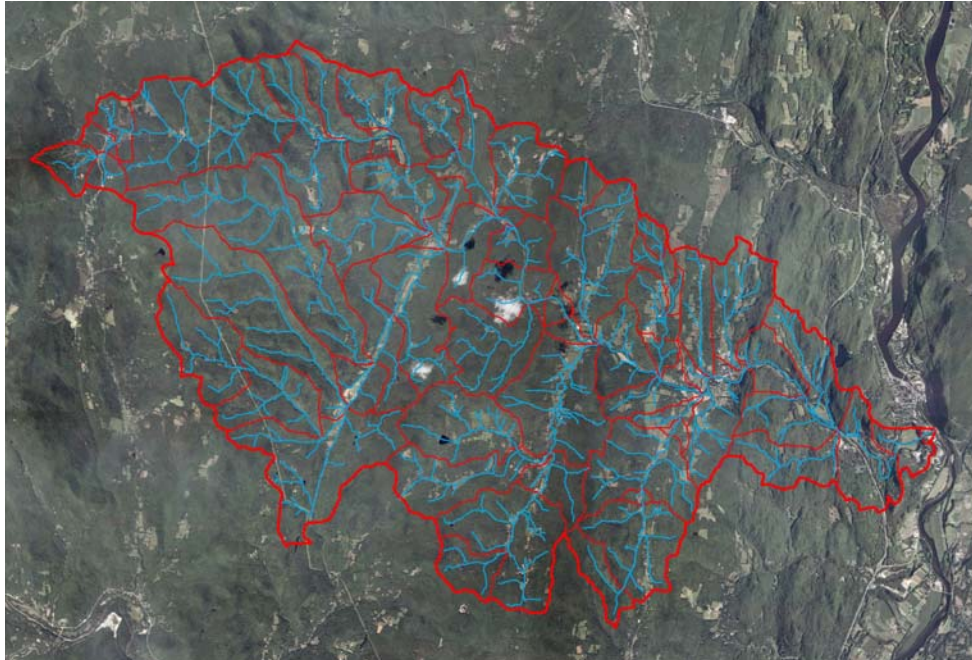


# Saxtons River Phase 1 Stream Geomorphic Assessment Summary

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**DRAFT**



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## Executive Summary

- Fitzgerald Environmental Associates, LLC. (FEA) was retained by WCNRCD in 2008 to carry out Phase 1 and 2 assessments in the Saxtons River watershed following the VTANR Stream Geomorphic Assessment (SGA) Protocols.
- The Saxtons River watershed is located in the towns of Rockingham, Westminster, Athens, Grafton, Townshend, and Windham. It has a drainage area of 77.9 square miles and outlets to the Connecticut River east of Route 5, just downstream of the village of Bellows Falls. Its mainstem surface waters are divided into the Lower and Upper Saxtons River. Six (6) major tributaries and 9 minor tributaries were identified for Phase 1 assessment.
- A total of 59 reaches along 77.2 river miles were identified during the Phase 1 analysis. The Phase 1 SGA approach resulted in watershed-scale data about the landscape (e.g., soils and land cover) and the stream channel (e.g., slope and form), providing a basis for understanding the natural and human-impacted conditions within the watershed. The SGA data also aided in the identification of specific stressors affecting the physical conditions of the stream channels and structures (e.g., bridges and culverts, bank armoring, etc).
- Approximately half (53%) of the assessed reaches are found in unconfined valley settings that would naturally support channels with a meandering profile and C or E-type geometry. The remaining reaches (47%) are found in steep, headwaters settings with confined valley geometry and A or B-type channel geometry.
- Approximately 90% of the watershed is forested, with agricultural land use representing approximately 6%. Developed lands (1.6%) are found mainly around the village centers of Bellows Falls, Saxtons River, Grafton, and Cambridgeport. Wetlands and other surface waters represent 1.5% of the watershed area.
- Impact ratings were developed for each reach using the Phase 1 parameters representing four classes of watershed and reach-scale impacts: 1) Land Cover and Reach Hydrology; 2) Channel Modifications; 3) Floodplain Modifications and Planform Changes; 4) Bed and Bank Conditions. Out of a total possible impact score of 32, the average rating for all reaches was 8, with a maximum score of 16 and a minimum score of 0 in the most remote headwaters reaches.
- Based on the Phase 1 impact ratings, a total of 20 high-priority reaches were selected for Phase 2 assessment, including 15 mainstem reaches and 5 tributary reaches. The selected reaches have a total channel length of 22.7 miles. In addition, 6 medium-priority reaches were selected for consideration due to their relatively high impact ratings.

