmonids	Mostly Compatable	MLL	33 %
Peacham	THADDEUS STEVENS RD	Peacham Hollow brook	100000000103091 700020036203093	Reduced AOP	Partially Compatable	LLL	26 %

Wildlife Passage

Stevens River - basin14

Structures Potentially Suitable for Terrestrial Wildlife Movement

Large Wildlife = deer, moose, bear

Medium Wildlife = fisher, otter, coyote, fox

Small Wildlife = herps, small mammals

					X = meets criteria MD = missing data			Wildlife Species Observed		
Town	**Road**	**Stream Name**	**SgaID / struct_num**	**Type**	**Small Wildlife**	**Medium Wildlife**	**Large Wildlife**	**Roadkill**	**Outside Structure**	**Inside Structure**
Barnet	farm road	Peacham Hollow brook	700000000103013	Bridge	-	-	MD	---	---	---
Barnet	LogRd_3085 W Barnet Rd	South Peacham Brook	700000000203013	Bridge	-	-	MD	---	---	---
Barnet	DW_3613 W Barnet Rd	South Peacham brook	700000000303013	Bridge	-	-	MD	---	---	---
Barnet	FarmRd_3871 W Barnet Rd	South Peacham Brook	700000000403013	Bridge	-	-	MD	---	---	---
Barnet	Pvt_113 W Main St	South Peacham Brook	700000000503013	Bridge	-	-	MD	---	Unsure - Tracks	---
Barnet	I-91	Stevens River	200000000103012 200091007203012	Culvert	-	-	-	---	---	---
Barnet	WACR_CT River Line	Stevens River	700000000003013	Bridge	-	-	MD	---	Beaver - Bedding Sites	---
Barnet	ANDERSON ST	Stevens River	100000000203011 100301004703011	Bridge	-	-	MD	---	Deer - Tracks	Deer - Tracks
Barnet	BARNET CENTER RD	Stevens River	100000000403011 100301004503011	Bridge	-	-	MD	---	---	---
Barnet	CARTER ST	Stevens River	100000000003011 100301004103011	Bridge	-	-	MD	---	Mink - Sighting	---
Barnet	CHURCH ST	Stevens River	100000000103011 100301001103011	Bridge	-	-	MD	---	---	---
Barnet	E PEACHAM RD	Peacham Hollow Brook	100000000603011 100301000503011	Bridge	X	-	MD	---	---	---

Town	Road	Stream Name	SgaID / struct_num	Type	Small Wildlife	Medium Wildlife	Large Wildlife	Roadkill	Outside Structure	Inside Structure
Barnet	FERGUSON RD	Peacham Hollow Brook	100000000503011 100301003903011	Bridge	-	-	MD	---	---	---
Barnet	GARLAND HILL	South Peacham Brook	100000000803011 100301004203011	Bridge	-	-	MD	---	---	---
Barnet	HARVEY MTN RD	South Peacham Brook	100000000903011 100301003703011	Bridge	-	-	MD	---	Deer - Sighting	---
Barnet	PATNEAUDE LN	Stevens River	100000000303011 100301004403011	Bridge	-	-	MD	---	Unsure - Sighting	Unsure - Tracks
Barnet	ROUTE 5 S	Stevens River	200000000003012 200113012103012	Bridge	-	-	MD	---	---	---
Barnet	SOMERHILL RD	Peacham Hollow Brook	100000000703011 100301004603011	Bridge	-	-	MD	---	Unsure - Sighting	---
Barnet	W BARNET RD	South Peacham Brook	200000000003011 200216000803012	Bridge	-	-	MD	---	---	---
Barnet	W MAIN ST	South Peacham Brook	200000000103011 200216000903012	Bridge	X	-	MD	---	---	---
Peacham	DW_1518 E Peacham Rd	Peacham Hollow Brook	700000000003093	Culvert	-	-	-	---	---	---
Peacham	VAST_Rte2_corrid or	Peacham Hollow Brook	700000000103093	Bridge	X	-	MD	---	Beaver - Feeding Signs	---
Peacham	DW_no address	Peacham Hollow Brook	700000000203093	Culvert	-	-	-	---	---	---
Peacham	DW1_2671 Slack St	Peacham Hollow Brook	700000000303093	Culvert	-	-	-	---	---	---
Peacham	DW2_2671 Slack St	Peacham Hollow Brook	700000000403093	Bridge	-	-	MD	---	---	---
Peacham	Back Achers log rd_trail	Unnamed trib to Peacham Hollow Brook	700000000503093	Bridge	-	-	MD	---	---	---
Peacham	BAYLEY-HAZEN RD	Peacham Hollow Brook	100000000503091 700008029303093	Culvert	-	-	-	---	---	---
Peacham	COUNTY RD	South Peacham Brook	100000000803091 700006060303093	Culvert	-	-	-	---	---	---

Town	Road	Stream Name	SgaID / struct_num	Type	Small Wildlife	Medium Wildlife	Large Wildlife	Roadkill	Outside Structure	Inside Structure
Peacham	E PEACHAM RD	Peacham Hollow Brook	100000000003091 990002001003091	Bridge	-	-	-	---	---	---
Peacham	E PEACHAM RD	Peacham Hollow Brook	100000000203091 700002010603093	Culvert	-	-	-	---	---	---
Peacham	E PEACHAM RD	Peacham Hollow Brook	400000000003091 990002001103091	Bridge	-	-	MD	---	---	---
Peacham	GOV MATTOCKS RD	South Peacham Brook	100000000703091 700053058303093	Culvert	-	-	-	---	---	---
Peacham	GOV MATTOCKS RD	South Peacham Brook	700000000603093	Bridge	-	-	MD	---	---	---
Peacham	HOLLOW WOOD RD	South Peacham Brook	400000000103091 990004000803091	Bridge	-	-	MD	---	---	---
Peacham	MILL TRCE	South Peacham Brook	100000000603091 100309003903091	Bridge	-	-	MD	---	---	---
Peacham	PEACHAM DANVILLE RD	Peacham Hollow Brook	100000000303091 700001008603093	Culvert	-	-	-	---	---	---
Peacham	S MAIN ST	South Peacham Brook	990000000103091 990001001403091	Culvert	-	-	-	---	---	---
Peacham	STEVENSON RD	Peacham Hollow brook	990000000003091 700044054603093	Culvert	-	-	-	---	---	---
Peacham	STILL RUN	Peacham Hollow Brook	100000000403091 990017002003091	Culvert	-	-	-	---	Beaver - Feeding Signs	---
Peacham	THADDEUS STEVENS RD	Peacham Hollow brook	100000000103091 700020036203093	Culvert	-	-	-	---	---	---

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	100000000203011	Local SgaID		VOBCIT struct_num	100301004703011
Observers	Redstart	Assessment Date	7/27/2010	Project Name	Stevens River
Town	Barnet	Latitude	44.30199	Longitude	-72.05915
Location	Anderson St., 0.2 mi NE of W. Barnet Rd. and 100 ft US of M1.04 reach break			Reach VTID	M104
Road Name	ANDERSON ST	Road Type	Gravel	Stream Name	Stevens River
High Flow Stage	No	Channel Width			69.9

Bridge Information

Bridge Width	15.5	Material	Steel
Bridge Clearance	20	Number of bridge piers/arches	1
Bridge/Arch Span	45		
		Skewed to roadway?	No

Geomorphic Information

General

Floodplain filled by roadway approaches	Entirely	Structure is located at significant break in valley slope	No

Upstream

Obstructions at the opening of the structure	None	Estimated distance avulsion would follow road	100
Steep riffle present immediately upstream of structure	Yes	Angle of stream flow approaching structure	Naturally Straight
If channel avulses, stream will	Follow Road		

Downstream

Pool present immediately downstream of structure	No	
Downstream bank heights are substantially higher than upstream bank heights	No	
Pool Depth at point of streamflow entry	No 0 ft.	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Cobble	Sand	Gravel
Bedrock Present	Yes	Yes	Yes
Type of Sediment Deposits	Side	Side	Side
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	None	None	
Hard Bank Armoring	Failing	Intact	
Stream bed scour causing undermining around or under structure	None	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Deciduous Forest	Deciduous Forest	
Dominant Vegetation Type - Right	Deciduous Forest	Deciduous Forest	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	Yes	No	
Vegitation Band -Right	Yes	Yes	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	Deer - Tracks	Deer - Tracks

Other Information

Spatial location data collected with GPS?	Yes	Photos taken?	Yes

Comments **structure span in step 2 is effective width due to narrowing of valley by riprap on RVW inside abutment; abutments placed high on valley walls, abut2abut span is 73.5 ft**

Culvert Summary Report

Stevens River - basin14

General Information

SgaID	**700000000003093**	Local SgaID		VOBCIT struct_num	
Observers	**Redstart**	Assessment Date	**9/30/2010**	Project Name	**Stevens River**
Town	**Peacham**	Latitude	**44.33987**	Longitude	**-72.1601**
Location	**Private driveway leading to 1518 E. Peacham Rd., ~0.2 mi NW of E. Peacham village**			Reach VTID	**T1.05**
Road Name		Road Type	**Gravel**	Stream Name	**Peacham Hollow Brook**
High Flow Stage	**No**	Channel Width			**29.2**

Culvert Information

Culvert Length	**20.4**	Material	**Steel Corrugated**
Culvert Height	**6**	Number of culverts	**1**
Culvert Width	**6**	Culvert Overflow Pipe	**No**
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Entirely**	Structure is located at significant break in valley slope	**No**
		Culvert slope as compared with channel slope is significantly	**Same**

Upstream

Obstructions at the opening of the structure	**Wood debris,Sediment**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**Yes**	Angle of stream flow approaching structure	**Channelized Straight**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	Water depth in culvert (at outlet)	**0.4**
Downstream bank heights are substantially higher than upstream bank heights	**Yes**	Culvert outlet invert	**At Grade**
Stepped Footers	**0.4 ft.**	Backwater Length (measured from outlet)	**0**
Maximum pool depth	**2 ft.**	Backwater Length (measured from outlet)	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Gravel**	**Gravel**	**None**
Bedrock Present	**No**	**No**	
Type of Sediment Deposits	**Mid-channel**	**None**	**None**
Material Present throughout			**No**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**None**	**Low**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**Culvert**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Shrub/Sapling**	**Deciduous Forest**	
Dominant Vegetation Type - Right	**Mixed Forest**	**Deciduous Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**No**	**No**
Vegitation Band -Right	**Yes**	**No**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **undersized private culvert, unclear how old**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	**100000000003091**	Local SgaID		VOBCIT struct_num	**990002001003091**
Observers	**Redstart**	Assessment Date	**6/22/2010**	Project Name	**Stevens River**
Town	**Peacham**	Latitude	**44.3367**	Longitude	**-72.15603**
Location	**E. Peacham Rd., 0.11 mi SE of main intersection in E. Peacham village**			Reach VTID	**T1.04**
Road Name	**E PEACHAM RD**	Road Type	**Paved**	Stream Name	**Peacham Hollow Brook**
High Flow Stage	**No**	Channel Width			**30.3**

Bridge Information

Bridge Width	**24**	Material	**Concrete**
Bridge Clearance	**5.5**	Number of bridge piers/arches	**0**
Bridge/Arch Span	**10**		
		Skewed to roadway?	**Yes**

Geomorphic Information

General

Floodplain filled by roadway approaches **Entirely**

Structure is located at significant break in valley slope **No**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Channelized Straight**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**No**	
Downstream bank heights are substantially higher than upstream bank heights	**No**	
Pool Depth at point of streamflow entry	**No** **0 ft.**	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	Cobble	Cobble	Cobble
Bedrock Present	No	No	
Type of Sediment Deposits	None	Mid-channel	None
			Yes
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	None	Low	
Hard Bank Armoring	Intact	Intact	
Stream bed scour causing undermining around or under structure	None	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Shrub/Sapling	Herbaceous/Grass	
Dominant Vegetation Type - Right	Herbaceous/Grass	Shrub/Sapling	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

	Upstream	Downstream
Vegitation Band - Left	No	No
Vegitation Band -Right	No	No

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species			

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **originally assessed as a box culvert, but think it's actually a concrete bridge poured in place; very undersized but not in bad shape; may have been clean-outs after flood events**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	200000000003011	Local SgaID		VOBCIT struct_num	200216000803012
Observers	Redstart	Assessment Date	9/6/2010	Project Name	Stevens River
Town	Barnet	Latitude	44.3131	Longitude	-72.10848
Location	W. Barnet Rd., 0.05 mi SE o E. Peacham Rd. jct.			Reach VTID	T2.01
Road Name	W BARNET RD	Road Type	Paved	Stream Name	South Peacham Brook
High Flow Stage	No	Channel Width			52

Bridge Information

Bridge Width	24	Material	Concrete
Bridge Clearance	7.4	Number of bridge piers/arches	0
Bridge/Arch Span	30		
		Skewed to roadway?	Yes

Geomorphic Information

General

Floodplain filled by roadway approaches	**Partially**	Structure is located at significant break in valley slope	**No**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Mild Bend**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**No**	
Downstream bank heights are substantially higher than upstream bank heights	**No**	
Pool Depth at point of streamflow entry	**No** **0 ft.**	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Cobble**	**Cobble**
Bedrock Present	**No**	**No**	**No**
Type of Sediment Deposits	**Mid-channel**	**Mid-channel**	**None**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**Low**	**None**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Deciduous Forest**	**Mixed Forest**	
Dominant Vegetation Type - Right	**Mixed Forest**	**Mixed Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**No**	**No**
Vegitation Band -Right	**Yes**	**Yes**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species			

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **30 ft width listed is effective width due to angle of alignment_VTrans lists as 33 ft span**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	**700000000503013**	Local SgaID		VOBCIT struct_num	
Observers	**Redstart**	Assessment Date	**9/13/2010**	Project Name	**Stevens River**
Town	**Barnet**	Latitude	**44.31107**	Longitude	**-72.13438**
Location	**behind West Barnet Quick-Stop, 113 West Main St**			Reach VTID	**T2.02**
Road Name		Road Type	**Trail**	Stream Name	**South Peacham Brook**
High Flow Stage	**No**	Channel Width			**51.2**

Bridge Information

Bridge Width	**12**	Material	**Steel**
Bridge Clearance	**6.8**	Number of bridge piers/arches	**0**
Bridge/Arch Span	**29.5**		
		Skewed to roadway?	**Yes**

Geomorphic Information

General

Floodplain filled by roadway approaches	Partially	Structure is located at significant break in valley slope	No

Upstream

Obstructions at the opening of the structure	None	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	Yes	Angle of stream flow approaching structure	Channelized Straight
If channel avulses, stream will	Cross Road		

Downstream

Pool present immediately downstream of structure	No	
Downstream bank heights are substantially higher than upstream bank heights	No	
Pool Depth at point of streamflow entry	No 0 ft.	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Cobble	Cobble	Cobble
Bedrock Present	No	No	No
Type of Sediment Deposits	Point	Point	None
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	None	None	
Hard Bank Armoring	Intact	Intact	
Stream bed scour causing undermining around or under structure	Abutments	Abutments	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Herbaceous/Grass	Herbaceous/Grass	
Dominant Vegetation Type - Right	Deciduous Forest	Herbaceous/Grass	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	No	No	
Vegitation Band -Right	Yes	Yes	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	Unsure - Tracks	None

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **currently used as seating deck but potentially functional_may have been a logging bridge; stormater pipe enters right underneath bridge; unsure tracks outside structure in step 6 are raccoon (spp not listed)**

Bridge Summary Report Stevens River - basin14

General Information

SgaID	100000000603011	Local SgaID		VOBCIT struct_num	100301000503011
Observers	Redstart	Assessment Date	7/1/2010	Project Name	Stevens River
Town	Barnet	Latitude	44.31833	Longitude	-72.11523
Location	E. Peacham Rd., 0.45 mi NW of W. Barnet Rd and 0.22 mi SE of Somerhill and Morrison Hill Rds			Reach VTID	T1.02
Road Name	E PEACHAM RD	Road Type	Gravel	Stream Name	Peacham Hollow Brook
High Flow Stage	No		Channel Width		44.5

Bridge Information

Bridge Width	25.5	Material	Steel
Bridge Clearance	6.9	Number of bridge piers/arches	0

Bridge/Arch Span **45**

Skewed to roadway? **No**

Geomorphic Information

General

Floodplain filled by roadway approaches **Partially**

Structure is located at significant break in valley slope **No**

Upstream

Obstructions at the opening of the structure **None**

Estimated distance avulsion would follow road **475**

Steep riffle present immediately upstream of structure **Yes**

Angle of stream flow approaching structure **Channelized Straight**

If channel avulses, stream will **Follow Road**

Downstream

Pool present immediately downstream of structure **No**

Downstream bank heights are substantially higher than upstream bank heights **No**

Pool Depth at point of streamflow entry **No** **0 ft.** **0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Cobble**	**Cobble**
Bedrock Present	**No**	**No**	**No**
Type of Sediment Deposits	**Side,Mid-channel**	**Mid-channel**	**None**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**Low**	**Low**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Coniferous Forest**	**Coniferous Forest**	
Dominant Vegetation Type - Right	**Mixed Forest**	**Coniferous Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

	Upstream	Downstream	
Vegitation Band - Left	**Yes**	**Yes**	
Vegitation Band -Right	**Yes**	**Yes**	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species			

Other Information

Spatial location data collected with GPS? **Yes**

Photos taken? **Yes**

Comments **effective span is less than structure span according to water level: riprap sloped 45 degrees inside both sides of structure**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	**700000000203013**	Local SgaID		VOBCIT struct_num	
Observers	**Redstart**	Assessment Date	**9/6/2010**	Project Name	**Stevens River**
Town	**Barnet**	Latitude	**44.31145**	Longitude	**-72.11255**
Location	**logging road crosses stream beyond log home at 3085 W Barnet Rd**			Reach VTID	**T2.01**
Road Name		Road Type		Stream Name	**South Peacham Brook**
High Flow Stage	**No**			Channel Width	**52**

Bridge Information

Bridge Width	9.5	Material	Steel
Bridge Clearance	3.5	Number of bridge piers/arches	0
Bridge/Arch Span	29.5		
		Skewed to roadway?	Yes

Geomorphic Information

General

Floodplain filled by roadway approaches	Not Significant	Structure is located at significant break in valley slope	No

Upstream

Obstructions at the opening of the structure	None	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	Yes	Angle of stream flow approaching structure	Mild Bend
If channel avulses, stream will	Cross Road		

Downstream

Pool present immediately downstream of structure	No	
Downstream bank heights are substantially higher than upstream bank heights	No	
Pool Depth at point of streamflow entry	No 0 ft.	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Cobble	Cobble	Cobble
Bedrock Present	No	No	No
Type of Sediment Deposits	Side,Mid-channel	Side,Mid-channel	Side
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	None	None	
Hard Bank Armoring	Intact	None	
Stream bed scour causing undermining around or under structure	None	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Coniferous Forest	Herbaceous/Grass	
Dominant Vegetation Type - Right	Mixed Forest	Mixed Forest	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	Yes	No	
Vegitation Band -Right	Yes	Yes	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species			

Other Information

Spatial location data collected with GPS?	Yes	Photos taken?	Yes

Comments **timber planks on old truck chassis**

Culvert Summary Report

Stevens River - basin14

General Information

SgaID	100000000103091	Local SgaID		VOBCIT struct_num	700020036203093
Observers	Redstart	Assessment Date	6/22/2010	Project Name	Stevens River
Town	Peacham	Latitude	44.33807	Longitude	-72.15746
Location	Thaddeus Stevens Rd. in center of E. Peacham village			Reach VTID	T1.04
Road Name	THADDEUS STEVENS RD	Road Type	Gravel	Stream Name	Peacham Hollow brook

High Flow Stage	No	Channel Width	30.3

Culvert Information

Culvert Length	52	Material	Steel Corrugated
Culvert Height	8	Number of culverts	1
Culvert Width	8	Culvert Overflow Pipe	No
		Skewed to roadway?	No

Geomorphic Information

General

Floodplain filled by roadway approaches	Entirely	Structure is located at significant break in valley slope	No
		Culvert slope as compared with channel slope is significantly	Same

Upstream

Obstructions at the opening of the structure	None	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	No	Angle of stream flow approaching structure	Mild Bend
If channel avulses, stream will	Cross Road		