## **1.0 Project Background**

### 1.1 Introduction and Study Goals

The Windham County Natural Resources Conservation District (WCNRCD), the Windham Regional Commission (WRC), and the Vermont Department of Environmental Conservation (VTDEC) identified the Saxtons River watershed in southeastern Vermont for assessment of fluvial geomorphic conditions. The study is part of a larger effort to characterize the physical and biological conditions of the Lower Saxtons River watershed and to aid in the identification of stressors on aquatic biota communities. In addition, the study results will form the basis for future stream corridor and Fluvial Erosion Hazard (FEH) planning efforts in the watershed. Fitzgerald Environmental Associates, LLC (FEA) was retained by WCNRCD in 2008 to carry out Phase 1 and 2 assessments following the Stream Geomorphic Assessment (SGA) Protocols developed by the Vermont River Management Program (RMP).

VTDEC used the Stream Geomorphic Assessment Tool (SGAT) to develop the baseline GIS data for the watershed in early 2008. The remaining Phase 1 data has been collected by FEA for the entire watershed. A total of 59 reaches along 77.2 river miles were identified during the Phase 1 analysis. The Phase 1 SGA approach results in watershed-scale data about the landscape (e.g., soils and land cover) and the stream channel (e.g., slope and form), providing a basis for understanding the natural and human-impacted conditions within the watershed. The SGA data also aids in the identification of specific stressors affecting the physical conditions of the stream channels and structures (e.g., bridges and culverts).

The overall goal of the RMP is to “manage toward, protect, and restore the fluvial geomorphic equilibrium condition of Vermont rivers by resolving conflicts between human investments and river dynamics in the most economically and ecologically sustainable manner,” (VTANR, 2007a) achieved through:

- Fluvial erosion hazard mitigation,
- Sediment and nutrient load reduction, and
- Aquatic and riparian habitat protection and restoration

The Phase 1 assessment of the Saxtons River will provide the basis for identifying 20 reaches for Phase 2 assessment during the 2008 field season. Detailed, reach-level data collected from the Phase 2 surveys will be used for project identification and development activities that meet the RMP goals stated above.

## 1.2 Previous Studies

VTDEC has developed a Draft Comprehensive Basin Plan for Basin 11 encompassing the West, Williams, and Saxtons River watersheds (VTDEC, 2007). This document summarizes an extensive effort to engage the basins stakeholders in a process to protect and enhance the health of the basin. The plan includes a review of previous studies, historic data, and restoration projects within the basin. The plan characterizes the basin's water quality conditions and stressors, and the current and future challenges to protecting and restoring the health of the basin's waterways. The plan asserts that the greatest concerns to water quality and aquatic habitat are, in order of priority: 1) thermal modification, 2) sedimentation, 3) physical habitat alterations, 4) flow alterations, and 5) pathogens. The stressors pertinent to the Saxtons River watershed are discussed below.

- **Thermal modification** affects 107 miles of Basin 11, impacting the aquatic biota community by increasing metabolism rates and decreasing dissolved oxygen. Thermal modification has been identified in the Saxtons River watershed as a possible stressor to the biological community in the Lower Saxtons River. Restoration projects to address this stressor can be identified using the SGA data, including riparian buffer plantings and stream corridor conservation.
- **Sedimentation** affects many river reaches in Basin 11, impacting the aquatic biota community and increasing nutrient loading to downstream waters. Sedimentation has been identified in the Lower Saxtons River as a possible stressor on the biological community. Restoration projects to address this stressor can be identified using the SGA data, including stream bank stabilization, replacement of undersized stream crossings, and conservation of sediment attenuation zones within the stream corridor.
- **Physical habitat alterations** are directly impacting the biological communities in Basin 11, including those in the Lower Saxtons River. The collection of geomorphic assessment data is recommended to identify areas where habitat can be improved or restored using passive or active stream channel management approaches.

The Saxtons River watershed has been sampled periodically by the VTDEC Biomonitoring Section, with the most recent sampling occurring in 2006. The results of the sampling indicated that the Upper and Lower Saxtons River supported good to excellent macroinvertebrate communities within the sampled riffles. In addition, sampling on the lowermost reach of Leach Brook (Reach T1.03) indicated an excellent macroinvertebrate community. Fish sampling also indicated a healthy community in the Upper and Lower Saxtons River, however the fish community in Leach Brook was rated as poor due to low densities of fish, especially native brook trout (*Salvelinus fontinalis*). A summary of macroinvertebrate and fish sampling data is provided in Appendix D.

Based on qualitative channel observations made by VTDEC Biomonitoring staff while sampling in 2006, the Lower Saxtons River has been considered a priority for future sampling (VTDEC, 2008) due to impacts on riparian vegetation and physical habitat. The VTDEC Biomonitoring Section plans to sample the fish community in the Lower Saxtons River upstream of the mouth (Reach M01) during the 2008 field season

## **2.0 Watershed Background**

### **2.1 Geographic Setting and Land Use History**

The Saxtons River watershed is located in Basin 11 in northern Windham County, Vermont (Figure 1). The watershed has a drainage area of 77.9 square miles and outlets to the Connecticut River east of the Route 5 river crossing, just downstream of the Bellows Falls. The watershed spans the towns of Rockingham, Westminster, Grafton, Athens, Windham and Townshend (Figure 2). The mainstem of Saxtons River heads to the north of the village of Windham and flows in an easterly direction along Route 121. In the Village of Grafton the mainstem meets the South Branch entering from the south, and Hinkley Brook entering from the west. Continuing east from Grafton, the Saxtons meets Bull Creek and Weaver Brook in the Village of Cambridgeport. This point represents the division of the Upper and Lower Saxtons River basins (Figure 3).

Downstream of Cambridgeport, Leach Brook enters the mainstem from the north about a mile upstream of the Village of Saxtons River. East of Saxtons River the mainstem meets the confluence with Bundy Brook entering from the south at 1 mile upstream of the river mouth.

Land cover data based on imagery from 2006 (NOAA, 2008a) are summarized in Table 1. The Saxtons River is drained by a rural watershed, with forest representing the dominant cover type. Agricultural lands only cover 6.1% of the watershed, with a majority of larger farmlands found in the lower watershed downstream of Cambridgeport. The wide, alluvial valleys associated with Bull Creek and the South Branch continue to support extensive agricultural lands, including hayfields and pasture for cows, horses and sheep. There is limited developed in the watershed, with only 1.6% coverage. Concentrated areas of residential development are found primarily around the three main villages along Route 121: Saxtons River, Grafton, and Cambridgeport.

**Table 1. Land Cover Data for Saxtons River watershed and sub-basins.**

Land Cover Type	South Branch (T6)*	Upper Saxtons River (M09-M24;T6)	Bull Creek (T4)**	Lower Saxtons River (M01-M08;T1-T5)	Entire Watershed
Developed	0.2%	0.5%	0.5%	3.0%	1.6%
Agriculture	2.8%	4.0%	6.7%	8.7%	6.1%
Forest	95.9%	94.4%	91.3%	86.3%	90.8%
Wetland	1.1%	1.1%	1.0%	1.8%	1.4%
Open Water	0.1%	0.1%	0.4%	0.2%	0.1%

\* Includes Stiles, Willie and Howe Brooks

\*\* Includes Athens Brook

*Historical Land Uses*

Historically, the impacts of agricultural practices on the Vermont landscape played an important role in the legacy effects on waterways like the Saxtons River. Prior to the deforestation associated with human settlement, the watershed would have been a mixture of deciduous forest on the valley floors, coniferous forest along the mountain spines, and a mixture of both along the slopes. Deforestation and grazing, largely from sheep farms, likely left over 90 percent of the watershed devoid of trees at one time or another (Albers, 1998). This landscape change had a tremendous impact on waterways like the Saxtons River. Exposed, highly-erodible soils (e.g. glacial tills) on steep slopes was carried to the valley floors where it aggraded on river bottoms; a legacy that still influences the way Vermont’s rivers are managed today.



Figure 1. Watershed location map for the Saxtons River watershed.