Downstream

Pool present immediately downstream of structure	Yes	Water depth in culvert (at outlet)	0.5
Downstream bank heights are substantially higher than upstream bank heights	No	Culvert outlet invert	Partially Backwatered
Stepped Footers	1 ft.	Backwater Length (measured from outlet)	2
Maximum pool depth	1.5 ft.	Backwater Length (measured from outlet)	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Gravel	Cobble	None
Bedrock Present	No	No	
Type of Sediment Deposits	None	None	None
Material Present throughout			No
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	None	None	
Hard Bank Armoring	Failing	Failing	
Stream bed scour causing undermining around or under structure	Wing walls	Culvert	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Herbaceous/Grass	Herbaceous/Grass	
Dominant Vegetation Type - Right	Shrub/Sapling	Herbaceous/Grass	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

	Upstream	Downstream
Vegitation Band - Left	No	No
Vegitation Band -Right	No	No

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	None	None

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **double entry in transtruc Local Inventory: Lyndon State 2003 indicates culvert (it is a culvert, but not 9 ft plastic corrugated listed in 2003; is now 8 ft corrugated steel; may have been replaced); bulk upload 'bridge' is incorrect**

Culvert Summary Report

Stevens River - basin14

General Information

SgaID	100000000203091	Local SgaID		VOBCIT struct_num	700002010603093
Observers	Redstart	Assessment Date	8/4/2010	Project Name	Stevens River
Town	Peacham	Latitude	44.35581	Longitude	-72.1728
Location				Reach VTID	T1.05

E. Peacham Rd., 0.2 mi S of intersection with Peacham-Danville Rd. near Ewells Mills; VT Hydrography Dataset stream line indicates further north by pond and is incorrect

Road Name **E PEACHAM RD** Road Type **Paved** Stream Name **Peacham Hollow Brook**
High Flow Stage **Yes** Channel Width **29.2**

Culvert Information

Culvert Length	**70**	Material	**Steel Corrugated**
Culvert Height	**6**	Number of culverts	**1**
Culvert Width	**6**	Culvert Overflow Pipe	**No**
		Skewed to roadway?	**Yes**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Entirely**	Structure is located at significant break in valley slope	**No**
		Culvert slope as compared with channel slope is significantly	**Higher**

Upstream

Obstructions at the opening of the structure	**Wood debris**	Estimated distance avulsion would follow road	**600**
Steep riffle present immediately upstream of structure	**Yes**	Angle of stream flow approaching structure	**Mild Bend**
If channel avulses, stream will	**Follow Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	Water depth in culvert (at outlet)	**1**
Downstream bank heights are substantially higher than upstream bank heights	**Yes**	Culvert outlet invert	**Free Fall**
Stepped Footers	**2 ft.**	Backwater Length (measured from outlet)	**0**
Maximum pool depth	**3 ft.**	Backwater Length (measured from outlet)	**2.5**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Gravel**	**None**
Bedrock Present	**No**	**No**	
Type of Sediment Deposits	**Mid-channel**	**Mid-channel**	**None**
Material Present throughout			**No**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**Low**	**High**	
Hard Bank Armoring	**Intact**	**Failing**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Mixed Forest**	**Road Embankment**	
Dominant Vegetation Type - Right	**Mixed Forest**	**Mixed Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vigitation Band - Left	**Yes**	**No**
Vigitation Band -Right	**Yes**	**Yes**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **Perched pond above downstream right bank; exposed blue clay indicates possibility of scour triggering bank instability beneath pond; VT Hydrography Dataset stream line is off in this area, indicates stream crossing E.Peacham Rd. and entering US end of pond; it actually crosses further downstream by driveway to 455 E. Peacham Rd.; assumed this is a town culvert but don't actually know that for sure**

General Information

SgaID	**700000000503093**	Local SgaID		VOBCIT struct_num	
Observers	**Redstart**	Assessment Date	**10/12/2010**	Project Name	**Stevens River**
Town	**Peacham**	Latitude	**44.37052**	Longitude	**-72.19598**
Location	**Former logging road now trail at 'Back Achers'**			Reach VTID	**T1.07**
Road Name		Road Type	**Trail**	Stream Name	**Unnamed trib to Peacham Hollow Brook**
High Flow Stage	**No**	Channel Width	**10.1**		

Bridge Information

Bridge Width	**11.2**	Material	**Masonary (arches) & Slabs**
Bridge Clearance	**4.1**	Number of bridge piers/arches	**0**
Bridge/Arch Span	**5.2**		
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Entirely**	Structure is located at significant break in valley slope	**Yes**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**Yes**	Angle of stream flow approaching structure	**Mild Bend**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**No**	
Downstream bank heights are substantially higher than upstream bank heights	**No**	
Pool Depth at point of streamflow entry	**No** **0 ft.**	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Gravel**	**Cobble**
Bedrock Present	**No**	**No**	**No**
Type of Sediment Deposits	**None**	**Point**	**None**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**Low**	**None**	
Hard Bank Armoring	**Intact**	**None**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Mixed Forest**	**Coniferous Forest**	
Dominant Vegetation Type - Right	**Mixed Forest**	**Coniferous Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**Yes**	**Yes**
Vegitation Band -Right	**Yes**	**Yes**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species			

Other Information

Spatial location data collected with GPS?	**Yes**	Photos taken?	**Yes**

VERMONT

Stream Geomorphic Assessment

Agency of Natural Resouces

VT DEC

Vermont.gov

August. 14 2011

Comments **this stone slab bridge was actually on an unnamed trib of Peacham Hollow; fieldwork mistakenly tracked up this trib (which was larger than Peacham Hollow Brook) to start, then backtracked**

Culvert Summary Report

Stevens River - basin14

General Information

SgaID	**200000000103012**	Local SgaID		VOBCIT struct_num	**200091007203012**
Observers	**Redstart**	Assessment Date	**7/27/2010**	Project Name	**Stevens River**
Town	**Barnet**	Latitude	**44.30074**	Longitude	**-72.05379**
Location	**I-91 main corridor, 0.2 mi NE of Exit 18**			Reach VTID	**M103**
Road Name		Road Type	**Paved**	Stream Name	**Stevens River**
High Flow Stage	**No**			Channel Width	**70.5**

Culvert Information

Culvert Length	**430**	Material	**Concrete**
Culvert Height	**15**	Number of culverts	**2**
Culvert Width	**40**	Culvert Overflow Pipe	**No**
		Skewed to roadway?	**Yes**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Entirely**	Structure is located at significant break in valley slope	**No**
		Culvert slope as compared with channel slope is significantly	**Same**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**Yes**	Angle of stream flow approaching structure	**Channelized Straight**
If channel avulses, stream will	**Unsure**		

Downstream

Pool present immediately downstream of structure	**No**	Water depth in culvert (at outlet)	**1.6**
Downstream bank heights are substantially higher than upstream bank heights	**No**	Culvert outlet invert	**Partially Backwatered**
Stepped Footers	**0 ft.**	Backwater Length (measured from outlet)	**240**
Maximum pool depth	**0 ft.**	Backwater Length (measured from outlet)	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Gravel**	**None**
Bedrock Present	**No**	**No**	
Type of Sediment Deposits	**Side**	**Side**	**None**
Material Present throughout			**No**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**None**	**None**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Shrub/Sapling	Herbaceous/Grass	
Dominant Vegetation Type - Right	Shrub/Sapling	Shrub/Sapling	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

	Upstream	Downstream	In Structure
Vegitation Band - Left	No	No	
Vegitation Band -Right	No	No	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	None	None

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **nice backwater in left bank culvert but no material; fish just outside structure where there are cobbles_gravel; half of right bank culvert ahs material in it**

Culvert Summary Report

Stevens River - basin14

General Information

SgaID	**100000000303091**	Local SgaID		VOBCIT struct_num	**700001008603093**
Observers	**Redstart**	Assessment Date	**9/16/2010**	Project Name	**Stevens River**
Town	**Peacham**	Latitude	**44.35949**	Longitude	**-72.17295**
Location	**Peacham-Danville Rd. at Ewells Mills village**			Reach VTID	**T1.05**
Road Name	**PEACHAM DANVILLE RD**	Road Type	**Paved**	Stream Name	**Peacham Hollow Brook**

High Flow Stage **No** Channel Width **29.2**

Culvert Information

Culvert Length	**60**	Material	**Concrete**
Culvert Height	**7.4**	Number of culverts	**1**
Culvert Width	**6**	Culvert Overflow Pipe	**No**
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Entirely**	Structure is located at significant break in valley slope	**Yes**
		Culvert slope as compared with channel slope is significantly	**Lower**

Upstream

Obstructions at the opening of the structure	**Wood debris,Sediment**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**Yes**	Angle of stream flow approaching structure	**Channelized Straight**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	Water depth in culvert (at outlet)	**0.6**
Downstream bank heights are substantially higher than upstream bank heights	**No**	Culvert outlet invert	**Partially Backwatered**
Stepped Footers	**1 ft.**	Backwater Length (measured from outlet)	**32**
Maximum pool depth	**1.1 ft.**	Backwater Length (measured from outlet)	**0**

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	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Cobble**	**None**
Bedrock Present	**No**	**No**	
Type of Sediment Deposits	**Mid-channel**	**Side**	**None**
Material Present throughout			**No**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**None**	**Low**	
Hard Bank Armoring	**Intact**	**Failing**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Mixed Forest**	**Deciduous Forest**	
Dominant Vegetation Type - Right	**Deciduous Forest**	**Shrub/Sapling**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

	Upstream	Downstream
Vegitation Band - Left	**Yes**	**Yes**
Vegitation Band -Right	**No**	**No**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **old culvert, located a good distance underneath the road, buckled slightly mid-structure**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	**700000000403093**	Local SgaID		VOBCIT struct_num	
Observers	**Redstart**	Assessment Date	**10/12/2010**	Project Name	**Stevens River**
Town	**Peacham**	Latitude	**44.37117**	Longitude	**-72.1901**
Location	**Upstream of 2 driveways at entrance to Butternut Hill Farm at 2671 Slack St**			Reach VTID	**T1.07**
Road Name		Road Type	**Gravel**	Stream Name	**Peacham Hollow Brook**
High Flow Stage	**No**	Channel Width			**14.1**

Bridge Information

Bridge Width	**12.4**	Material	**Timber**
Bridge Clearance	**3.5**	Number of bridge piers/arches	**0**
Bridge/Arch Span	**6.5**		
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Partially**	Structure is located at significant break in valley slope	**No**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Channelized Straight**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**No**	
Downstream bank heights are substantially higher than upstream bank heights	**No**	
Pool Depth at point of streamflow entry	**Yes** **0 ft.**	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Gravel**	**Cobble**	**Gravel**
Bedrock Present	**No**	**No**	**No**
Type of Sediment Deposits	**None**	**None**	**None**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**Low**	**Low**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Deciduous Forest**	**Herbaceous/Grass**	
Dominant Vegetation Type - Right	**Mixed Forest**	**Deciduous Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**Yes**	**Yes**	
Vegitation Band -Right	**No**	**No**	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **Assume this is a private structure; Lyndon St 2003 inventory lists a culvert very close to this location, STRUCT_NUM 700028044203093, owner unknown; not clear if this bridge replaced that culvert; stone abutments very undersized for stream, may have contributed to donwstream erosion and scouring in recent microburst storm; Japanese knotweed present in an area where it is not common_may have been introduced during bridge construction**

Culvert Summary Report

Stevens River - basin14

General Information

SgaID	**100000000703091**	Local SgaID		VOBCIT struct_num	**700053058303093**
Observers	**Redstart**	Assessment Date	**8/4/2010**	Project Name	**Stevens River**
Town	**Peacham**	Latitude	**44.31242**	Longitude	**-72.17346**
Location	**Gov. Mattocks Rd., 0.3 mi SE of County Rd. jct and 0.4 mi W of South Peacham village**			Reach VTID	**T2.05**
Road Name	**GOV MATTOCKS RD**	Road Type	**Gravel**	Stream Name	**South Peacham Brook**

High Flow Stage	No	Channel Width	29.7

Culvert Information

Culvert Length	60	Material	Other
Culvert Height	9.5	Number of culverts	1
Culvert Width	15	Culvert Overflow Pipe	No
		Skewed to roadway?	Yes

Geomorphic Information

General

Floodplain filled by roadway approaches	Entirely	Structure is located at significant break in valley slope	No
		Culvert slope as compared with channel slope is significantly	Same

Upstream

Obstructions at the opening of the structure	None	Estimated distance avulsion would follow road	500
Steep riffle present immediately upstream of structure	Yes	Angle of stream flow approaching structure	Mild Bend
If channel avulses, stream will	Follow Road		

Downstream

Pool present immediately downstream of structure	Yes	Water depth in culvert (at outlet)	0.5
Downstream bank heights are substantially higher than upstream bank heights	No	Culvert outlet invert	At Grade
Stepped Footers	1 ft.	Backwater Length (measured from outlet)	0
Maximum pool depth	2.9 ft.	Backwater Length (measured from outlet)	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Boulder	Cobble	Cobble
Bedrock Present	No	No	
Type of Sediment Deposits	Side,Mid-channel	Side	None
Material Present throughout			No
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	High	Low	
Hard Bank Armoring	Intact	Intact	
Stream bed scour causing undermining around or under structure	None	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Mixed Forest	Mixed Forest	
Dominant Vegetation Type - Right	Coniferous Forest	Mixed Forest	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

	Upstream	Downstream	
Vegitation Band - Left	Yes	No	
Vegitation Band -Right	Yes	Yes	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	None	None

Other Information

Spatial location data collected with GPS?	Yes	Photos taken?	Yes

Comments **windrowing upstream, likely at time of culvert replacement; lots of sand depositing downstream of structure; assujmed to be a town culvert, though Lyndon St. 2003 inventory lists owner unknown**

Bridge Summary Report — Stevens River - basin14

General Information

SgaID	100000000103011	Local SgaID		VOBCIT struct_num	100301001103011
Observers	Redstart	Assessment Date	7/28/2010	Project Name	Stevens River
Town	Barnet	Latitude	44.29641	Longitude	-72.05023
Location	Church St., Barnet village 0.05 mi W of US5			Reach VTID	M103

Road Name	**CHURCH ST**	Road Type	**Paved**	Stream Name	**Stevens River**
High Flow Stage	**No**	Channel Width			**70.5**

Bridge Information

Bridge Width	**37.5**	Material	**Steel**
Bridge Clearance	**6.7**	Number of bridge piers/arches	**1**
Bridge/Arch Span	**88**		
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Partially**	Structure is located at significant break in valley slope	**No**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	**1000**
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Mild Bend**
If channel avulses, stream will	**Follow Road**		

Downstream

Pool present immediately downstream of structure	**No**	
Downstream bank heights are substantially higher than upstream bank heights	**No**	
Pool Depth at point of streamflow entry	**No** **0 ft.**	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Bedrock**	**Bedrock**	**Bedrock**
Bedrock Present	**Yes**	**Yes**	**Yes**
Type of Sediment Deposits	**None**	**None**	**None**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**None**	**None**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Herbaceous/Grass**	**Deciduous Forest**	
Dominant Vegetation Type - Right	**Shrub/Sapling**	**Deciduous Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**No**	**No**
Vegitation Band -Right	**No**	**No**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **hydro dam sluice located under bridge**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	700000000403013	Local SgaID		VOBCIT struct_num	
Observers	Redstart	Assessment Date	9/14/2010	Project Name	Stevens River
Town	Barnet	Latitude	44.30783	Longitude	-72.12484
Location	Stream crossing in farm fields at Choate Farm_3871 W Barnet Rd			Reach VTID	T2.02
Road Name		Road Type	Gravel	Stream Name	South Peacham Brook
High Flow Stage	No	Channel Width			51.2

Bridge Information

Bridge Width	9	Material	Timber
Bridge Clearance	4	Number of bridge piers/arches	0
Bridge/Arch Span	20		
		Skewed to roadway?	Yes

Geomorphic Information

General

Floodplain filled by roadway approaches	Not Significant	Structure is located at significant break in valley slope	No

Upstream

Obstructions at the opening of the structure	Wood debris	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	No	Angle of stream flow approaching structure	Channelized Straight
If channel avulses, stream will	Cross Road		

Downstream

Pool present immediately downstream of structure	Yes	
Downstream bank heights are substantially higher than upstream bank heights	No	
Pool Depth at point of streamflow entry	No 0 ft.	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Sand	Sand	Sand
Bedrock Present	No	No	No
Type of Sediment Deposits	None	None	None
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	Low	Low	
Hard Bank Armoring	Intact	Intact	
Stream bed scour causing undermining around or under structure	None	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Herbaceous/Grass	Herbaceous/Grass	
Dominant Vegetation Type - Right	Herbaceous/Grass	Herbaceous/Grass	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	No	No
Vegitation Band -Right	No	No

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	None	None

Other Information

Spatial location data collected with GPS?	Yes	Photos taken?	Yes

Comments **wood debris in opening is a buckled timber supporting the concrete deck of the bridge**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	100000000403011	Local SgaID		VOBCIT struct_num	100301004503011
Observers	Redstart	Assessment Date	8/9/2011	Project Name	Stevens River
Town	Barnet	Latitude	44.30947	Longitude	-72.09032
Location	Barnet Ctr. Rd., 0.01 mi N of W. Barnet Rd.			Reach VTID	M107
Road Name	BARNET CENTER RD	Road Type	Paved	Stream Name	Stevens River
High Flow Stage	No	Channel Width	67.6		

Bridge Information

Bridge Width	26	Material	Concrete
Bridge Clearance	18	Number of bridge piers/arches	0
Bridge/Arch Span	32		
		Skewed to roadway?	No

Geomorphic Information

General

Floodplain filled by roadway approaches	Entirely	Structure is located at significant break in valley slope	No

Upstream

Obstructions at the opening of the structure	None	Estimated distance avulsion would follow road	Channelized
Steep riffle present immediately upstream of structure	Yes	Angle of stream flow approaching structure	Straight
If channel avulses, stream will	Cross Road		

Downstream

Pool present immediately downstream of structure	Yes	
Downstream bank heights are substantially higher than upstream bank heights	No	
Pool Depth at point of streamflow entry	No 0 ft.	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Cobble	Cobble	Cobble
Bedrock Present	No	No	No
Type of Sediment Deposits	Mid-channel	Mid-channel	Mid-channel
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	None	None	
Hard Bank Armoring	Intact	Intact	
Stream bed scour causing undermining around or under structure	None	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Mixed Forest	Herbaceous/Grass	
Dominant Vegetation Type - Right	Mixed Forest	Deciduous Forest	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	Yes	No
Vegitation Band -Right	No	No

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	None	None

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **looks fairly new; stream likely windrowed and riprapped at time of repalcement**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	400000000003091	Local SgaID		VOBCIT struct_num	990002001103091
Observers	Redstart	Assessment Date	6/22/2010	Project Name	Stevens River
Town	Peacham	Latitude	44.33814	Longitude	-72.15842
Location	E. Peacham Rd. at E. Peacham Baptist Church in E. Peacham village			Reach VTID	T1.04
Road Name	E PEACHAM RD	Road Type	Paved	Stream Name	Peacham Hollow Brook
High Flow Stage	No	Channel Width			30.3

Bridge Information

Bridge Width	24	Material	Timber
Bridge Clearance	7.3	Number of bridge piers/arches	0
Bridge/Arch Span	17.5		
		Skewed to roadway?	Yes

Geomorphic Information

General

Floodplain filled by roadway approaches	Not Significant	Structure is located at significant break in valley slope	No

Upstream

Obstructions at the opening of the structure	None	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	No	Angle of stream flow approaching structure	Mild Bend
If channel avulses, stream will	Cross Road		

Downstream

Pool present immediately downstream of structure	No	
Downstream bank heights are substantially higher than upstream bank heights	No	
Pool Depth at point of streamflow entry	No 0 ft.	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Cobble	Cobble	Gravel
Bedrock Present	No	No	No
Type of Sediment Deposits	None	Mid-channel	Side
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	None	None	
Hard Bank Armoring	Intact	Intact	
Stream bed scour causing undermining around or under structure	Wing walls	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Herbaceous/Grass	Shrub/Sapling	
Dominant Vegetation Type - Right	Herbaceous/Grass	Herbaceous/Grass	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	No	No	
Vegitation Band -Right	No	No	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	None	None