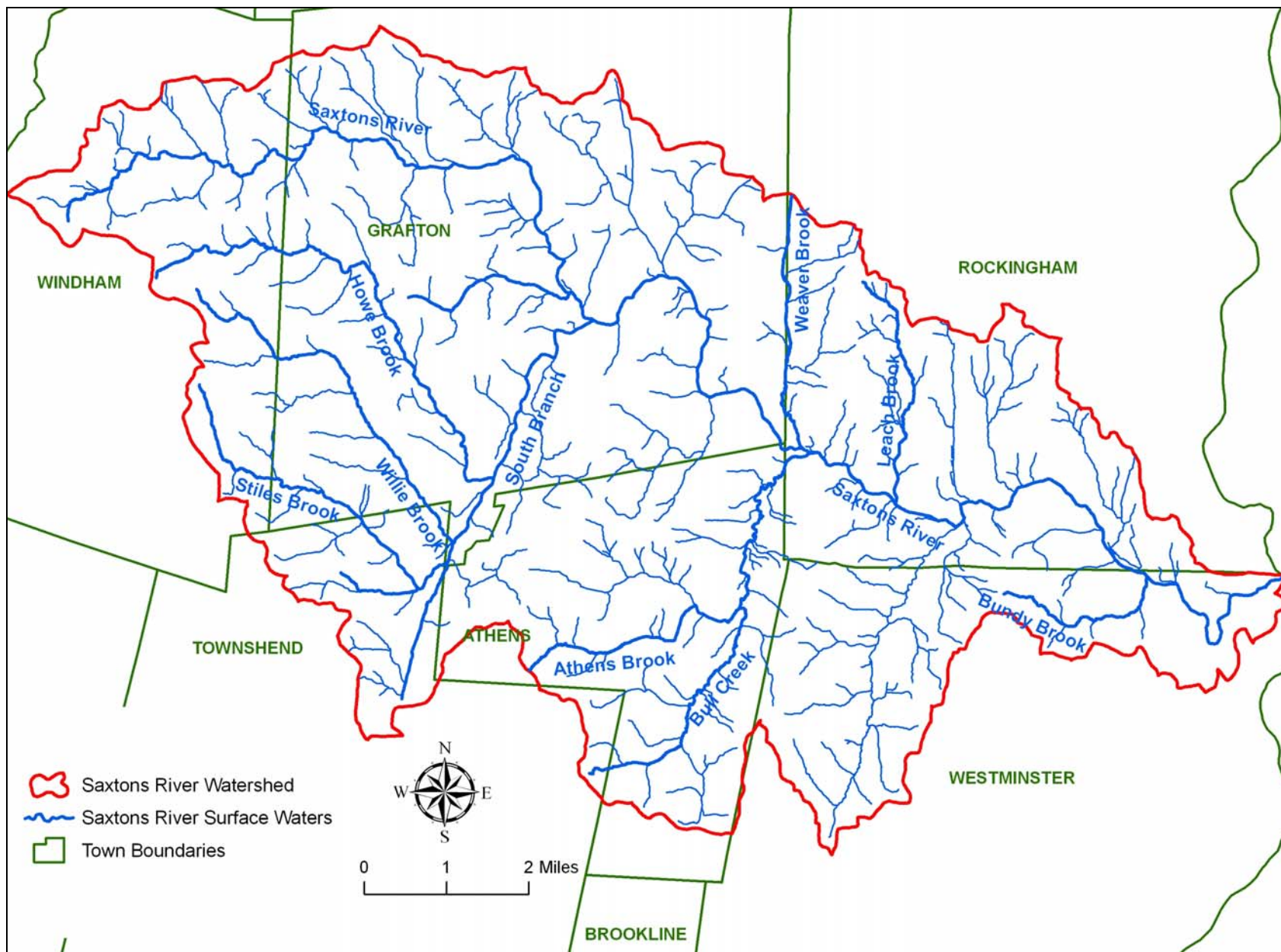


Figure 2. Saxtons River watershed, surface waters, and town boundaries.

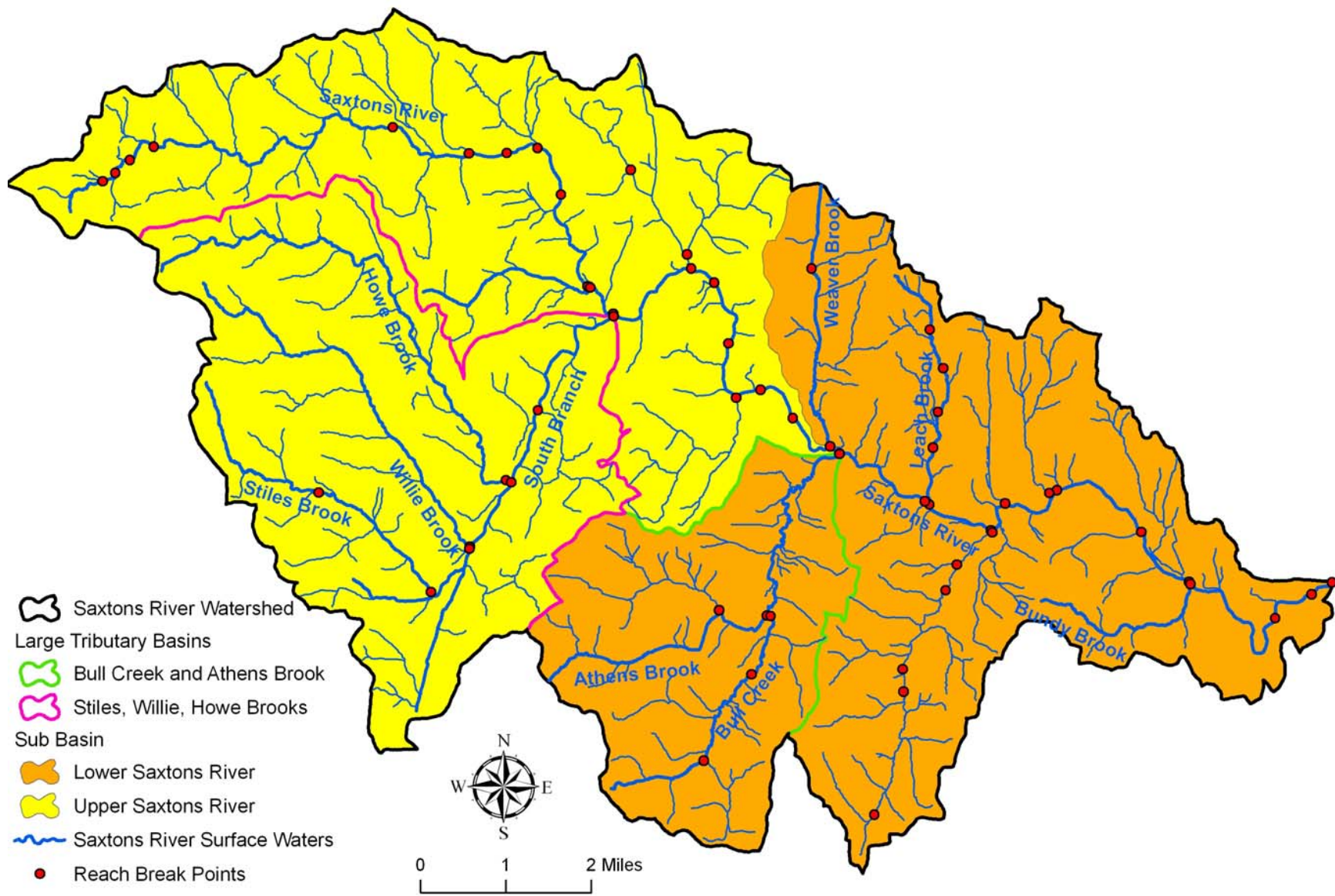


Figure 3. Saxtons River subwatersheds and reach breaks.

As Vermont's farmers began to move to the Midwest in search of more productive farmland in the mid to late 1800's, the deciduous forests along the mountain slopes began to recover (Albers, 1998). Throughout the early and mid 1900's, as more family farms found on marginal lands were given up, the forests continued to recover. Today, approximately 90 percent of the Saxtons River watershed is covered by forest. With the increasing tourism sector in the state, and the need for lumber for second-homes and construction, forestry has replaced agriculture in many of the rural hill slopes of Vermont.

## 2.2 Geologic and Geomorphic Setting

### *Geologic Setting*

The underlying geology of the Saxtons River watershed is comprised of mixture of rock types from the Devonian, Ordovician, and Precambrium eras (Doll et al., 1961). The Waits River Formation, which contains a mixture of schist and marble, is found in the eastern section of the watershed. The Missisquoi formation, found mainly in the western section of the watershed, contains a mixture of quartzites, schists and phyllites. The weathering of calcium carbonate rich (sea bottom) sediments in these formations results in basic soils that typically support communities of rich woods species.

The presence of Glacial Lake Hitchcock also had a significant effect on the surficial geology of the lower watershed, perhaps as far upslope as reach M05. This lake occupied the Connecticut River Valley from central Connecticut north to St. Johnsbury during the retreat of the Laurentide ice sheet beginning approximately 18,000 years ago (Ridge and Larson, 1990). The great size of the lake, combined with the erosive forces of the glacier moving over bedrock surfaces allowed for the development of annual layering of fine sediments (e.g., varves) throughout the area affected by the lake.

### *Geomorphic Setting*

The Saxtons River has two main branches and a minimum of 4 significant tributaries. The mainstem of the Saxtons River has an overall channel slope of 1.8%, with significant differences in the reference valley and channel morphology between the Upper and Lower basins. The Lower Saxtons River (Reaches M01 – M08) has an overall channel slope of 0.8%, and most of the reaches are found in unconfined valley settings with significant alluvial deposits found within. The Upper Saxtons River (Reaches M09 – M24) has an overall channel slope of 2.4%, and the reaches are found in both unconfined and confined valley settings typical of Vermont headwaters channels.

The first major tributary stemming southward from the mainstem in the Lower Saxtons River Basin is Bull Creek (T4). Bull Creek is found in an unconfined, alluvial valley and has an overall channel slope of 1.0%. The final reach of Bull Creek (T4.04) is a headwaters reach found in a steep, confined valley with a slope of approximately 7%. The South Branch (T6) has an overall channel slope of 1.5%, and the channel is found in a very broad, unconfined alluvial valley. Entering the South Branch from the west are three steep, headwaters tributaries known as Howe, Willie, and Stiles Brooks. The reaches associated with these tributaries all have gradients above 3% and are found in confined valley settings. A summary of the average channel slopes for the mainstem and major tributaries is found below in Table 2.

**Table 2. Average Channel Slopes for Mainstem and Tributary Channels.**

<b>Channel (SGA Reaches)</b>	<b>Average Slope</b>
Saxtons River (M01 – M24)	1.8%
Lower Saxtons River (M01 – M08)	0.8%
Upper Saxtons River (M09 – M24)	2.4%
Bull Creek (T4.01 – T4.03)*	1.0 %
South Branch (T6.01 – T6.04)	1.5%
Howe Brook (T6.S1.01)	3.4%
Willie Brook (T6.S2.01)	4.5%
Stiles Brook (T6.05 – T6.06)	3.8%

\* Average slope is 2.1% with inclusion of high gradient reach T4.04

### 2.3 Hydrology and Flood History

The United States Geological Survey (USGS) operates a real-time flow monitoring gauge on the lower Saxtons River approximately 3.9 miles upstream of the confluence with the Connecticut River (USGS, 2008). The gauge is found within SGA reach M05, and has an upslope drainage area of 72.2 square miles. The gauge was operated by USGS from 1940 to 1982 and then abandoned from 1983 until 2002. It has since been operating from 2002 until present. Thus, the period of record spans a total of 48 years. The Saxtons River flow data from 1940 to 1982 was included in a USGS study to summarize the flow-frequency characteristics of Vermont rivers and streams (Oslen, 2002). The magnitude and return frequency data produced from this study for the Saxtons River gauge are included below in Table 3.