Other Information

Spatial location data collected with GPS?	Yes	Photos taken?	Yes

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Comments **small amounts of recent creosote dripping into stream in high heat**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	**700000000303013**	Local SgaID		VOBCIT struct_num	
Observers	**Redstart**	Assessment Date	**9/9/2010**	Project Name	**Stevens River**
Town	**Barnet**	Latitude	**44.30992**	Longitude	**-72.12219**
Location	**driveway entrance to 3613 W Barnet Rd**			Reach VTID	**T2.01**
Road Name		Road Type	**Gravel**	Stream Name	**South Peacham brook**
High Flow Stage	**No**	Channel Width			**52**

Bridge Information

Bridge Width	**14**	Material	**Steel**
Bridge Clearance	**13**	Number of bridge piers/arches	**0**
Bridge/Arch Span	**27**		
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Entirely**	Structure is located at significant break in valley slope	**No**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**Yes**	Angle of stream flow approaching structure	**Channelized Straight**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	
Downstream bank heights are substantially higher than upstream bank heights	**No**	
Pool Depth at point of streamflow entry	**No** **0 ft.**	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Boulder**	**Boulder**
Bedrock Present	**No**	**No**	**No**
Type of Sediment Deposits	**Mid-channel**	**Side**	**None**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**Low**	**Low**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Coniferous Forest**	**Coniferous Forest**	
Dominant Vegetation Type - Right	**Coniferous Forest**	**Coniferous Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**Yes**	**Yes**
Vegitation Band -Right	**Yes**	**Yes**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS?	**Yes**	Photos taken?	**Yes**

Comments **Effective width of 27 ft at bankfull, due to sloped concrete abutments and stone reinforcements, is listed in Step 2; structure is 38 ft long at top of abutments; VT dam inventory 2009 lists dam Barnet-9 at this site but there is no dam present at this point - only a small recreational pool formed by stones piled by hand in the stream**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	**700000000103093**	Local SgaID		VOBCIT struct_num	
Observers	**Redstart**	Assessment Date	**9/21/2010**	Project Name	**Stevens River**
Town	**Peacham**	Latitude	**44.34505**	Longitude	**-72.16431**
Location	**VAST trail next to Peacham Town Garage**			Reach VTID	**T1.05**
Road Name		Road Type	**Trail**	Stream Name	**Peacham Hollow Brook**
High Flow Stage	**No**			Channel Width	**29.2**

Bridge Information

Bridge Width	**12**	Material	**Steel**
Bridge Clearance	**3**	Number of bridge piers/arches	**0**
Bridge/Arch Span	**29.5**		
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Not Significant**	Structure is located at significant break in valley slope	**No**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Mild Bend**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**No**	
Downstream bank heights are substantially higher than upstream bank heights	**No**	
Pool Depth at point of streamflow entry	**No** **0 ft.**	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Bedrock**	**Gravel**	**Gravel**
Bedrock Present	**Yes**	**No**	**No**
Type of Sediment Deposits	**Mid-channel**	**Mid-channel**	**Mid-channel**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**None**	**None**	
Hard Bank Armoring	**Intact**	**None**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**Yes**	
Beaver Dam distance (ft.)	**0**	**150**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Mixed Forest**	**Herbaceous/Grass**	
Dominant Vegetation Type - Right	**Coniferous Forest**	**Herbaceous/Grass**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

	Upstream	Downstream
Vegitation Band - Left	**No**	**Yes**
Vegitation Band -Right	**Yes**	**Yes**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**Beaver - Feeding Signs**	**None**

Other Information

Spatial location data collected with GPS? **Yes**　　Photos taken? **Yes**

Comments **beaver dams downstream appear to have been blown out in recent flooding, no signs of rebuilding but may be too early**

Bridge Summary Report　　Stevens River - basin14

General Information

SgaID	**700000000603093**	Local SgaID		VOBCIT struct_num	
Observers	**Redstart**	Assessment Date	**8/26/2010**	Project Name	**Stevens River**
Town	**Peacham**	Latitude	**44.31363**	Longitude	**-72.16838**
Location	**footbridge leading to field N of South Peacham Brook in between 86 and 97 Gov. Mattocks Rd.**			Reach VTID	**T2.05**
Road Name	**GOV MATTOCKS RD**	Road Type	**Gravel**	Stream Name	**South Peacham Brook**
High Flow Stage	**No**	Channel Width			**32.8**

Bridge Information

Bridge Width	**8**	Material	**Timber**
Bridge Clearance	**3.8**	Number of bridge piers/arches	**0**
Bridge/Arch Span	**24**		
		Skewed to roadway?	**Yes**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Not Significant**	Structure is located at significant break in valley slope	**Yes**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Mild Bend**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	
Downstream bank heights are substantially higher than upstream bank heights	**No**	
Pool Depth at point of streamflow entry	**No** **0 ft.**	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Cobble**	**Cobble**
Bedrock Present	**Yes**	**Yes**	**Yes**
Type of Sediment Deposits	**Point,Side**	**Point**	**Point**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**Low**	**None**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Deciduous Forest**	**Deciduous Forest**	
Dominant Vegetation Type - Right	**Deciduous Forest**	**Shrub/Sapling**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**No**	**No**	
Vegitation Band -Right	**No**	**No**	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species			

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **footbridge near site of old strach factory accesses filed across stream; this bridge significantly damaged in May 26, 2011 flooding**

Culvert Summary Report

Stevens River - basin14

General Information

SgaID	**700000000203093**	Local SgaID		VOBCIT struct_num	
Observers	**Redstart**	Assessment Date	**10/11/2010**	Project Name	**Stevens River**
Town	**Peacham**	Latitude	**44.36828**	Longitude	**-72.1802**
Location	**Old logging road now offering primary access on lot for sale, 0.03 mi S of Bayley-Hazen Rd.-Slack St. jct**			Reach VTID	**T1.07**
Road Name		Road Type	**Trail**	Stream Name	**Peacham Hollow Brook**
High Flow Stage	**No**	Channel Width			**14.1**

Culvert Information

Culvert Length	**16**	Material	**Steel Corrugated**
Culvert Height	**2.4**	Number of culverts	**1**
Culvert Width	**2.4**	Culvert Overflow Pipe	**No**
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Partially**	Structure is located at significant break in valley slope	**No**
		Culvert slope as compared with channel slope is significantly	**Lower**

Upstream

Obstructions at the opening of the structure	**Sediment**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**Yes**	Angle of stream flow approaching structure	**Mild Bend**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	Water depth in culvert (at outlet)	**0.7**
Downstream bank heights are substantially higher than upstream bank heights	**No**	Culvert outlet invert	**Cascade**
Stepped Footers	**1.3 ft.**	Backwater Length (measured from outlet)	**0**
Maximum pool depth	**2.2 ft.**	Backwater Length (measured from outlet)	**1**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Gravel**	**Sand**	**None**
Bedrock Present	**No**	**No**	
Type of Sediment Deposits	**Mid-channel**	**Mid-channel**	**None**
Material Present throughout			**No**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**Yes**	**No**
Bank Erosion	**Low**	**Low**	
Hard Bank Armoring	**Intact**	**Failing**	
Stream bed scour causing undermining around or under structure	**Wing walls**	**Wing walls**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Mixed Forest**	**Mixed Forest**	
Dominant Vegetation Type - Right	**Mixed Forest**	**Mixed Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

	Upstream	Downstream
Vegitation Band - Left	**No**	**Yes**
Vegitation Band -Right	**No**	**No**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **Left bank upstream recently cleared for a different lot; property on which culvert listed here is located is for sale _44 ac _old logging road on which this culvert is located is main access to property; looks like a steel plate may have been placed in stream bed on US end of culvert, possibly as a check dam**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	100000000703011	Local SgaID		VOBCIT struct_num	100301004603011
Observers	Redstart	Assessment Date	7/1/2010	Project Name	Stevens River
Town	Barnet	Latitude	44.32016	Longitude	-72.11819
Location	Somerhill Rd., 0.02 mi SW of E. Peacham Rd.			Reach VTID	T1.02
Road Name	SOMERHILL RD	Road Type	Gravel	Stream Name	Peacham Hollow Brook
High Flow Stage	No	Channel Width			44.5

Bridge Information

Bridge Width	14	Material	Steel
Bridge Clearance	6.25	Number of bridge piers/arches	0
Bridge/Arch Span	25		
		Skewed to roadway?	No

Geomorphic Information

General

Floodplain filled by roadway approaches	Entirely	Structure is located at significant break in valley slope	No

Upstream

Obstructions at the opening of the structure	None	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	No	Angle of stream flow approaching structure	Mild Bend
If channel avulses, stream will	Cross Road		

Downstream

Pool present immediately downstream of structure	No	
Downstream bank heights are substantially higher than upstream bank heights	No	
Pool Depth at point of streamflow entry	Yes 0 ft.	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Cobble	Cobble	Cobble
Bedrock Present	No	No	No
Type of Sediment Deposits	Side	Side,Mid-channel	Side
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	Low	None	
Hard Bank Armoring	None	None	
Stream bed scour causing undermining around or under structure	Wing walls	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Mixed Forest	Coniferous Forest	
Dominant Vegetation Type - Right	Mixed Forest	Coniferous Forest	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	Yes	Yes
Vegitation Band -Right	Yes	Yes

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	Unsure - Sighting	None

Other Information

Spatial location data collected with GPS?	Yes	Photos taken?	Yes

Comments **wildife is not unsure but spp not listed: red squirrel outside structure**

Culvert Summary Report

Stevens River - basin14

General Information

SgaID	100000000503091	Local SgaID		VOBCIT struct_num	700008029303093
Observers	Redstart	Assessment Date	10/6/2010	Project Name	Stevens River
Town	Peacham	Latitude	44.36884	Longitude	-72.1809
Location	Junction of Bayley-Hazen Rd and Slack St			Reach VTID	T1.07
Road Name	BAYLEY-HAZEN RD	Road Type	Gravel	Stream Name	Peacham Hollow Brook
High Flow Stage	No		Channel Width		14.1

Culvert Information

Culvert Length	60	Material	Steel Corrugated
Culvert Height	5.1	Number of culverts	1
Culvert Width	4.6	Culvert Overflow Pipe	No
		Skewed to roadway?	Yes

Geomorphic Information

General

Floodplain filled by roadway approaches	Entirely	Structure is located at significant break in valley slope	No
		Culvert slope as compared with channel slope is significantly	Same

Upstream

Obstructions at the opening of the structure	Wood debris	Estimated distance avulsion would follow road	50
Steep riffle present immediately upstream of structure	No	Angle of stream flow approaching structure	Mild Bend
If channel avulses, stream will	Follow Road		

Downstream

Pool present immediately downstream of structure	No	Water depth in culvert (at outlet)	0.5
Downstream bank heights are substantially higher than upstream bank heights	No	Culvert outlet invert	At Grade
Stepped Footers	0 ft.	Backwater Length (measured from outlet)	0
Maximum pool depth	0 ft.	Backwater Length (measured from outlet)	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Gravel	Bedrock	None
Bedrock Present	No	Yes	
Type of Sediment Deposits	Mid-channel	Side	None
Material Present throughout			No
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	None	Low	
Hard Bank Armoring	Intact	Intact	
Stream bed scour causing undermining around or under structure	None	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Mixed Forest	Coniferous Forest	
Dominant Vegetation Type - Right	Mixed Forest	Deciduous Forest	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	Yes	No
Vegitation Band -Right	No	Yes

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	None	None

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **Culvert is buckled slightly mid-length; downstream end points directly at left bank, but stream turns; recently clearing above bank may increase susceptibility to bank failure**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	**100000000003011**	Local SgaID		VOBCIT struct_num	**100301004103011**
Observers	**Redstart**	Assessment Date	**8/8/2010**	Project Name	**Stevens River**
Town	**Barnet**	Latitude	**44.2947**	Longitude	**-72.05078**
Location	**.04 mi from TH 100 (Creamery Ln)**			Reach VTID	**M102**
Road Name	**CARTER ST**	Road Type	**Paved**	Stream Name	**Stevens River**
High Flow Stage	**No**	Channel Width	**70.7**		

Bridge Information

Bridge Width	**20**	Material	**Steel**
Bridge Clearance	**10**	Number of bridge piers/arches	**0**
Bridge/Arch Span	**32**		
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Partially**	Structure is located at significant break in valley slope	**No**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Mild Bend**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	
Downstream bank heights are substantially higher than upstream bank heights	**No**	
Pool Depth at point of streamflow entry	**Yes** **0 ft.**	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Boulder**	**Gravel**	**Sand**
Bedrock Present	**No**	**No**	**No**
Type of Sediment Deposits	**None**	**Mid-channel**	**None**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**None**	**Low**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**Abutments,Wing walls**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Deciduous Forest**	**Herbaceous/Grass**	
Dominant Vegetation Type - Right	**Herbaceous/Grass**	**Shrub/Sapling**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**No**	**Yes**	
Vegitation Band -Right	**No**	**Yes**	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**Mink - Sighting**	**None**

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **undersized but outflanking not likely to be catastrophic**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	**100000000303011**	Local SgaID		VOBCIT struct_num	**100301004403011**
Observers	**Redstart**	Assessment Date	**8/2/2010**	Project Name	**Stevens River**
Town	**Barnet**	Latitude	**44.30208**	Longitude	**-72.06615**
Location	**Patenaude Rd., 0.17 mi NW of W. Barnet Rd; entrance to Karme Cho-ling**			Reach VTID	**M104**
Road Name	**PATNEAUDE LN**	Road Type	**Gravel**	Stream Name	**Stevens River**
High Flow Stage	**No**	Channel Width			**69.9**

Bridge Information

Bridge Width	**15**	Material	**Concrete**
Bridge Clearance	**9.4**	Number of bridge piers/arches	**0**
Bridge/Arch Span	**30**		
		Skewed to roadway?	**Yes**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Partially**	Structure is located at significant break in valley slope	**No**

Upstream

Obstructions at the opening of the structure	**Sediment**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**Yes**	Angle of stream flow approaching structure	**Mild Bend**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**No**	
Downstream bank heights are substantially higher than upstream bank heights	**No**	
Pool Depth at point of streamflow entry	**Yes** **0 ft.**	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Cobble**	**Cobble**
Bedrock Present	**No**	**No**	**No**
Type of Sediment Deposits	**Side**	**Side**	**Side**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**Low**	**None**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Herbaceous/Grass**	**Deciduous Forest**	
Dominant Vegetation Type - Right	**Mixed Forest**	**Deciduous Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

	Upstream	Downstream
Vegitation Band - Left	**No**	**Yes**
Vegitation Band -Right	**Yes**	**No**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**Unsure - Sighting**	**Unsure - Tracks**

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **undersized but appears in relatively good shape; significant steep riffle US; wildlife use is not unsure but is spp not listed: woodchuck sighted US, raccoon tracks in and around structure**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	**700000000103013**	Local SgaID		VOBCIT struct_num	
Observers	**Redstart**	Assessment Date	**9/9/2010**	Project Name	**Stevens River**
Town	**Barnet**	Latitude	**44.32393**	Longitude	**-72.12698**
Location	**Farm bridge off E. Peacham Rd., 0.23 mi ESE of Peacham-Barnet town line**			Reach VTID	**T1.02**
Road Name		Road Type	**Trail**	Stream Name	**Peacham Hollow brook**
High Flow Stage	**No**	Channel Width			**44.5**

Bridge Information

Bridge Width	**10**	Material	**Other**
Bridge Clearance	**2.5**	Number of bridge piers/arches	**0**
Bridge/Arch Span	**38**		
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Not Significant**	Structure is located at significant break in valley slope	**No**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Channelized Straight**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	
Downstream bank heights are substantially higher than upstream bank heights	**No**	
Pool Depth at point of streamflow entry	**No** **0 ft.**	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Sand**	**Sand**	**Sand**
Bedrock Present	**No**	**No**	**No**
Type of Sediment Deposits	**None**	**None**	**None**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**None**	**None**	
Hard Bank Armoring	**None**	**None**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**Yes**	**Yes**	
Beaver Dam distance (ft.)	**200**	**150**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Herbaceous/Grass**	**Herbaceous/Grass**	
Dominant Vegetation Type - Right	**Herbaceous/Grass**	**Shrub/Sapling**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**No**	**No**	
Vegitation Band -Right	**No**	**No**	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species			

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **Farm bridge in beaver-controlled segment (excluded from full geomorphic assessment); timber planking on old truck chassis; likely to be quickly outflanked in any flooding**

Culvert Summary Report

Stevens River - basin14

General Information

SgaID	**990000000003091**	Local SgaID		VOBCIT struct_num	**700044054603093**
Observers	**Redstart**	Assessment Date	**6/22/2010**	Project Name	**Stevens River**
Town	**Peacham**	Latitude	**44.33264**	Longitude	**-72.15004**
Location	**Stevenson Rd., 0.2 mi SE of Stevenson Rd intersection**			Reach VTID	**T1.03**
Road Name	**STEVENSON RD**	Road Type	**Gravel**	Stream Name	**Peacham Hollow brook**
High Flow Stage	**No**		Channel Width		**40.4**

Culvert Information

Culvert Length	**28**	Material	**Steel Corrugated**
Culvert Height	**10**	Number of culverts	**1**
Culvert Width	**22**	Culvert Overflow Pipe	**No**

Skewed to roadway? **Yes**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Entirely**	Structure is located at significant break in valley slope	**No**
		Culvert slope as compared with channel slope is significantly	**Same**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Naturally Straight**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**No**	Water depth in culvert (at outlet)	**0.5**
Downstream bank heights are substantially higher than upstream bank heights	**No**	Culvert outlet invert	**At Grade**
Stepped Footers	**0 ft.**	Backwater Length (measured from outlet)	**0**
Maximum pool depth	**0 ft.**	Backwater Length (measured from outlet)	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Gravel**	**Gravel**
Bedrock Present	**No**	**No**	
Type of Sediment Deposits	**Mid-channel**	**None**	**None**
Material Present throughout			**Yes**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**None**	**None**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Herbaceous/Grass**	**Coniferous Forest**	
Dominant Vegetation Type - Right	**Coniferous Forest**	**Coniferous Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

	Upstream	Downstream
Vegitation Band - Left	**No**	**No**
Vegitation Band -Right	**Yes**	**Yes**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **double entry in transtruc Local Inventory: 'culvert' inspected by Lyndon St (2003) correct, 'Bridge' by automated bulk upload is incorrect**

Culvert Summary Report

Stevens River - basin14

General Information

SgaID	**100000000403091**	Local SgaID		VOBCIT struct_num	**990017002003091**
Observers	**Redstart**	Assessment Date	**10/4/2010**	Project Name	**Stevens River**
Town	**Peacham**	Latitude	**44.36238**	Longitude	**-72.17546**
Location	**Still Run, 0.03 mi off Ewells Mills Rd at 0.2 mi NW of Peacham-Danville Rd**			Reach VTID	**T1.06**
Road Name	**STILL RUN**	Road Type	**Gravel**	Stream Name	**Peacham Hollow Brook**
High Flow Stage	**No**	Channel Width			**17.6**

Culvert Information

Culvert Length **60** Material **Steel Corrugated**

Culvert Height	5.8	Number of culverts	1
Culvert Width	5.8	Culvert Overflow Pipe	No
		Skewed to roadway?	No

Geomorphic Information

General

Floodplain filled by roadway approaches	**Entirely**	Structure is located at significant break in valley slope	**No**
		Culvert slope as compared with channel slope is significantly	**Same**

Upstream

Obstructions at the opening of the structure	**Wood debris**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Channelized Straight**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	Water depth in culvert (at outlet)	**0.4**
Downstream bank heights are substantially higher than upstream bank heights	**Yes**	Culvert outlet invert	**Free Fall**
Stepped Footers	**1.3 ft.**	Backwater Length (measured from outlet)	**0**
Maximum pool depth	**3 ft.**	Backwater Length (measured from outlet)	**0.5**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Gravel**	**None**
Bedrock Present	**No**	**No**	
Type of Sediment Deposits	**None**	**Mid-channel**	**None**
Material Present throughout			**No**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**None**	**Low**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**Yes**	**No**	
Beaver Dam distance (ft.)	**50**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Shrub/Sapling**	**Mixed Forest**	
Dominant Vegetation Type - Right	**Coniferous Forest**	**Mixed Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**Yes**	**Yes**
Vegitation Band -Right	**Yes**	**Yes**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**Beaver - Feeding Signs**	**None**