**Table 3. Frequency and Magnitude of Saxtons River Discharge**

Return Frequency	Discharge (cfs)
2 year	2,640
5 year	4,180
10 year	5,420
25 year	7,270
50 year	8,860
100 year	10,600
500 year	15,700

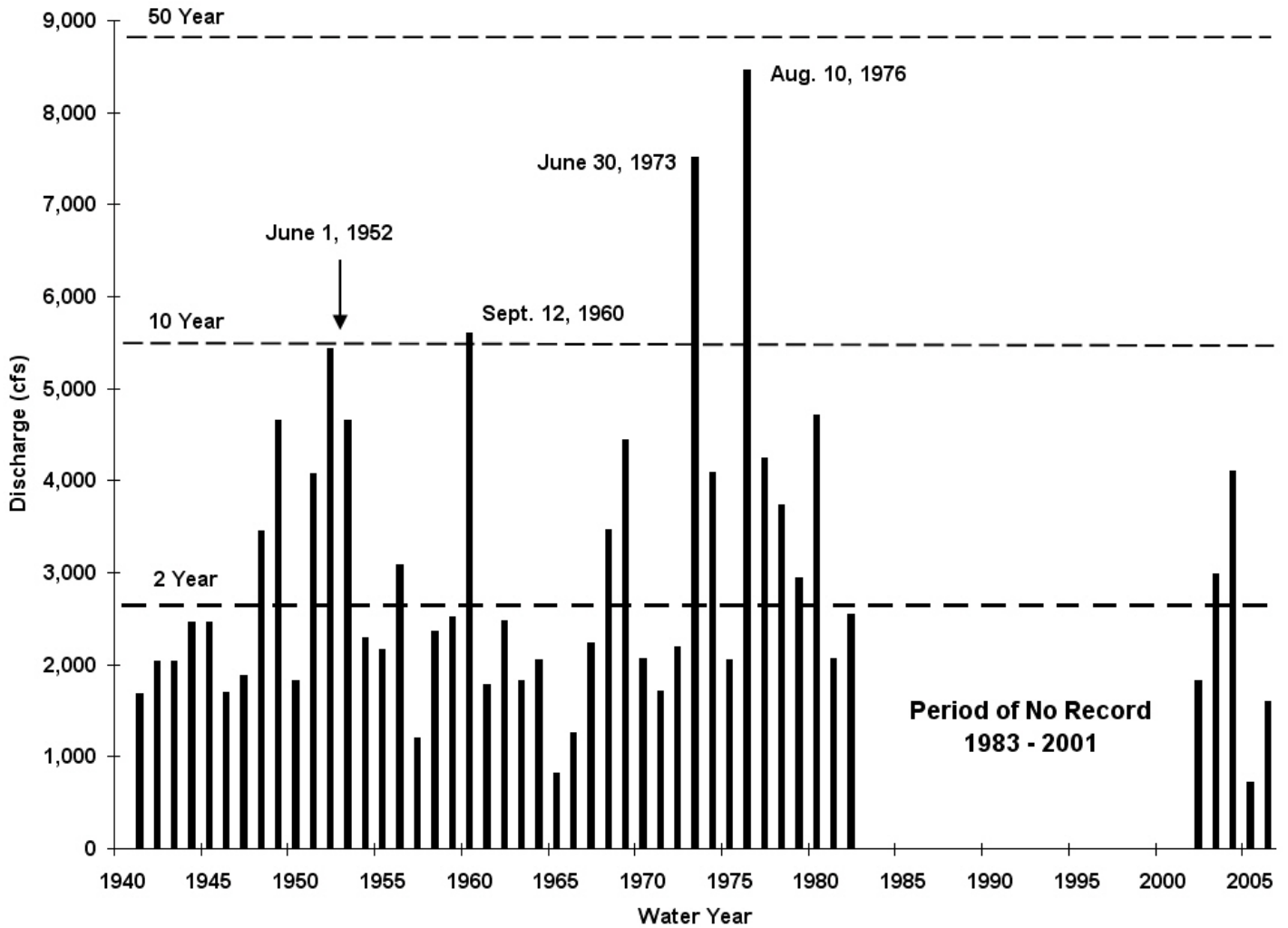


Figure 4. Annual peak discharges for USGS Gauge # 01154000 at Saxtons River, VT.  
 Estimated flow-frequency data from Olsen (2002).