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **not that old; possible older dam abutments downstream, also some sort of structure (maybe another dam) US where beavers have also placed a dam**

Culvert Summary Report

Stevens River - basin14

General Information

SgaID	**700000000303093**	Local SgaID		VOBCIT struct_num	
Observers	**Redstart**	Assessment Date	**10/6/2010**	Project Name	**Stevens River**
Town	**Peacham**	Latitude	**44.37128**	Longitude	**-72.18946**
Location	**Downstream of 2 entrances to Butternut Hill Farm at 2671 Slack St**			Reach VTID	**T1.07**
Road Name		Road Type	**Gravel**	Stream Name	**Peacham Hollow Brook**
High Flow Stage	**No**	Channel Width			**14.1**

Culvert Information

Culvert Length	**45**	Material	**Steel Corrugated**
Culvert Height	**5**	Number of culverts	**1**
Culvert Width	**5**	Culvert Overflow Pipe	**No**
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Entirely**	Structure is located at significant break in valley slope	**No**
		Culvert slope as compared with channel slope is significantly	**Lower**

Upstream

Obstructions at the opening of the structure	**Wood debris**	Estimated distance avulsion would follow road	**250**
Steep riffle present immediately upstream of structure	**Yes**	Angle of stream flow approaching structure	**Channelized Straight**
If channel avulses, stream will	**Follow Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	Water depth in culvert (at outlet)	**0.4**
Downstream bank heights are substantially higher than upstream bank heights	**Yes**	Culvert outlet invert	**Free Fall**
Stepped Footers	**1 ft.**	Backwater Length (measured from outlet)	**0**
Maximum pool depth	**2.1 ft.**	Backwater Length (measured from outlet)	**0.2**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Sand**	**Sand**	**None**
Bedrock Present	**No**	**No**	
Type of Sediment Deposits			
Material Present throughout			**No**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**Low**	**High**	
Hard Bank Armoring	**Intact**	**None**	
Stream bed scour causing undermining around or under structure	**Culvert**	**Culvert**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Shrub/Sapling**	**Mixed Forest**	
Dominant Vegetation Type - Right	**Mixed Forest**	**Mixed Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**No**	**Yes**	
Vegitation Band -Right	**No**	**No**	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **unclear if this is a private or town culvert; Lyndon St. 2003 inventory lists two culverts, STRUCT_NUMs 700028044303093 and 700028044403093, that used to carry the stream under the road to a meander and back under the road again; meander was eliminated and the two culverts were replaced by this one; recent microburst storm tore through this area downstream pretty heavily after the straightening**

Bridge Summary Report — Stevens River - basin14

General Information

SgaID	**100000000503011**	Local SgaID		VOBCIT struct_num	**100301003903011**
Observers	**Redstart**	Assessment Date	**7/21/2010**	Project Name	**Stevens River**
Town	**Barnet**	Latitude	**44.31485**	Longitude	**-72.10865**

August. 14 2011

Location	**Ferguson Rd., 0.08 mi NE of E. Peacham Rd.**			Reach VTID	**T1.01**
Road Name	**FERGUSON RD**	Road Type	**Gravel**	Stream Name	**Peacham Hollow Brook**
High Flow Stage	**No**	Channel Width			**45.7**

Bridge Information

Bridge Width	**16**	Material	**Concrete**
Bridge Clearance	**8**	Number of bridge piers/arches	**0**
Bridge/Arch Span	**23**		
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Entirely**	Structure is located at significant break in valley slope	**No**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Mild Bend**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	
Downstream bank heights are substantially higher than upstream bank heights	**Yes**	
Pool Depth at point of streamflow entry	**No** **0 ft.**	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Bedrock**	**Bedrock**	**Bedrock**
Bedrock Present	**Yes**	**Yes**	**Yes**
Type of Sediment Deposits	**None**	**Side**	**None**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**None**	**None**	
Hard Bank Armoring	**Intact**	**Failing**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Herbaceous/Grass**	**Herbaceous/Grass**	
Dominant Vegetation Type - Right	**Mixed Forest**	**Shrub/Sapling**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**No**	**No**
Vegitation Band -Right	**No**	**Yes**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **area appears to have been windrowed more than once**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	**200000000103011**	Local SgaID		VOBCIT struct_num	**200216000903012**
Observers	**Redstart**	Assessment Date	**8/4/2010**	Project Name	**Stevens River**
Town	**Barnet**	Latitude	**44.308**	Longitude	**-72.14517**

Location	**Peacham-Barnet Rd. west of West Barnet village, 0.04 mi E of McKinley Rd**			Reach VTID	**T2.03**
Road Name	**W MAIN ST**	Road Type	**Paved**	Stream Name	**South Peacham Brook**
High Flow Stage	**No**		Channel Width		**39.1**

Bridge Information

Bridge Width	**27.5**	Material	**Steel**
Bridge Clearance	**7.2**	Number of bridge piers/arches	**0**
Bridge/Arch Span	**52**		
		Skewed to roadway?	**Yes**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Partially**	Structure is located at significant break in valley slope	**No**

Upstream

Obstructions at the opening of the structure	**Sediment**	Estimated distance avulsion would follow road	**300**
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Mild Bend**
If channel avulses, stream will	**Follow Road**		

Downstream

Pool present immediately downstream of structure	**No**	
Downstream bank heights are substantially higher than upstream bank heights	**No**	
Pool Depth at point of streamflow entry	**No** **0 ft.**	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Sand**	**Cobble**	**Boulder**
Bedrock Present	**No**	**No**	**No**
Type of Sediment Deposits	**Point**	**Side**	**Point**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**None**	**Low**	
Hard Bank Armoring	**Intact**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Coniferous Forest**	**Coniferous Forest**	
Dominant Vegetation Type - Right	**Road Embankment**	**Mixed Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**Yes**	**Yes**	
Vegitation Band -Right	**No**	**Yes**	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS?	**Yes**	Photos taken?	**Yes**

Comments **effective width reduced to 33 ft at bankfull and 42 ft at floodprone due to armoring inside structure**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	**400000000103091**	Local SgaID		VOBCIT struct_num	**990004000803091**
Observers	**Redstart**	Assessment Date	**8/4/2010**	Project Name	**Stevens River**

Stream Geomorphic Assessment

VERMONT

Agency of Natural Resouces

VT DEC

Vermont.gov

August. 14 2011

Town	**Peacham**	Latitude	**44.30988**	Longitude	**-72.1539**
Location	**Hollow Woods Rd., 0.04 mi N of jct. with Peacham-Barnet Rd**			Reach VTID	**T2.04**
Road Name	**HOLLOW WOOD RD**	Road Type	**Gravel**	Stream Name	**South Peacham Brook**
High Flow Stage	**No**		Channel Width		**35.8**

Bridge Information

Bridge Width	**18**	Material	**Concrete**
Bridge Clearance	**3.4**	Number of bridge piers/arches	**0**
Bridge/Arch Span	**15**		
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Not Significant**	Structure is located at significant break in valley slope	**No**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Channelized Straight**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	
Downstream bank heights are substantially higher than upstream bank heights	**No**	
Pool Depth at point of streamflow entry	**No** **0 ft.**	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Cobble**	**Gravel**
Bedrock Present	**No**	**No**	**No**
Type of Sediment Deposits	**Side,Mid-channel**	**Side**	**Side**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**None**	**Low**	
Hard Bank Armoring	**Intact**	**Failing**	
Stream bed scour causing undermining around or under structure	**Wing walls**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Herbaceous/Grass**	**Coniferous Forest**	
Dominant Vegetation Type - Right	**Herbaceous/Grass**	**Shrub/Sapling**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**No**	**Yes**	
Vegitation Band -Right	**No**	**No**	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS?	**Yes**	Photos taken?	**Yes**

Comments **downstream scour not undermining structure yet but has that potential; this bridge appears to have plugged in May 26, 2011 flash flood: http://s1083.photobucket.com/albums/j384/TownofPeacham/?start=229**

Culvert Summary Report

Stevens River - basin14

General Information

SgaID	**100000000803091**	Local SgaID	**700006060303093**

Stream Geomorphic Assessment

VT DEC

VERMONT

Agency of Natural Resouces

Vermont.gov

August. 14 2011

				VOBCIT struct_num	
Observers	**Redstart**	Assessment Date	**8/4/2010**	Project Name	**Stevens River**
Town	**Peacham**	Latitude	**44.31448**	Longitude	**-72.17783**
Location	**Cunty Rd., 0.02 mi S of jct with Gov. Mattocks Rd.**			Reach VTID	**T2.05**
Road Name	**COUNTY RD**	Road Type	**Gravel**	Stream Name	**South Peacham Brook**
High Flow Stage	**No**		Channel Width		**29.7**

Culvert Information

Culvert Length	**48**	Material	**Concrete**
Culvert Height	**7**	Number of culverts	**1**
Culvert Width	**7**	Culvert Overflow Pipe	**No**
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Partially**	Structure is located at significant break in valley slope	**No**
		Culvert slope as compared with channel slope is significantly	**Same**

Upstream

Obstructions at the opening of the structure	**Wood debris**	Estimated distance avulsion would follow road	**230**
Steep riffle present immediately upstream of structure	**Yes**	Angle of stream flow approaching structure	**Sharp Bend**
If channel avulses, stream will	**Follow Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	Water depth in culvert (at outlet)	**1**
Downstream bank heights are substantially higher than upstream bank heights	**Yes**	Culvert outlet invert	**Free Fall**
Stepped Footers	**1.6 ft.**	Backwater Length (measured from outlet)	**0**
Maximum pool depth	**> 4.0 ft.**	Backwater Length (measured from outlet)	**0.2**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Cobble**	**None**
Bedrock Present	**No**	**No**	
Type of Sediment Deposits	**Mid-channel**	**Mid-channel**	**None**
Material Present throughout			**No**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**Low**	**Low**	
Hard Bank Armoring	**Failing**	**Failing**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Mixed Forest**	**Mixed Forest**	
Dominant Vegetation Type - Right	**Mixed Forest**	**Mixed Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**Yes**	**No**
Vegitation Band -Right	**Yes**	**No**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **small tributary confluence just upstream of structure; DS end appears to be excavated and maintained as a recreational pool; this culvert does appear to hav outflanked in May 26, 2011 flooding, allowing stream to run down Gov. Mattocks Rd.**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	100000000903011	Local SgaID		VOBCIT struct_num	100301003703011
Observers	Redstart	Assessment Date	9/7/2010	Project Name	Stevens River
Town	Barnet	Latitude	44.30693	Longitude	-72.1474
Location	Harvey Mtn. Rd., 0.05 mi SW of jct with W. Main St in West Barnet village			Reach VTID	T2.02
Road Name	HARVEY MTN RD	Road Type	Paved	Stream Name	South Peacham Brook
High Flow Stage	No	Channel Width			51.2

Bridge Information

Bridge Width	24	Material	Concrete
Bridge Clearance	6.4	Number of bridge piers/arches	0
Bridge/Arch Span	25		
		Skewed to roadway?	Yes

Geomorphic Information

General

Floodplain filled by roadway approaches	Partially	Structure is located at significant break in valley slope	No

Upstream

Obstructions at the opening of the structure	None	Estimated distance avulsion would follow road	200
Steep riffle present immediately upstream of structure	No	Angle of stream flow approaching structure	Sharp Bend
If channel avulses, stream will	Follow Road		

Downstream

Pool present immediately downstream of structure	Yes	
Downstream bank heights are substantially higher than upstream bank heights	Yes	
Pool Depth at point of streamflow entry	No 0 ft.	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Sand	Sand	Sand
Bedrock Present	No	No	No
Type of Sediment Deposits	None	None	Side
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	None	None	
Hard Bank Armoring	Failing	Failing	
Stream bed scour causing undermining around or under structure	None	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Shrub/Sapling	Herbaceous/Grass	
Dominant Vegetation Type - Right	Herbaceous/Grass	Shrub/Sapling	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	No	No
Vegitation Band -Right	No	No

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	Deer - Sighting	None

Other Information

Spatial location data collected with GPS?	Yes	Photos taken?	Yes

Comments

Bridge Summary Report — Stevens River - basin14

General Information

SgaID	100000000603091	Local SgaID		VOBCIT struct_num	100309003903091
Observers	Redstart	Assessment Date	8/4/2010	Project Name	Stevens River
Town	Peacham	Latitude	44.31399	Longitude	-72.16444
Location	Mill Trace, 0.01 mi N of Peacham-Barnet Rd and 0.11 mi E of South Peacham village			Reach VTID	T2.04
Road Name	MILL TRCE	Road Type	Gravel	Stream Name	South Peacham Brook
High Flow Stage	No	Channel Width	35.8		

Bridge Information

Bridge Width	15.2	Material	Steel
Bridge Clearance	4.5	Number of bridge piers/arches	0
Bridge/Arch Span	20		
		Skewed to roadway?	No

Geomorphic Information

General

Floodplain filled by roadway approaches	Entirely	Structure is located at significant break in valley slope	No

Upstream

Obstructions at the opening of the structure	None	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	No	Angle of stream flow approaching structure	Mild Bend
If channel avulses, stream will	Cross Road		

Downstream

Pool present immediately downstream of structure	Yes	
Downstream bank heights are substantially higher than upstream bank heights	Yes	
Pool Depth at point of streamflow entry	No 0 ft.	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Bedrock	Boulder	Cobble
Bedrock Present	Yes	No	No
Type of Sediment Deposits	Side	Side	Side
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	None	None	
Hard Bank Armoring	Failing	Failing	
Stream bed scour causing undermining around or under structure	None	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Deciduous Forest**	**Deciduous Forest**	
Dominant Vegetation Type - Right	**Deciduous Forest**	**Road Embankment**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vigitation Band - Left	**No**	**No**	
Vigitation Band -Right	**No**	**No**	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **confluence with tributary just US, right bank of this structure; side of Peacham-Barnet Rd. was undercut by South Peacham Brook and buckled during May 26, 2011 flash flood**

Culvert Summary Report

Stevens River - basin14

General Information

SgaID	**990000000103091**	Local SgaID		VOBCIT struct_num	**990001001403091**
Observers	**Redstart**	Assessment Date	**8/4/2010**	Project Name	**Stevens River**
Town	**Peacham**	Latitude	**44.31448**	Longitude	**-72.16662**
Location	**South Main St., South Peacham village**			Reach VTID	**T2.04**
Road Name	**S MAIN ST**	Road Type	**Paved**	Stream Name	**South Peacham Brook**
High Flow Stage	**No**	Channel Width			**35.8**

Culvert Information

Culvert Length	**90**	Material	**Steel Corrugated**
Culvert Height	**9.5**	Number of culverts	**1**
Culvert Width	**20**	Culvert Overflow Pipe	**No**
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Entirely**	Structure is located at significant break in valley slope	**Yes**
		Culvert slope as compared with channel slope is significantly	**Same**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Naturally Straight**
If channel avulses, stream will	**Cross Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	Water depth in culvert (at outlet)	**0.5**
Downstream bank heights are substantially higher than upstream bank heights	**No**	Culvert outlet invert	**Cascade**
Stepped Footers	**1 ft.**	Backwater Length (measured from outlet)	**0**
Maximum pool depth	**4 ft.**	Backwater Length (measured from outlet)	**1.5**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Bedrock**	**Bedrock**	**Boulder**
Bedrock Present	**Yes**	**Yes**	
Type of Sediment Deposits	**None**	**None**	**Side**
Material Present throughout			**Yes**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**Low**	**Low**	
Hard Bank Armoring	**Intact**	**Failing**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Deciduous Forest**	**Deciduous Forest**	
Dominant Vegetation Type - Right	**Deciduous Forest**	**Deciduous Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

	Upstream	Downstream
Vegitation Band - Left	**Yes**	**Yes**
Vegitation Band -Right	**Yes**	**No**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **this arch culvert is burined under a lot of fill; bedrock grade control on upstream end is half height of arch; old mill foundation in disrepair off left bank downstream**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	**200000000003012**	Local SgaID		VOBCIT struct_num	**200113012103012**
Observers	**Redstart**	Assessment Date	**8/9/2010**	Project Name	**Stevens River**
Town	**Barnet**	Latitude	**44.29613**	Longitude	**-72.04984**
Location	**Barnet Falls, center of Barnet village**			Reach VTID	**M102**
Road Name	**ROUTE 5 S**	Road Type	**Paved**	Stream Name	**Stevens River**
High Flow Stage	**No**	Channel Width			**70.6**

Bridge Information

Bridge Width	**26**	Material	**Concrete**
Bridge Clearance	**17**	Number of bridge piers/arches	**1**
Bridge/Arch Span	**80**		
		Skewed to roadway?	**Yes**

Geomorphic Information

General

Floodplain filled by roadway approaches	**Not Significant**	Structure is located at significant break in valley slope	**Yes**

Upstream

Obstructions at the opening of the structure	**None**	Estimated distance avulsion would follow road	**100**
Steep riffle present immediately upstream of structure	**No**	Angle of stream flow approaching structure	**Naturally Straight**
If channel avulses, stream will	**Follow Road**		

Downstream

Pool present immediately downstream of structure	**Yes**	
Downstream bank heights are substantially higher than upstream bank heights	**Yes**	
Pool Depth at point of streamflow entry	**Yes** **0 ft.**	**0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Bedrock**	**Bedrock**	**Bedrock**
Bedrock Present	**Yes**	**Yes**	**Yes**
Type of Sediment Deposits	**None**	**Side**	**None**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**None**	**None**	
Hard Bank Armoring	**None**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Shrub/Sapling**	**Deciduous Forest**	
Dominant Vegetation Type - Right	**Herbaceous/Grass**	**Deciduous Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**No**	**No**
Vegitation Band -Right	**No**	**No**

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	**None**	**None**	**None**

Other Information

Spatial location data collected with GPS?	**Yes**	Photos taken?	**Yes**

Comments **structure span listed in Step 2 is effective span, due to angle of alignment_VTrans lists as 118 ft**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	**100000000803011**	Local SgaID		VOBCIT struct_num	**100301004203011**
Observers	**Redstart**	Assessment Date	**9/13/2010**	Project Name	**Stevens River**
Town	**Barnet**	Latitude	**44.3106**	Longitude	**-72.13657**
Location	**Garland Hill Rd., 0.03 mi E of W Main St in West Barnet village**			Reach VTID	**T2.02**
Road Name	**GARLAND HILL**	Road Type	**Paved**	Stream Name	**South Peacham Brook**
High Flow Stage	**No**	Channel Width			**51.2**

Bridge Information

Bridge Width	**18.5**	Material	**Steel**
Bridge Clearance	**8.3**	Number of bridge piers/arches	**0**
Bridge/Arch Span	**21.5**		
		Skewed to roadway?	**No**

Geomorphic Information

General

Floodplain filled by roadway approaches **Partially**
Structure is located at significant break in valley slope **No**

Upstream

Obstructions at the opening of the structure **Wood debris**
Steep riffle present immediately upstream of structure **Yes**
If channel avulses, stream will **Cross Road**
Estimated distance avulsion would follow road
Angle of stream flow approaching structure **Channelized Straight**

Downstream

Pool present immediately downstream of structure **Yes**
Downstream bank heights are substantially higher than upstream bank heights **Yes**
Pool Depth at point of streamflow entry **No** **0 ft.** **0**

	Upstream	Downstream	In Structure
Dominant Bed Material	**Cobble**	**Cobble**	**Boulder**
Bedrock Present	**No**	**No**	**No**
Type of Sediment Deposits	**Mid-channel**	**None**	**None**
Elevation of sediment deposits >= 1/2 bankfull	**No**	**No**	**No**
Bank Erosion	**Low**	**None**	
Hard Bank Armoring	**Failing**	**Intact**	
Stream bed scour causing undermining around or under structure	**None**	**None**	
Beaver Dam near Structure	**No**	**No**	
Beaver Dam distance (ft.)	**0**	**0**	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	**Herbaceous/Grass**	**Shrub/Sapling**	
Dominant Vegetation Type - Right	**Shrub/Sapling**	**Deciduous Forest**	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	**No**	**No**	
Vegitation Band -Right	**Yes**	**No**	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species			

Other Information

Spatial location data collected with GPS? **Yes**
Photos taken? **Yes**

Comments **willow growing in downstream opening**

Bridge Summary Report

Stevens River - basin14

General Information

SgaID	700000000003013	Local SgaID		VOBCIT struct_num	
Observers	Redstart	Assessment Date	10/13/2010	Project Name	Stevens River
Town	Barnet	Latitude	44.291	Longitude	-72.05371
Location	Washington County Rail Line along Connecticut River at mouth of Stevens			Reach VTID	M101
Road Name		Road Type	Railroad	Stream Name	Stevens River
High Flow Stage	No	Channel Width	71		

Bridge Information

Bridge Width	9.8	Material	Steel
Bridge Clearance	11	Number of bridge piers/arches	0
Bridge/Arch Span	42		
		Skewed to roadway?	No

Geomorphic Information

General

Floodplain filled by roadway approaches	Entirely	Structure is located at significant break in valley slope	No

Upstream

Obstructions at the opening of the structure	None	Estimated distance avulsion would follow road	
Steep riffle present immediately upstream of structure	No	Angle of stream flow approaching structure	Mild Bend
If channel avulses, stream will	Cross Road		

Downstream

Pool present immediately downstream of structure	No	
Downstream bank heights are substantially higher than upstream bank heights	No	
Pool Depth at point of streamflow entry	No 0 ft.	0

	Upstream	Downstream	In Structure
Dominant Bed Material	Sand	Sand	Sand
Bedrock Present	No	No	No
Type of Sediment Deposits	Side	Side	None
Elevation of sediment deposits >= 1/2 bankfull	No	No	No
Bank Erosion	None	None	
Hard Bank Armoring	Intact	Intact	
Stream bed scour causing undermining around or under structure	None	None	
Beaver Dam near Structure	No	No	
Beaver Dam distance (ft.)	0	0	

Vegetation

	Upstream	Downstream	In Structure
Dominant Vegetation Type - Left	Shrub/Sapling	Herbaceous/Grass	
Dominant Vegetation Type - Right	Herbaceous/Grass	Herbaceous/Grass	

Does a band of shrub/forest vegetation 50 ft. wide start within 25 ft. of the structure and extend at least 500 ft. up/downstream?

Vegitation Band - Left	Yes	Yes	
Vegitation Band -Right	Yes	Yes	

Wildlife

	Roadkill	Outside Structure	Inside Structure
Species	None	Beaver - Bedding Sites	None

Other Information

Spatial location data collected with GPS? **Yes** Photos taken? **Yes**

Comments **elevated railway confines valley at all but highest flows, when shared floodplain with Connecticut is accessed further up the Connecticut**

- Appendix 7 -

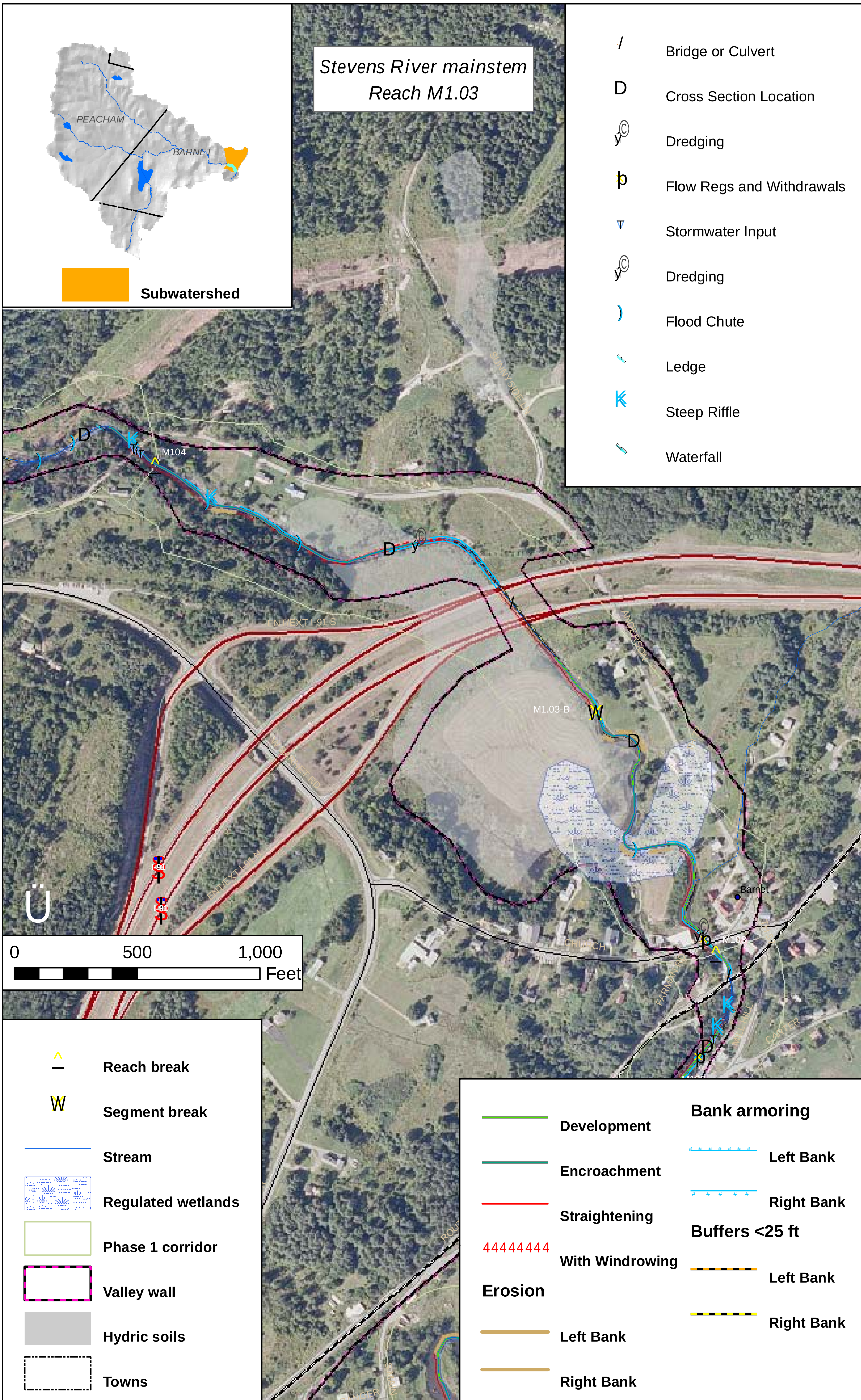
Large Format (11x17) Maps

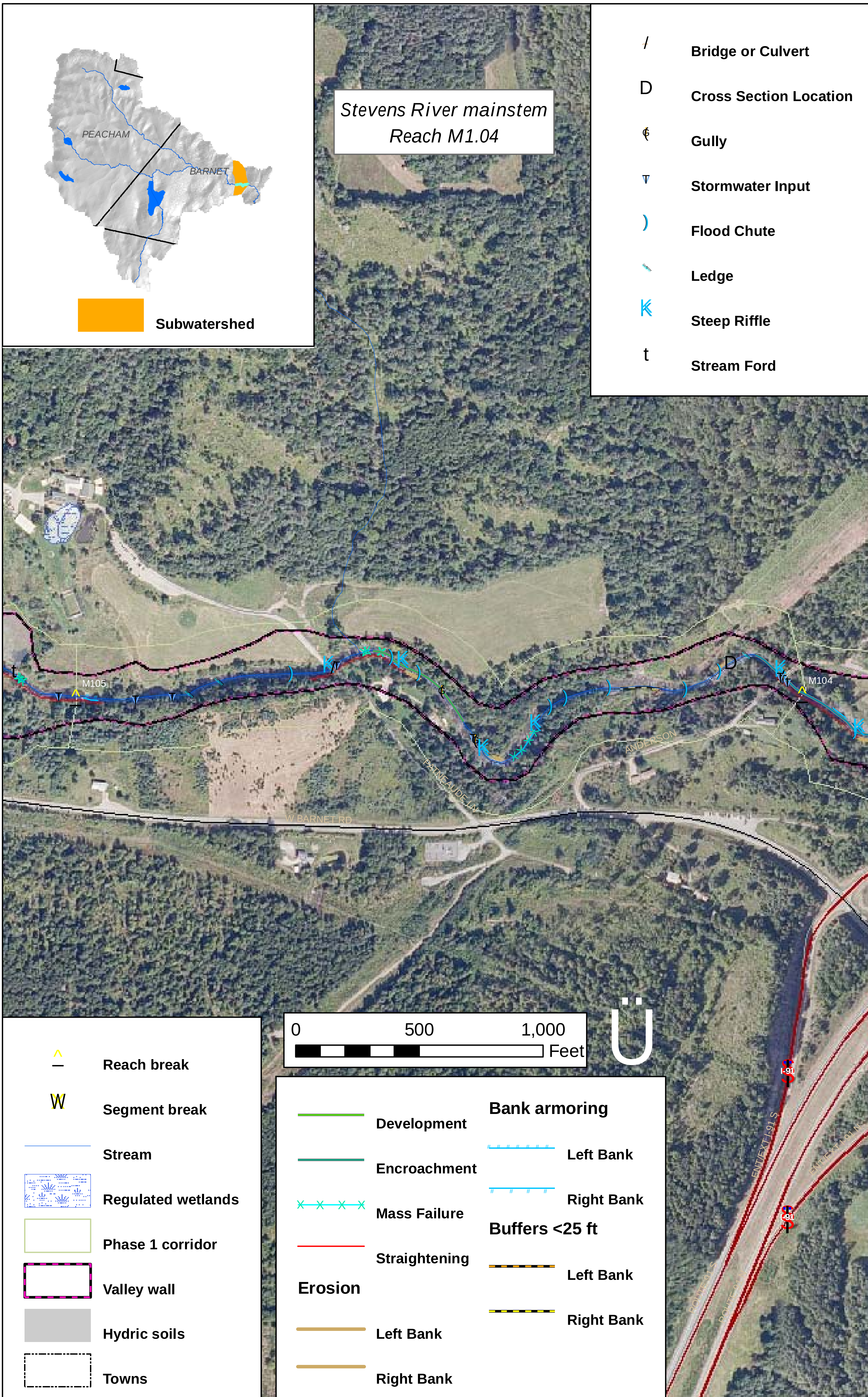
Reach maps

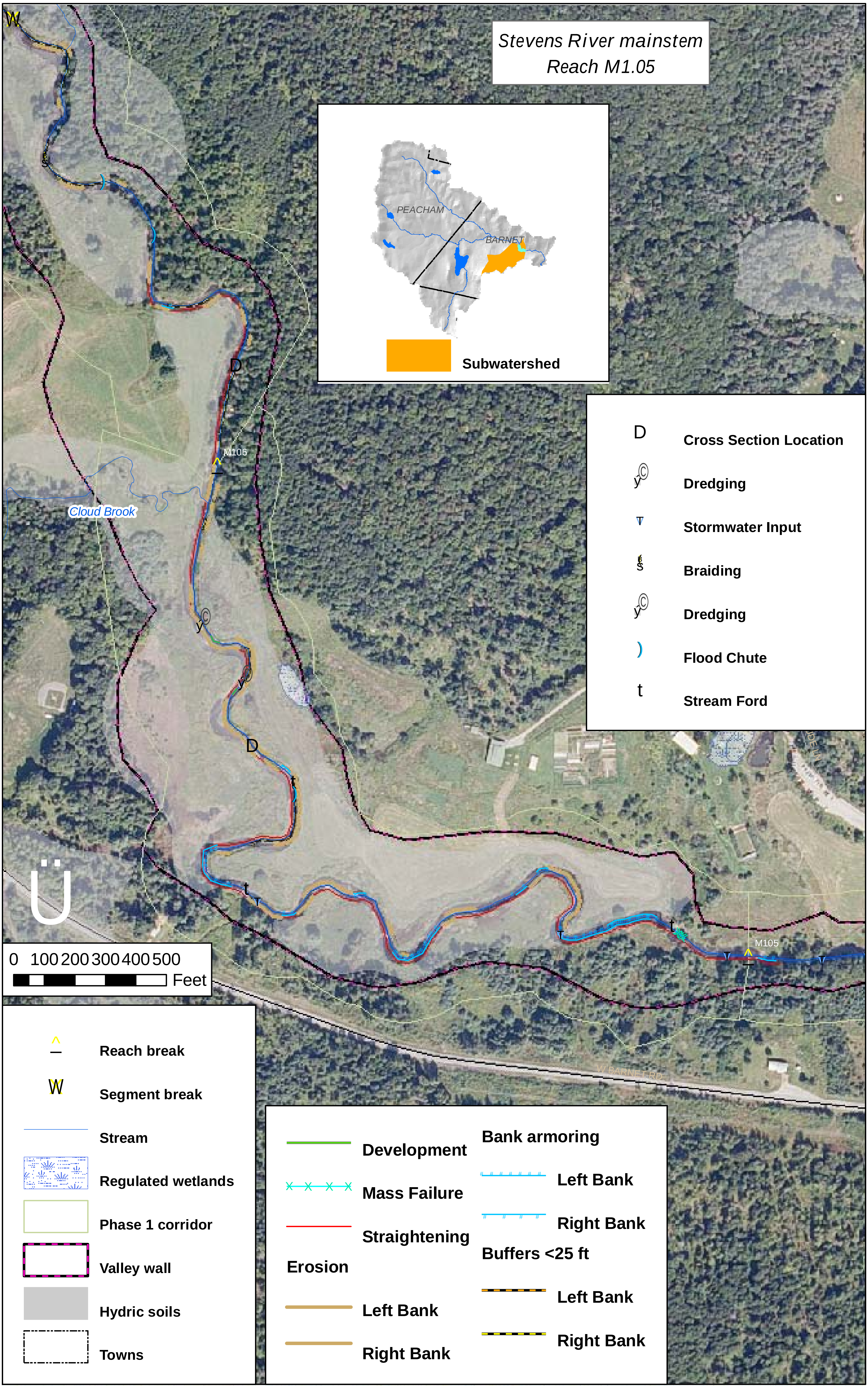
Analysis maps

Overview
Land cover/ Land use
Hydrologic alterations
Sediment load indicators
Channel slope modifiers
Channel depth modifiers
Boundary condition and riparian modifiers
Constraints to channel evolution
Sediment regime departure

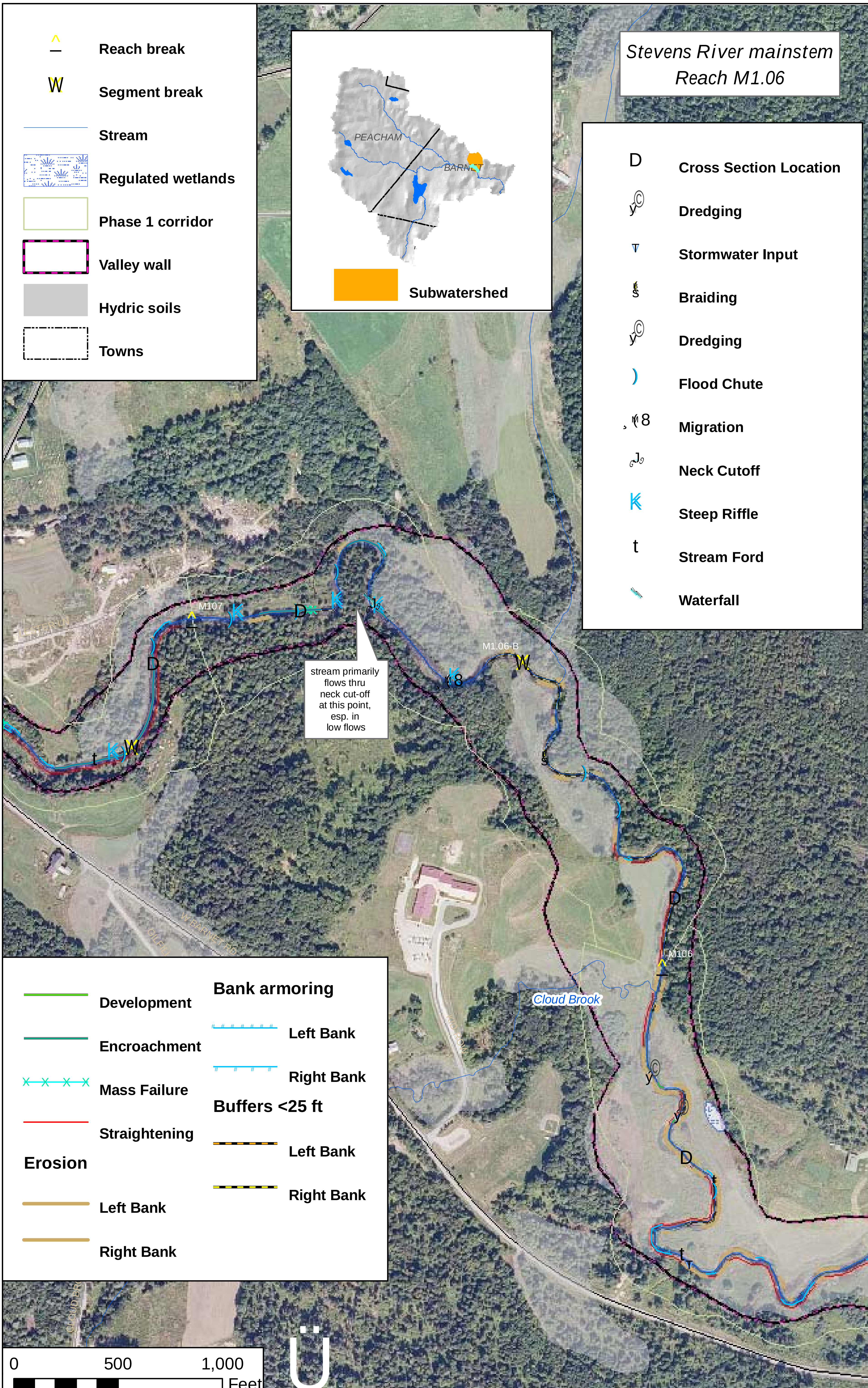
Stevens River mainstem
Reaches M1.01 - M1.02
PEACHAM
BARNET
Subwatershed
Barnet
M103
M102
M101
MILL HILL
Connecticut R
Bridge or Culvert
Cross Section Location
Dredging
Flow Regs and Withdrawals
Stormwater Input
Dredging
Flood Chute
Steep Riffle
Waterfall
0
500
Feet
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
Development
Encroachment
Berm
Straightening
Erosion
Left Bank
Right Bank
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank
Railroad