Figure 4 summarizes the annual peak discharges on the Saxtons River during the period of record. There are several historical flood events that are noteworthy. The June 1 flood of 1953 was a 10 year return event that was widespread throughout southern Vermont (USGS, 2008). The September 12, 1960 event was also a 10 year event that caused flooding in other basins throughout the state. The two larger events in the 1970's both exceeded the 25 year magnitude, and caused widespread flooding and damage throughout Vermont. The 1976 event, a result of heavy rainfall associated with Hurricane Belle, caused tremendous damage throughout the state and resulted in the second highest amount of federal disaster assistance to the state of Vermont (VEM, 2007). In June of 1996 approximately 11 inches of rain fell in 24 hours in the vicinity of Grafton, causing widespread road and infrastructure failures (including the destruction of a covered bridge) that exceeded \$1,000,000. Major damage from road and culvert washouts was concentrated along Fire Pond, Middletown, and Hinkley Brook roads to the southwest of Grafton village (R. Doherty, 2008). No streamflow data was available for this event because the USGS gauge was not in operation.

#### 2.4 Ecological Setting

With the exception of the upper headwaters reaches west of Grafton village, the Saxtons River watershed is found within the Southern Vermont Piedmont (SP) Biophysical Region (Thompson and Sorenson, 2000). The headwaters reaches upstream of Reach M17, as well as Stiles, Willie, and Howe Brooks are found within the Southern Green Mountain (SM) Biophysical Region. This SP region is found along the eastern border of Vermont and extends from White River Junction down to Massachusetts. It is characterized by gentle rolling hills and bedrock geology that supports Northern Hardwood Forest communities. Some areas of igneous intrusions (e.g., granitic plutons), such as Ascutney Mountain and Black Mountain to the west Brattleboro, support rare communities such as the Pitch Pine-Oak-Heath community. Rich soils of loam and silt along the Connecticut River that once supported extensive areas of silver maple (*Acer saccharinum*) and ostrich fern (*Matteuccia struthiopteris*) were converted to agricultural use during European settlement in the late 18<sup>th</sup> century. Post-glacial deposits of sand and gravel are common in the river valleys of the SP region, including the mainstem and tributary valleys in the Saxtons River watershed.

Elevations within the watershed range from 228 feet at the confluence with the Connecticut River, up to approximately 2,870 feet in the headwaters area north of Windham village. With an average annual rainfall of 40.2 inches (NOAA, 2008b) and a

temperate climate, the forest cover is comprised primarily of mixed hardwood tree species, with areas of white pine (*Pinus strobus*) and eastern hemlock (*Tsuga Canadensis*) found within younger growth and along steeper slopes, respectively.

Extensive wetlands occupy large areas within the watershed along the mainstem and tributaries (NWI, 2003). Along the mainstem a series of significant wetlands are found along Reach M09 just upstream of the confluence of Bull Creek and Weaver Brook. Along headwaters reaches M20, M21, and M22 there is another stretch of significant wetlands through which a low gradient channel flows. Along the low gradient tributary reaches of Bull Creek (T4.01 and T4.02) there are extensive wetlands in the wide alluvial valley. In addition, significant wetlands are found along the lower reach of Weaver Brook (T5.01) upstream of Route 121. These large wetland areas provide important flood control and water quality protection functions, and support continued inputs of subsurface and groundwater during the low flow periods of the year. These functions are maximized in areas where the wetland is contiguous with the channel and undisturbed by agricultural ditching or development, such as in reaches M09, M20 through M22, T5.01, and the middle section of T4.01

### **3.0 Data Collection**

#### **3.1 Data Collection Methods**

The Vermont River Management Program (RMP) has invested many person-years of effort into developing a state-of-the-art system of Stream Geomorphic Assessment (SGA) protocols. The SGA protocols are intended to be used by resource managers, community watershed groups, municipalities and others to identify how changes to land use affect hydro-geomorphic processes at the landscape and reach scale, and how these changes alter the physical structure and biological habitat of streams in Vermont. The SGA protocols have become a key tool in the prioritization of restoration projects that will 1) reduce sediment and nutrient loading to downstream receiving waters such as Lake Champlain and the Connecticut River, 2) reduce the risk of property damage from flooding and erosion, and 3) enhance the quality of instream biological habitat. The protocols are based on defensible scientific principles and have been tested widely in many watersheds throughout the state. Data collected for the Saxtons River watershed using the protocols will form the basis for preliminary project identification carried out during future River Corridor Planning efforts.