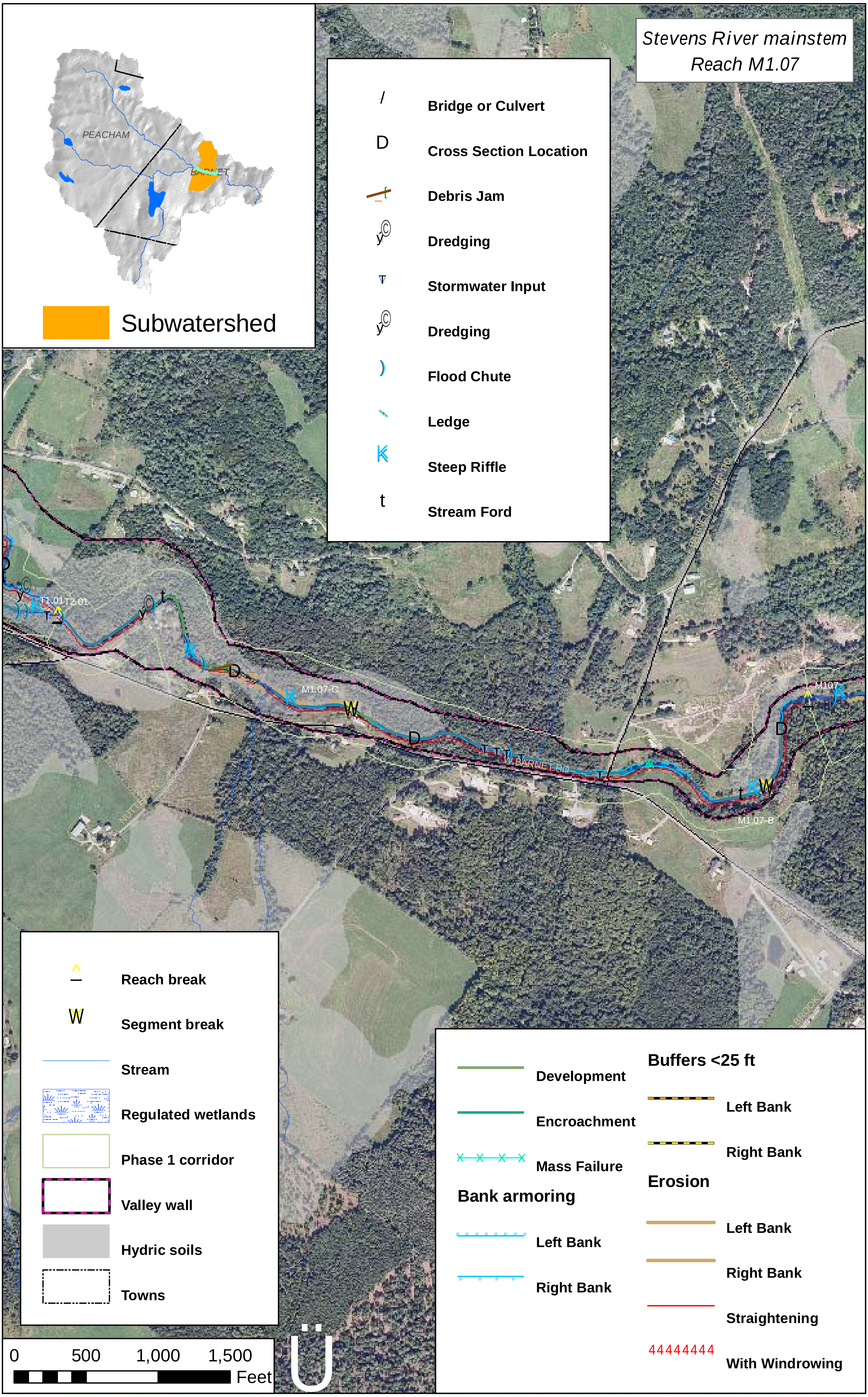

Stevens River mainstem
Reach M1.03
PEACHAM
BARNET
Subwatershed
Bridge or Culvert
Cross Section Location
Dredging
Flow Regs and Withdrawals
Stormwater Input
Dredging
Flood Chute
Ledge
Steep Riffle
Waterfall
M104
M1.03-B
Barnet
0
500
1,000
Feet
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
Development
Encroachment
Straightening
With Windrowing
Erosion
Left Bank
Right Bank
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank


Stevens River mainstem
Reach M1.04
PEACHAM
BARNET
Subwatershed
Bridge or Culvert
Cross Section Location
Gully
Stormwater Input
Flood Chute
Ledge
Steep Riffle
Stream Ford
M105
M104
W BARNET RD
I-91
0
500
1,000
Feet
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
Development
Encroachment
Mass Failure
Straightening
Erosion
Left Bank
Right Bank
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank

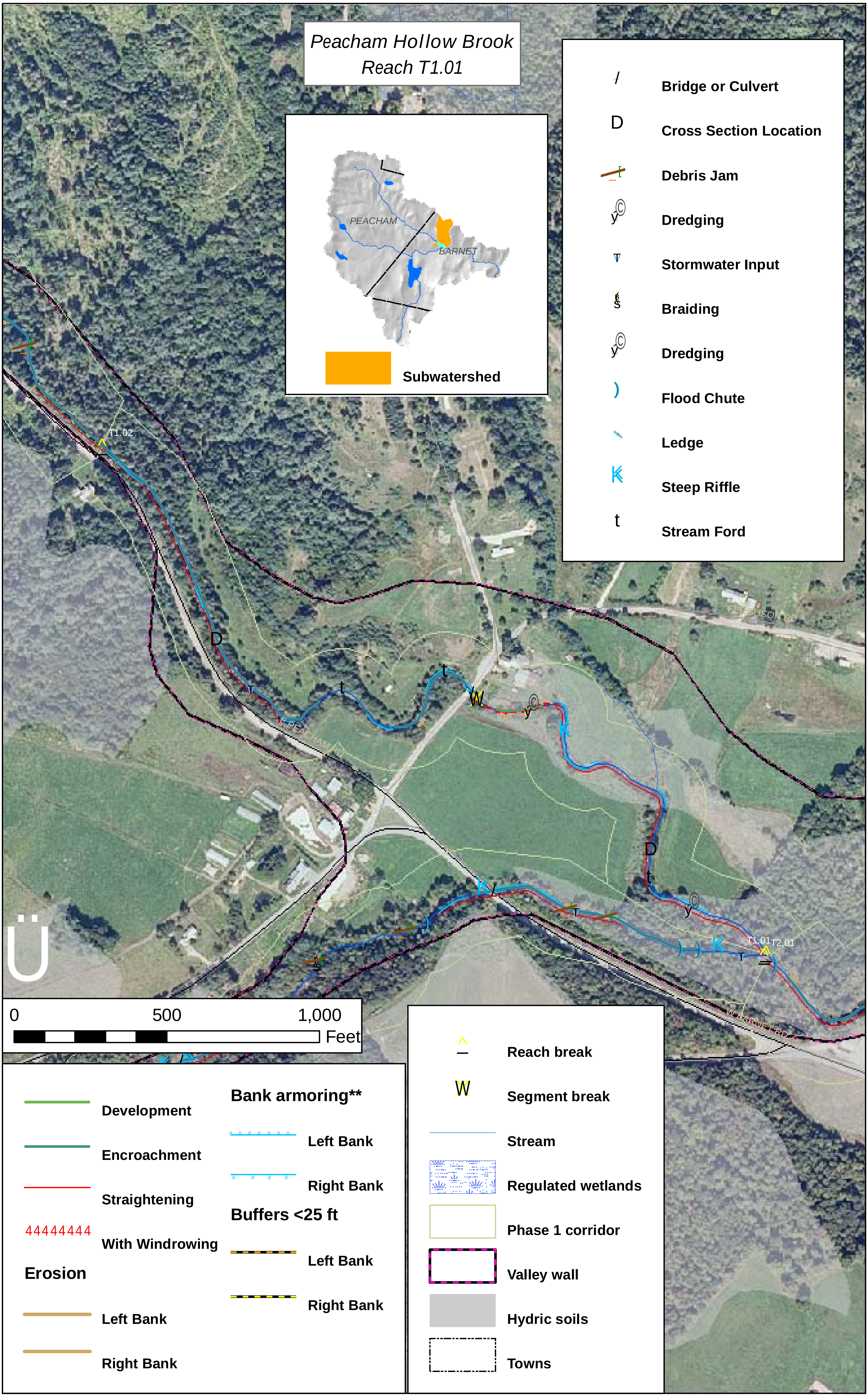


Stevens River mainstem
Reach M1.05
PEACHAM
BARNET
Subwatershed
Cloud Brook
M106
M105
D
Cross Section Location
Dredging
Stormwater Input
Braiding
Dredging
Flood Chute
Stream Ford
0 100 200 300 400 500
Feet
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
Development
Mass Failure
Straightening
Erosion
Left Bank
Right Bank
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank

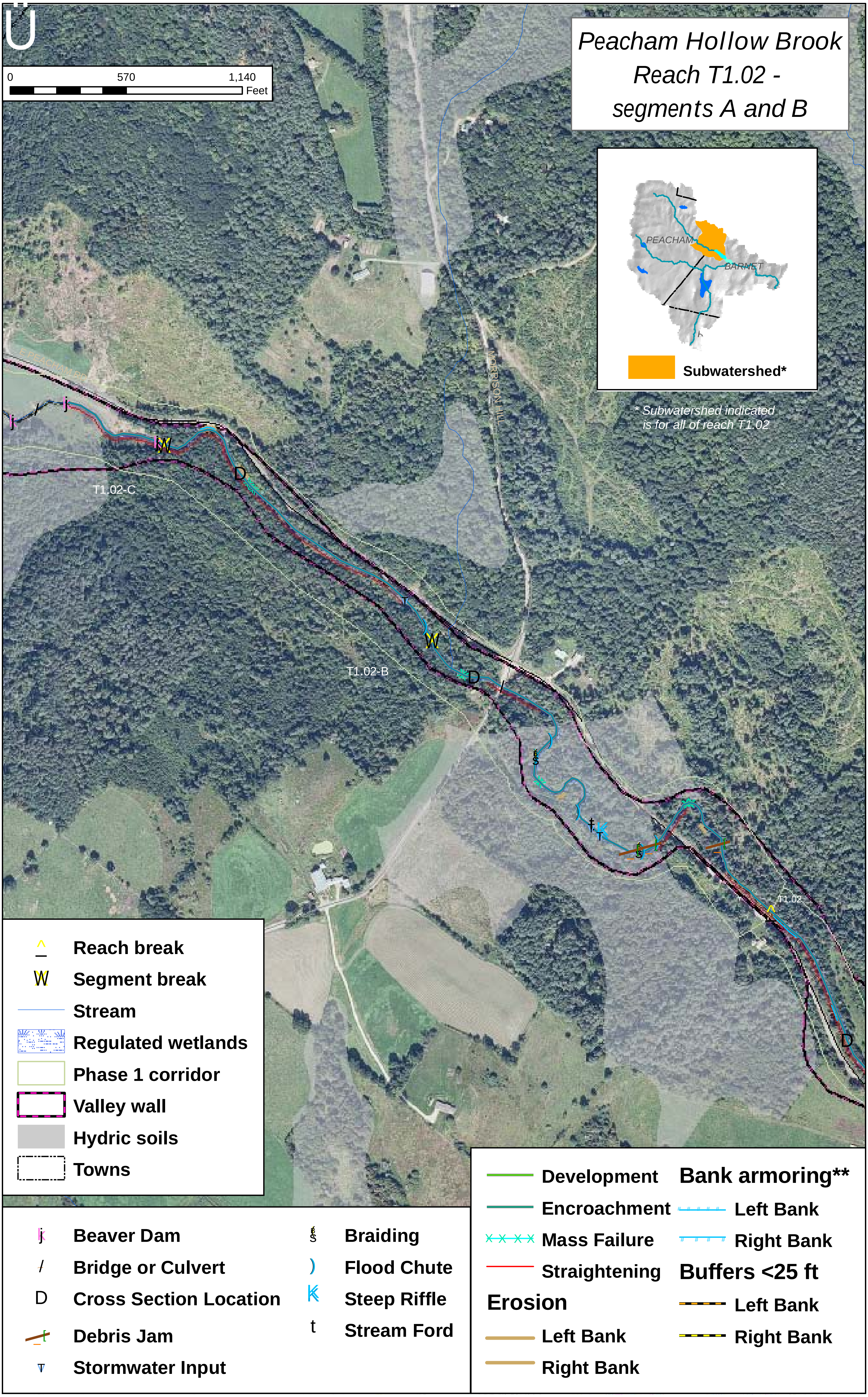

Stevens River mainstem
Reach M1.06
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
PEACHAM
BARNET
Subwatershed
Cross Section Location
Dredging
Stormwater Input
Braiding
Dredging
Flood Chute
Migration
Neck Cutoff
Steep Riffle
Stream Ford
Waterfall
M107
M1.06-B
M106
stream primarily flows thru neck cut-off at this point, esp. in low flows
Cloud Brook
Development
Encroachment
Mass Failure
Straightening
Erosion
Left Bank
Right Bank
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank
0
500
1,000
Feet

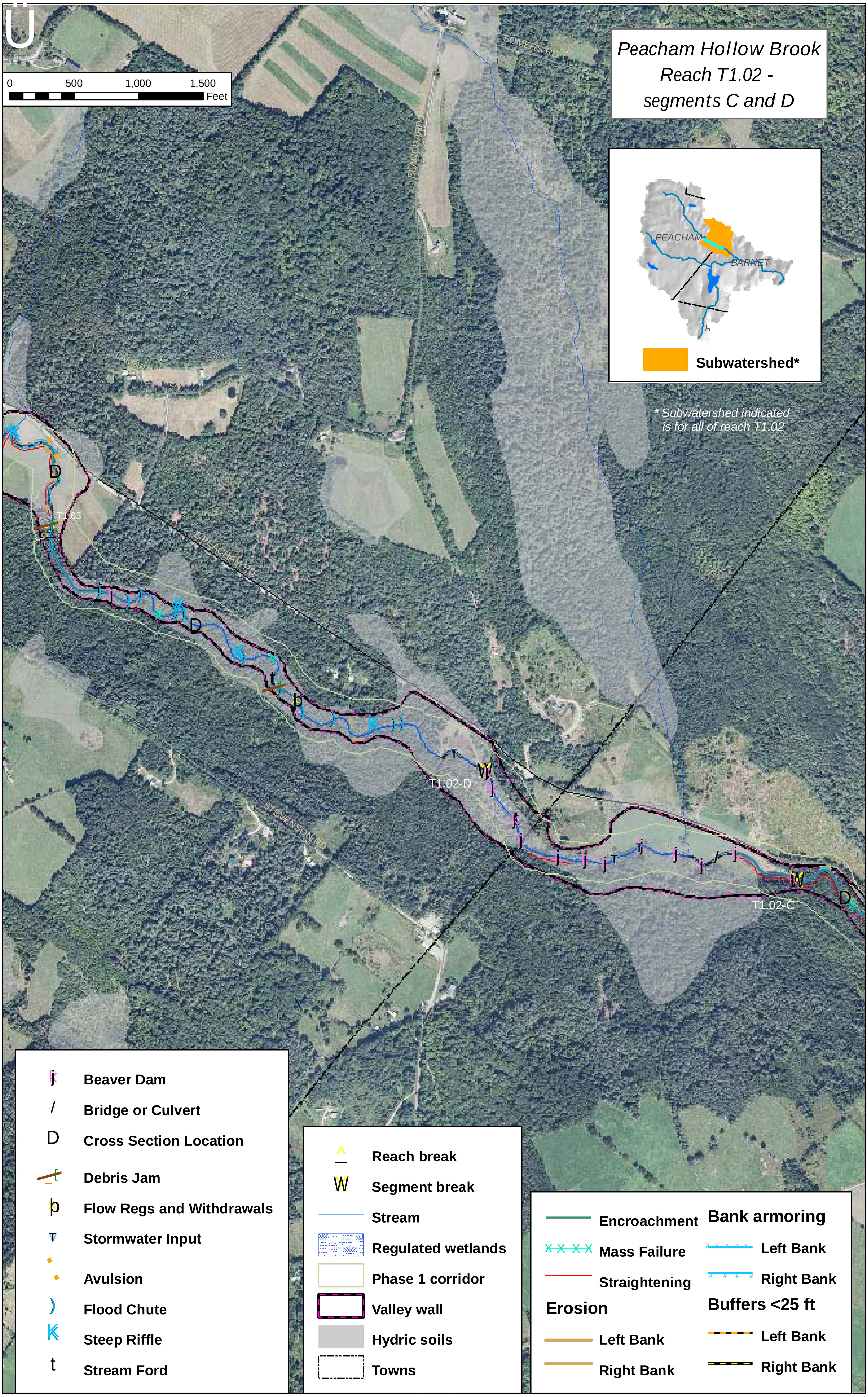


Stevens River mainstem
Reach M1.07
PEACHAM
BARNET
Subwatershed
Bridge or Culvert
Cross Section Location
Debris Jam
Dredging
Stormwater Input
Dredging
Flood Chute
Ledge
Steep Riffle
Stream Ford
M1.07-C
M1.07-B
W BARNET RD
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
0 500 1,000 1,500
Feet
Development
Encroachment
Mass Failure
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank
Erosion
Left Bank
Right Bank
Straightening
With Windrowing

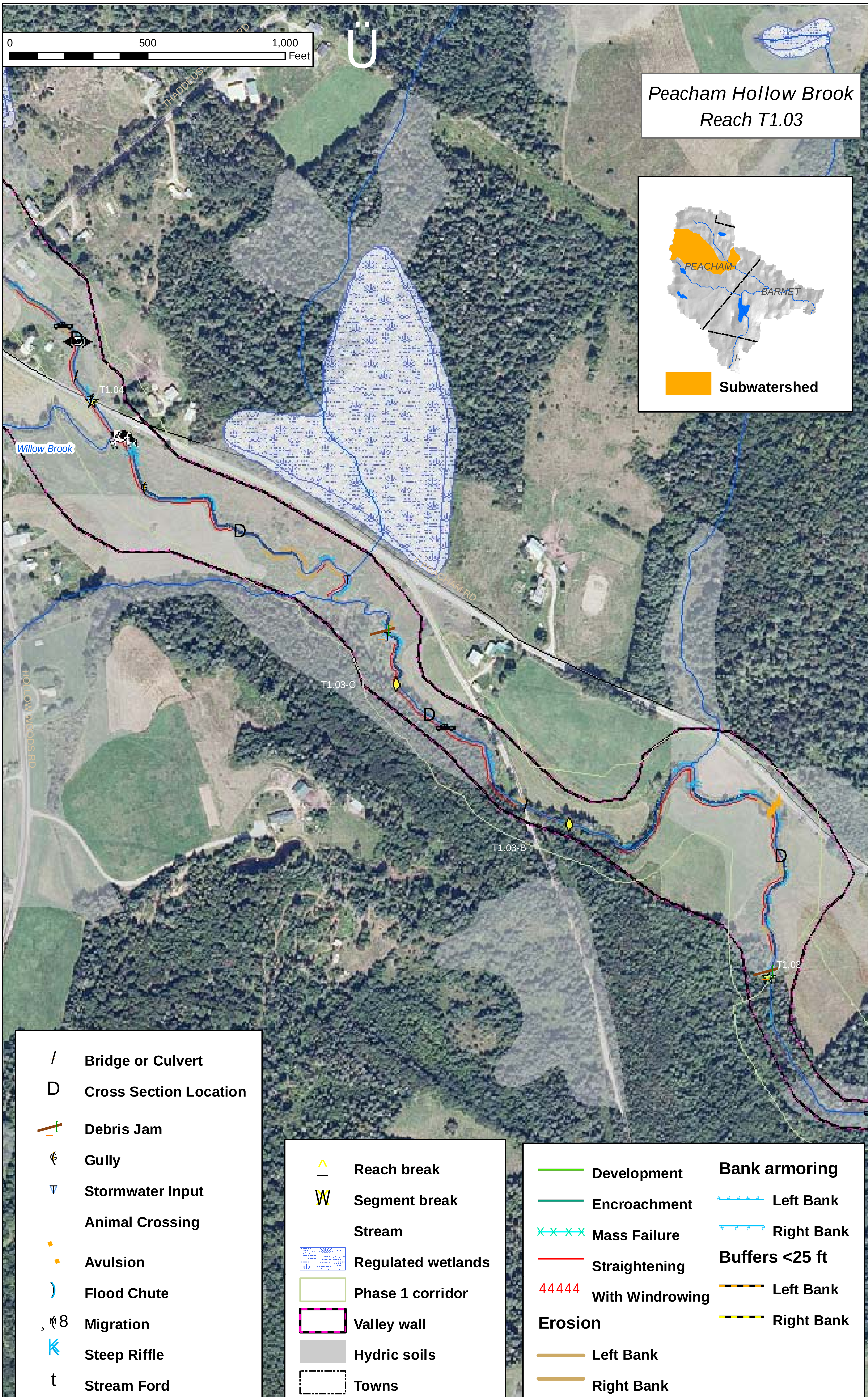


Peacham Hollow Brook
Reach T1.01
PEACHAM
BARNET
Subwatershed
Bridge or Culvert
Cross Section Location
Debris Jam
Dredging
Stormwater Input
Braiding
Dredging
Flood Chute
Ledge
Steep Riffle
Stream Ford
T1.02
T1.01
T2.01
FERGUSON RD
0
500
1,000
Feet
Development
Encroachment
Straightening
With Windrowing
Erosion
Left Bank
Right Bank
Bank armoring**
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns

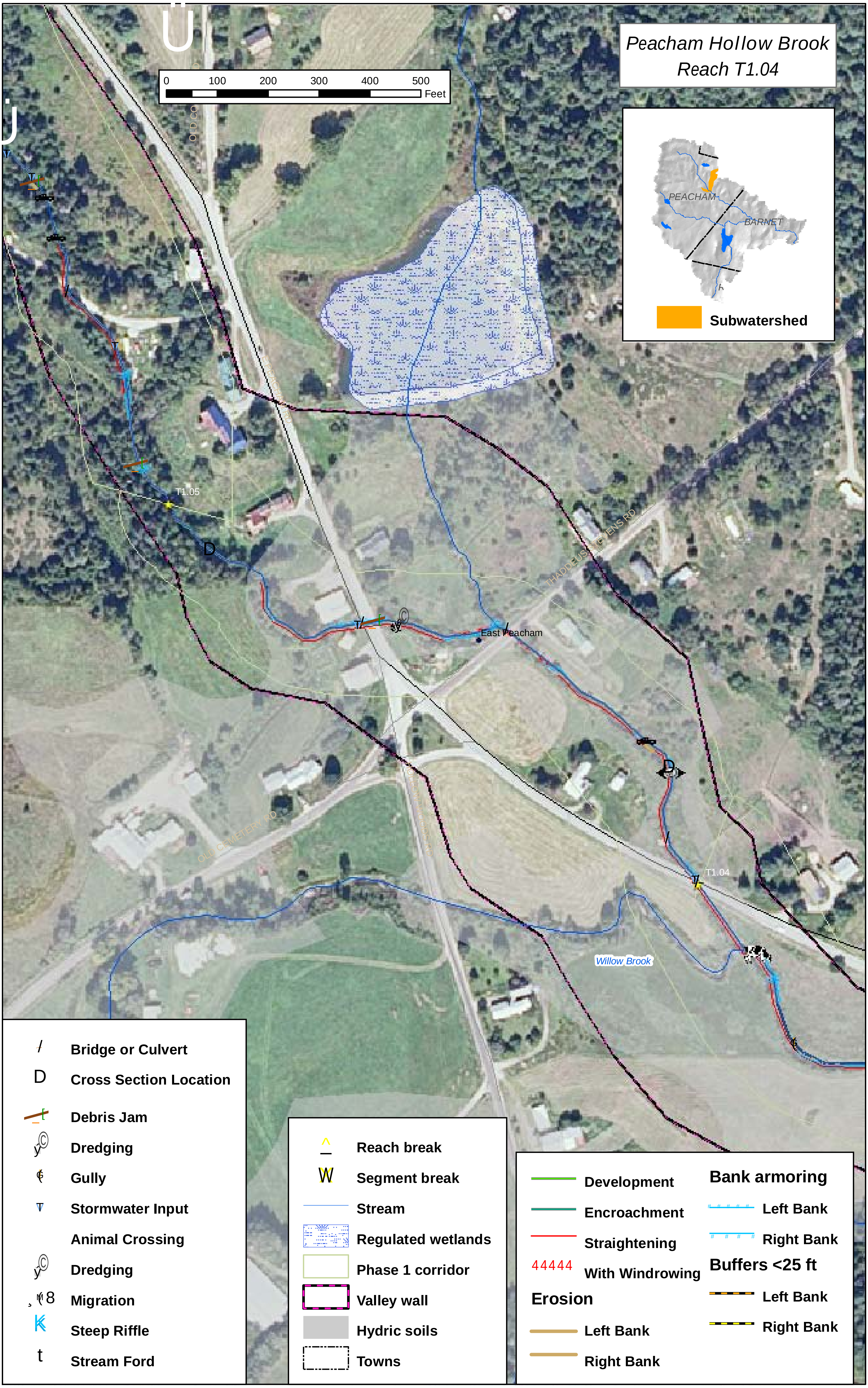

Peacham Hollow Brook
Reach T1.02 -
segments A and B
0
570
1,140
Feet
PEACHAM
BARNET
Subwatershed*
* Subwatershed indicated
is for all of reach T1.02
T1.02-C
T1.02-B
T1.02
MORRISON HILL
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
Beaver Dam
Bridge or Culvert
Cross Section Location
Debris Jam
Stormwater Input
Braiding
Flood Chute
Steep Riffle
Stream Ford
Development
Encroachment
Mass Failure
Straightening
Erosion
Left Bank
Right Bank
Bank armoring**
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank



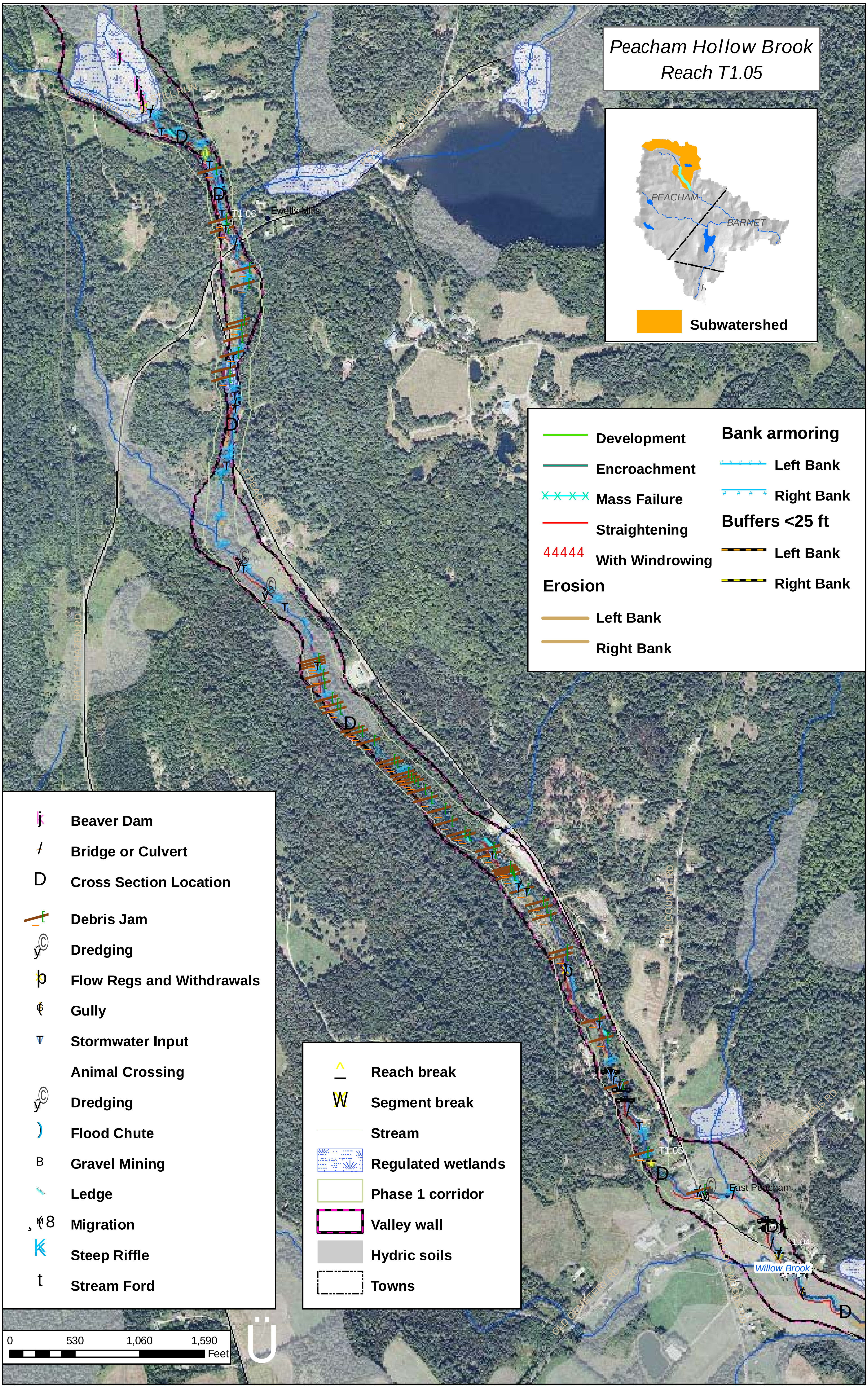
Peacham Hollow Brook
Reach T1.02 -
segments C and D
0
500
1,000
1,500
Feet
PEACHAM
BARNET
Subwatershed*
* Subwatershed indicated is for all of reach T1.02
SOMERS RD
BLANCHARD
E PEACHAM RD
STEVENSON RD
T1.03
T1.02-D
T1.02-C
Beaver Dam
Bridge or Culvert
Cross Section Location
Debris Jam
Flow Regs and Withdrawals
Stormwater Input
Avulsion
Flood Chute
Steep Riffle
Stream Ford
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
Encroachment
Mass Failure
Straightening
Erosion
Left Bank
Right Bank
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank



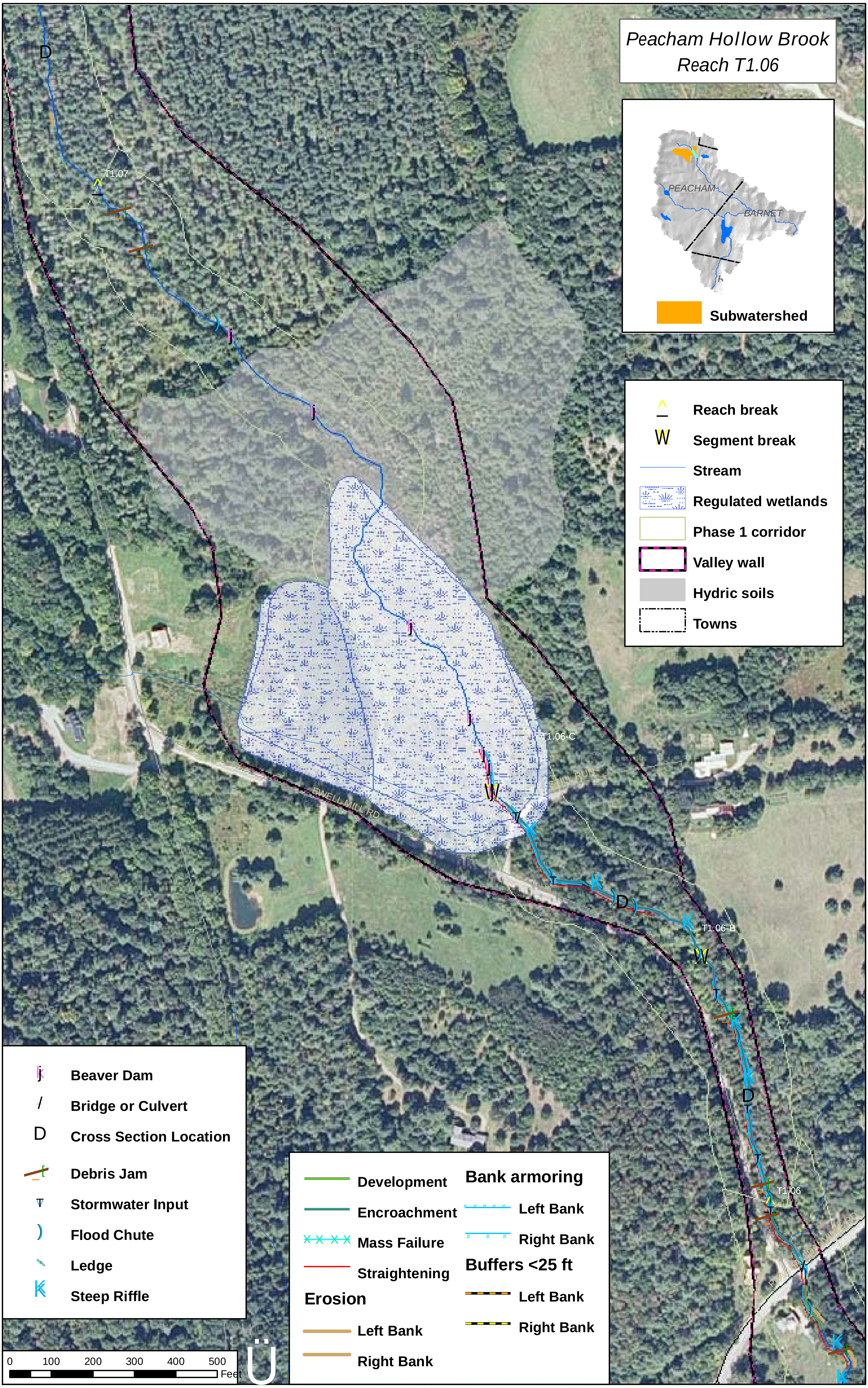
Peacham Hollow Brook
Reach T1.03
0
500
1,000
Feet
PEACHAM
BARNET
Subwatershed
Willow Brook
T1.04
T1.03-C
T1.03-B
T1.03
D
Bridge or Culvert
Cross Section Location
Debris Jam
Gully
Stormwater Input
Animal Crossing
Avulsion
Flood Chute
Migration
Steep Riffle
Stream Ford
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
Development
Encroachment
Mass Failure
Straightening
With Windrowing
Erosion
Left Bank
Right Bank
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank



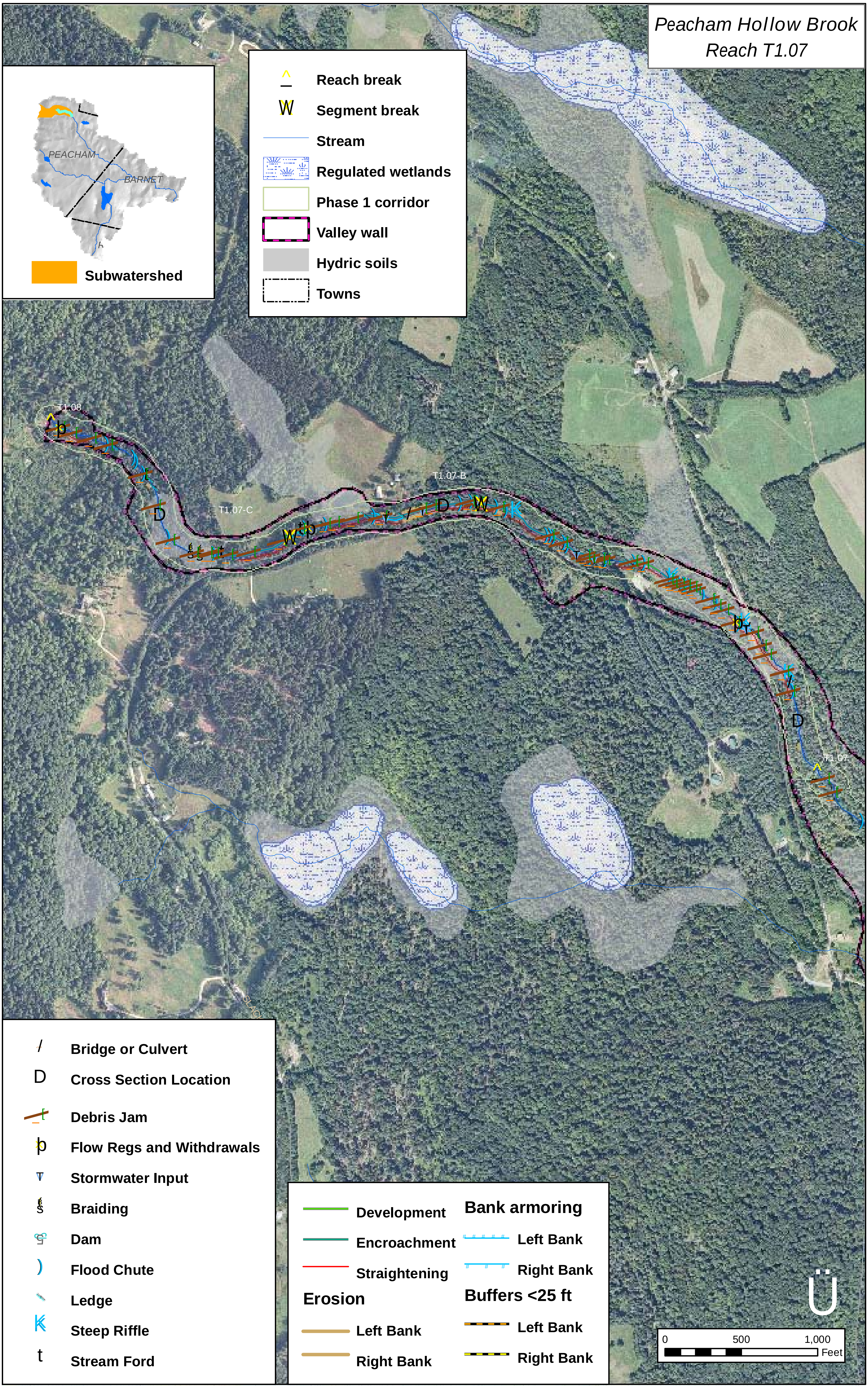
Peacham Hollow Brook
Reach T1.04
0
100
200
300
400
500
Feet
PEACHAM
BARNET
Subwatershed
T1.05
East Peacham
T1.04
Willow Brook
THADDEUS STEVENS RD
OLD CEMETERY RD
Bridge or Culvert
Cross Section Location
Debris Jam
Dredging
Gully
Stormwater Input
Animal Crossing
Dredging
Migration
Steep Riffle
Stream Ford
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
Development
Encroachment
Straightening
With Windrowing
Erosion
Left Bank
Right Bank
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank

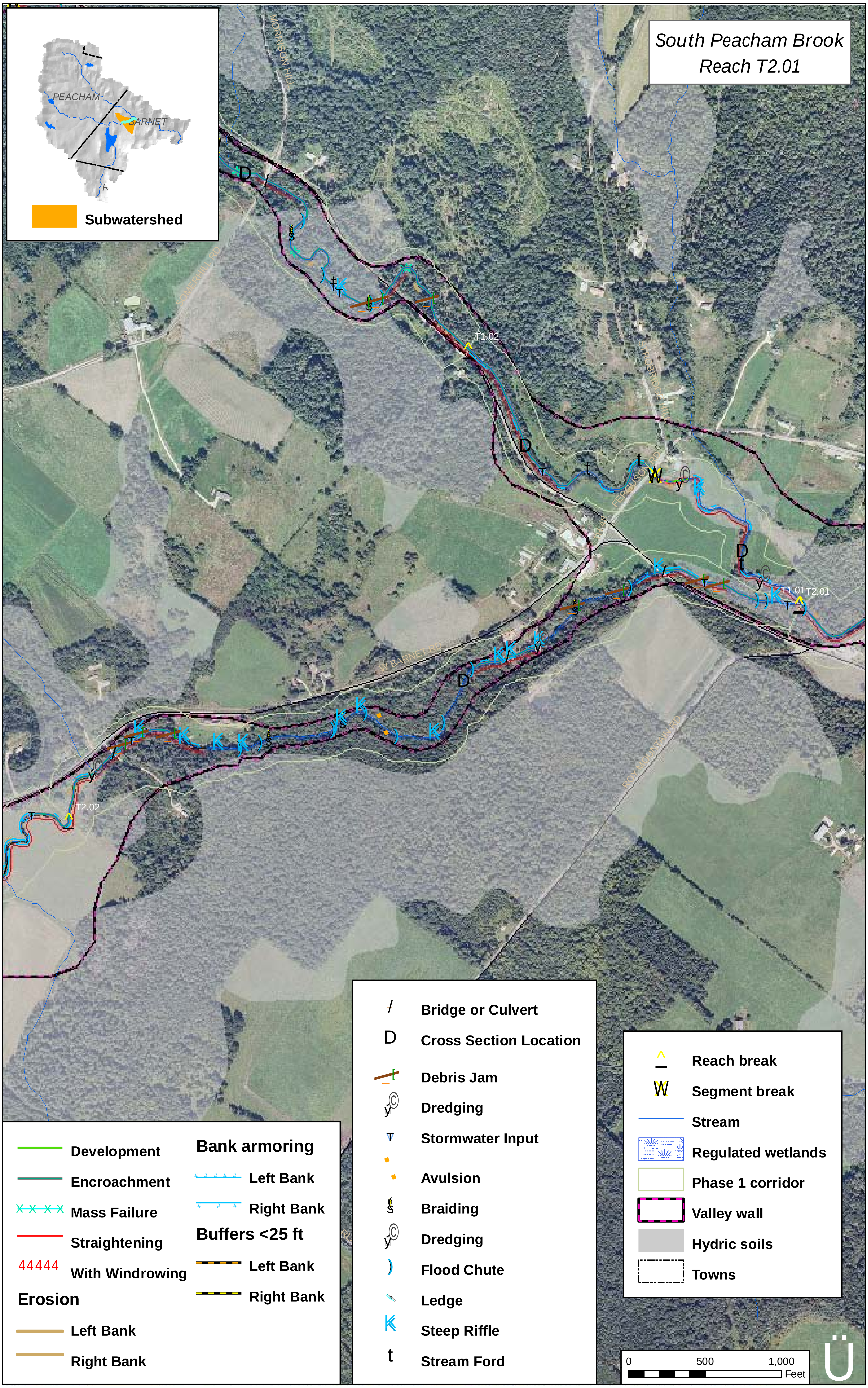


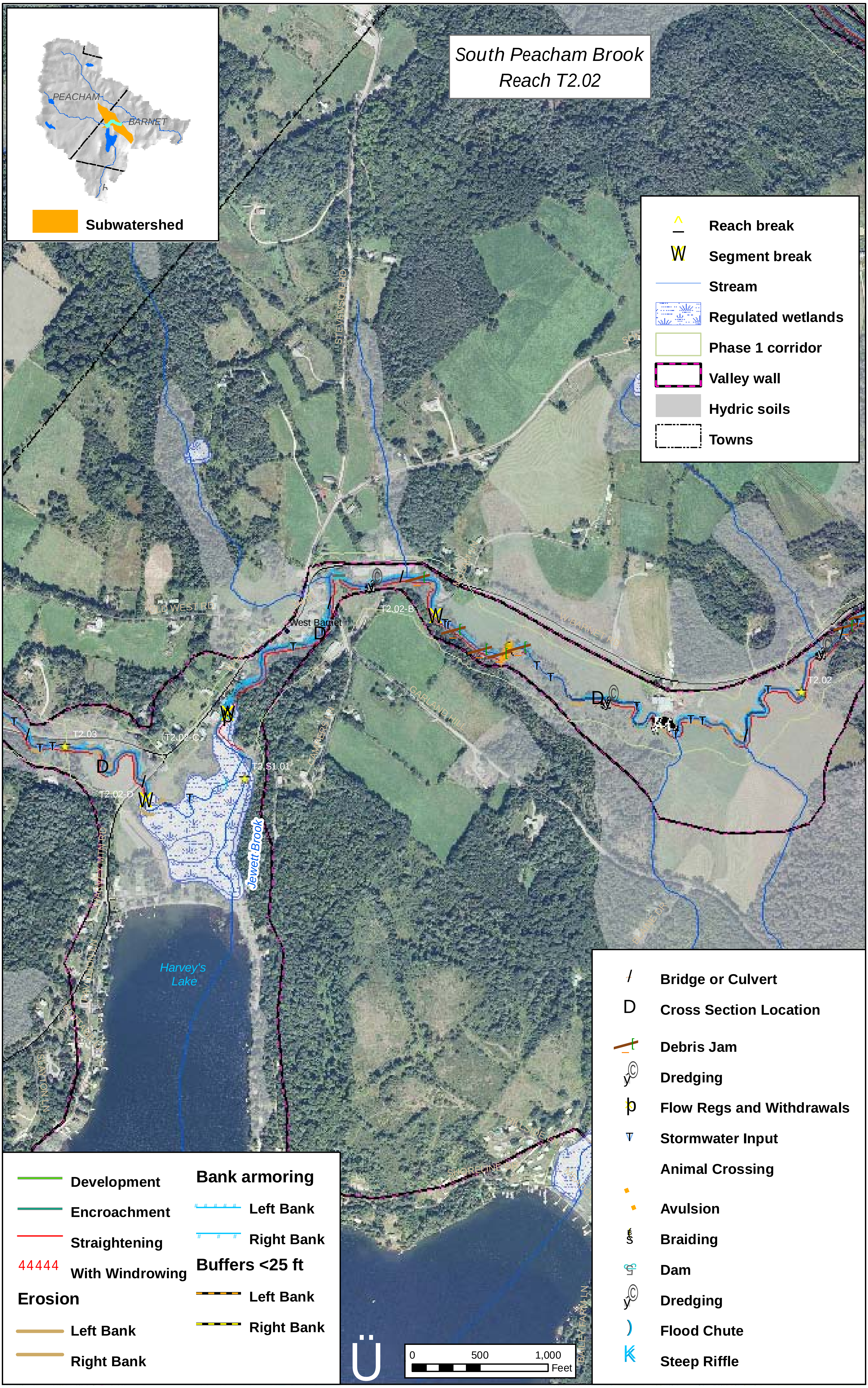
Peacham Hollow Brook
Reach T1.05
PEACHAM
BARNET
Subwatershed
Development
Encroachment
Mass Failure
Straightening
With Windrowing
Erosion
Left Bank
Right Bank
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank
Beaver Dam
Bridge or Culvert
Cross Section Location
Debris Jam
Dredging
Flow Regs and Withdrawals
Gully
Stormwater Input
Animal Crossing
Dredging
Flood Chute
Gravel Mining
Ledge
Migration
Steep Riffle
Stream Ford
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
0 530 1,060 1,590 Feet
T1.06
Ewells Mills
T1.05
East Peacham
T1.04
Willow Brook

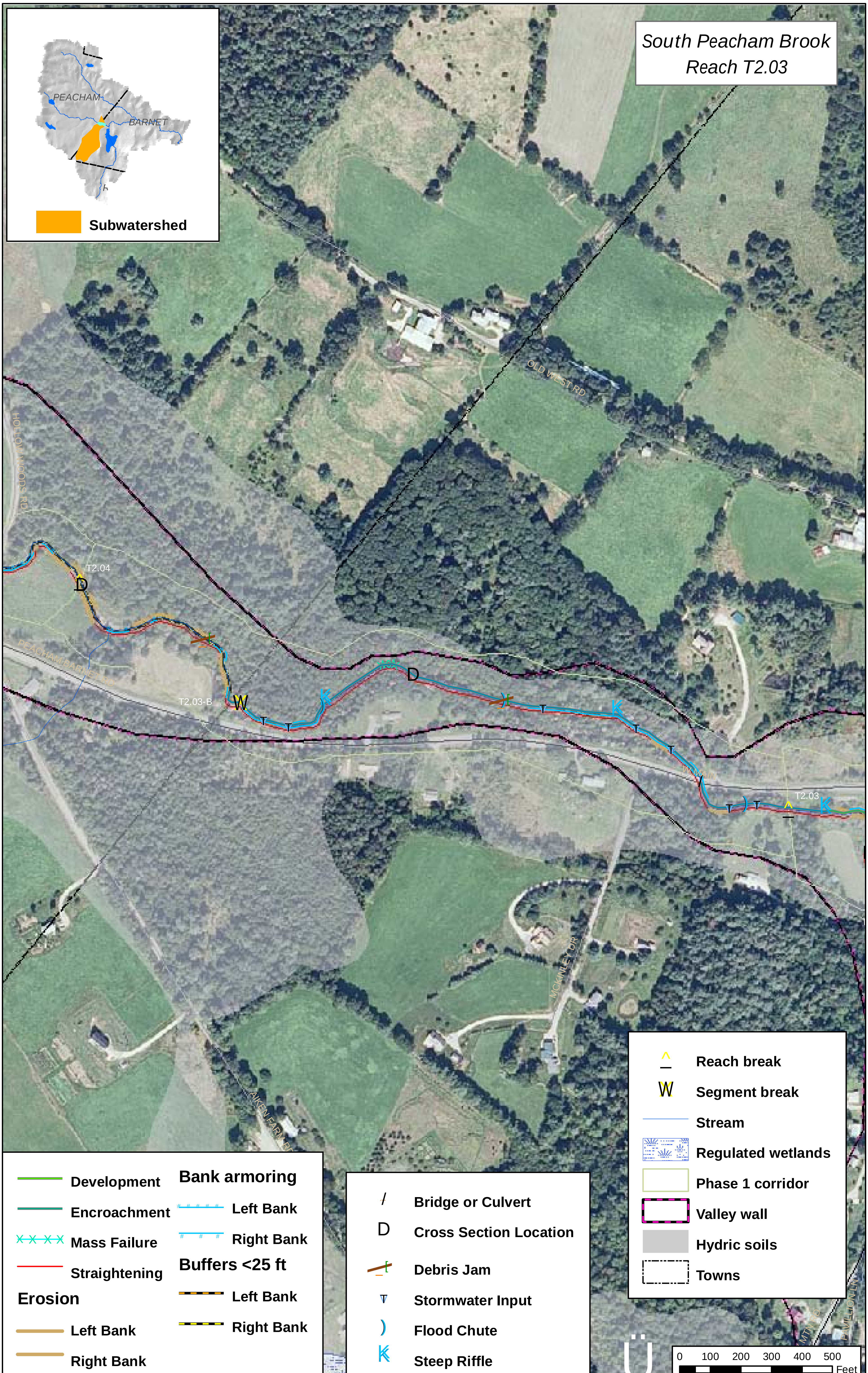


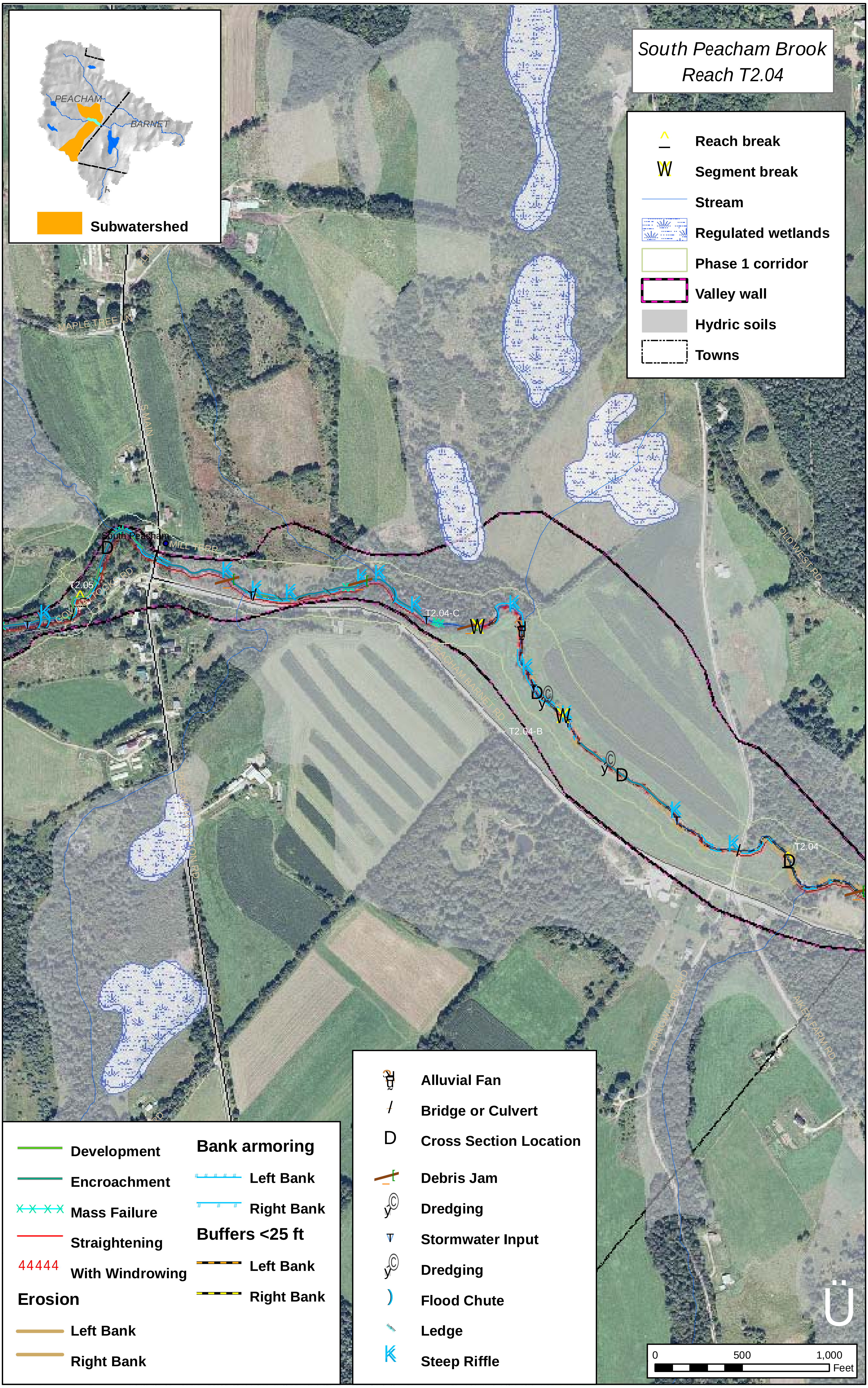
Peacham Hollow Brook
Reach T1.06
PEACHAM
BARNET
Subwatershed
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
T1.07
T1.06-C
T1.06-B
T1.06
SWELL MILL RD
Beaver Dam
Bridge or Culvert
Cross Section Location
Debris Jam
Stormwater Input
Flood Chute
Ledge
Steep Riffle
Development
Encroachment
Mass Failure
Straightening
Erosion
Left Bank
Right Bank
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank
0 100 200 300 400 500
Feet

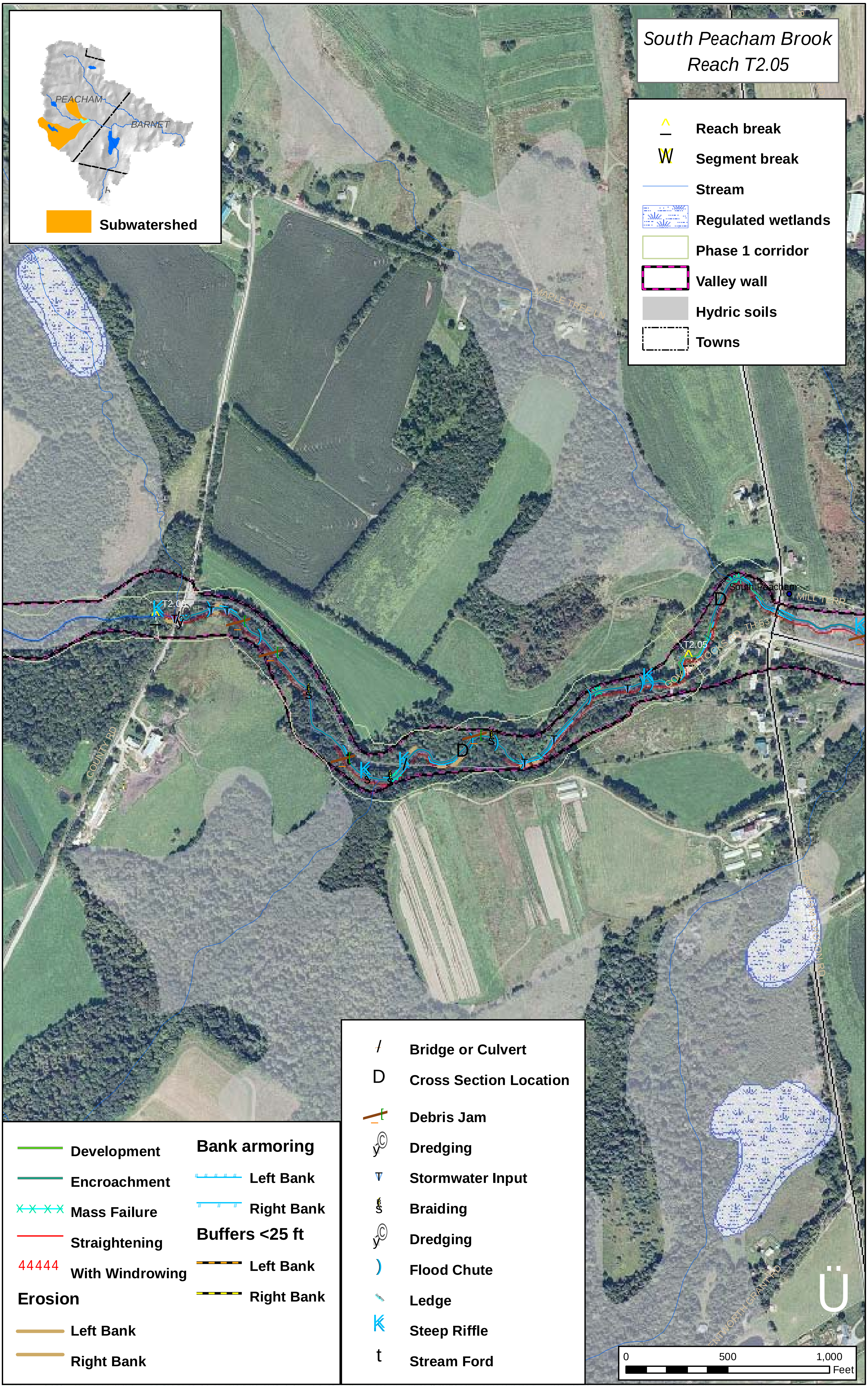

Peacham Hollow Brook
Reach T1.07
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
PEACHAM
BARNET
Subwatershed
T1.08
T1.07-C
T1.07-B
T1.07
Bridge or Culvert
Cross Section Location
Debris Jam
Flow Regs and Withdrawals
Stormwater Input
Braiding
Dam
Flood Chute
Ledge
Steep Riffle
Stream Ford
Development
Encroachment
Straightening
Erosion
Left Bank
Right Bank
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank
0
500
1,000
Feet


South Peacham Brook
Reach T2.01
PEACHAM
BARNET
Subwatershed
T1.02
T1.01
T2.01
T2.02
W BARNET RD
Bridge or Culvert
Cross Section Location
Debris Jam
Dredging
Stormwater Input
Avulsion
Braiding
Dredging
Flood Chute
Ledge
Steep Riffle
Stream Ford
Development
Encroachment
Mass Failure
Straightening
With Windrowing
Erosion
Left Bank
Right Bank
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
0
500
1,000
Feet


South Peacham Brook
Reach T2.02
PEACHAM
BARNET
Subwatershed
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
West Barnet
Jewett Brook
Harvey's Lake
T2.03
T2.02-B
T2.02-C
T2.02-D
T2.S1.01
T2.02
Bridge or Culvert
Cross Section Location
Debris Jam
Dredging
Flow Regs and Withdrawals
Stormwater Input
Animal Crossing
Avulsion
Braiding
Dam
Dredging
Flood Chute
Steep Riffle
Development
Encroachment
Straightening
With Windrowing
Erosion
Left Bank
Right Bank
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank
0
500
1,000
Feet


South Peacham Brook
Reach T2.03
PEACHAM
BARNET
Subwatershed
OLD WEST RD
HOLLOW WOODS RD
PEACHAM RD
MCKINLEY DR
AIKEN FARM RD
T2.04
T2.03-B
T2.03
D
W
Development
Encroachment
Mass Failure
Straightening
Erosion
Left Bank
Right Bank
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank
Bridge or Culvert
Cross Section Location
Debris Jam
Stormwater Input
Flood Chute
Steep Riffle
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
0 100 200 300 400 500
Feet


South Peacham Brook
Reach T2.04
PEACHAM
BARNET
Subwatershed
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
South Peacham
T2.05
T2.04-C
T2.04-B
T2.04
Development
Encroachment
Mass Failure
Straightening
With Windrowing
Erosion
Left Bank
Right Bank
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank
Alluvial Fan
Bridge or Culvert
Cross Section Location
Debris Jam
Dredging
Stormwater Input
Dredging
Flood Chute
Ledge
Steep Riffle
0
500
1,000
Feet


South Peacham Brook
Reach T2.05
PEACHAM
BARNET
Subwatershed
Reach break
Segment break
Stream
Regulated wetlands
Phase 1 corridor
Valley wall
Hydric soils
Towns
T2.06
T2.05
South Peacham
Development
Encroachment
Mass Failure
Straightening
With Windrowing
Erosion
Left Bank
Right Bank
Bank armoring
Left Bank
Right Bank
Buffers <25 ft
Left Bank
Right Bank
Bridge or Culvert
Cross Section Location
Debris Jam
Dredging
Stormwater Input
Braiding
Dredging
Flood Chute
Ledge
Steep Riffle
Stream Ford
0
500
1,000
Feet