The SGA protocols include three phases (VTANR, 2007b):

- Phase 1:** The Phase 1 SGA approach utilizes the Stream Geomorphic Assessment Tool (SGAT), a GIS extension developed by RMP for the collection of reach and watershed scale data. In addition to the GIS and remote sensing effort, a cursory field assessment (“windshield survey”) is included for the verification of stream and valley forms, significant channel features and the location of man-made infrastructure. The Phase 1 SGA approach results in watershed-scale data about the landscape (e.g., soils and land cover) and the stream channel (e.g., slope and form), which provides a basis for understanding the natural and human-impacted conditions within the watershed. The SGA data also aids in the identification of specific stressors affecting the physical conditions of the stream channels and structures (e.g., bridges and culverts). Table 4 summarizes the parameters collected in Phase 1 using the Feature Indexing Tool (FIT), which include those utilized to develop the final impact ratings.
- Phase 2:** The Phase 2 approach builds upon Phase 1 data through the collection of reach-specific data about the current physical conditions. Characterization of reach conditions utilizes a suite of quantitative (e.g., channel geometry, pebble counts) and qualitative (e.g., pool-riffle habitat) measurements to calculate two indices: Rapid Geomorphic Assessment (RGA) Score; Rapid Habitat Assessment (RHA) score. Using the RGA scores in conjunction with knowledge about the background or “reference” conditions, a sensitivity rating is developed to predict the degree to which the channel will adjust to human impacts in the future. Table 4 summarizes the parameters collected and verified in Phase 2 using the Feature Indexing Tool (FIT).

**Table 4. Parameters Collected with FIT**

<b>Phase 1 Step</b>	<b>Phase 2 Step</b>	<b>Data Type</b>	<b>Impact</b>	<b>Sub-Impact</b>
<b>3.1</b>	<b>1.2</b>	Point	Alluvial Fan	NA
<b>3.2</b>	<b>1.6</b>	Point	Grade Control	Dam Ledge Waterfall Weir
<b>NA</b>	<b>3.3</b>	Point	Mass Failure	NA
<b>5.5</b>	<b>5.5</b>	Point	Dredging	Dredging Gravel Mining

				Commercial Mining
NA	4.4	Point	Debris Jam	NA
NA	4.6	Point	Stormwater Input	NA
NA	4.9	Point	Beaver Dam	NA
NA	5.2	Point	Migration	Neck Cut Off Flood chute Avulsion Braiding
NA	5.3	Point	Steep Riffle or Head Cut	Head Cut Steep Riffle
NA	5.4	Point	Stream Crossing	Stream Ford Animal Crossing
NA	3.3	Point	Gully	NA
6.2	1.3	Line	Development	NA
6.1	1.3	Line	Encroachment	Berm Improved Path Road Railroad
5.3	3.1	Line	Bank Armoring or Revetment	Rip-Rap Hard Bank Other
7.2	3.1	Line	Erosion	NA
5.4	5.5	Line	Straightening	Straightening With Windrowing

- **Phase 3:** Phase 3 surveys involve the collection of detailed, reach-scale survey data to verify or build upon Phase 2 data. These surveys are typically carried out prior to project development for an “active” channel management approach (e.g., floodplain restoration), or for long-term monitoring purposes.

VTDEC used SGAT to develop the baseline data layers for the watershed. The remaining Phase 1 data has been collected remotely and with windshield surveys by FEA for 59 reaches along 77.2 river miles. All major human impacts and natural features were indexed in a GIS using the Feature Indexing Tool (FIT; VTANR, 2007b).

### 3.2 Phase 1 Quality Assurance

The RMP Quality Assurance (QA) protocols outlined in the SGA protocols (VTANR, 2007b) were followed in order to ensure a complete and accurate dataset. RMP assumed full responsibility for QA for the SGAT shapefiles, as these were developed and processed in-house. RMP staff shared responsibility with FEA for the QA of the finalized Phase 1 dataset. All metadata describing the data sources were entered in the Data Management System (DMS), with extraordinary sources noted in the comments section

in Step 7. Two separate QA reviews were completed by RMP staff following the completion of Steps 2 and 7. A written record of the QA issues raised by RMP, and responses from FEA is included in Appendix C. The DMS database for Phase 2 reaches was finalized in July, 2008.

## 4.0 Results

### 4.1 Reach Delineations

The 77.2 miles of assessed surface waters within the Saxtons River watershed were divided into 59 reaches during the SGAT analysis carried out by VTDEC. Reach divisions were based on changes in valley geometry, channel slope, and the size and influence of tributaries entering the mainstem channel (VTANR, 2007b). Six major tributaries (e.g., drainage area exceeds 10% of mainstem drainage area at confluence) were identified during the SGAT analysis (see Figure 3). Table 5 summarizes data for the mainstem and tributary watersheds. Detailed information about each reach location is found in the reach reports in Appendix B.

**Table 5. Mainstem and Tributary Summary Data**

DMS ID	Name	Watershed Area (square miles)	Assessed River Length (mi)*	Number of Assessed Reaches*
M	Saxtons Mainstem	77.9	33.3	31
T1	Bundy Brook	1.2	2.4	1
T2	Unnamed Tributary	5.4	4.8	6
T3	Leach Brook	1.7	3.2	5
T4	Bull Creek	11.2	9.7	6
T5	Weaver Brook	3.3	3.4	2
T6	South Branch	20.0	20.3	8

\* includes subtributary reaches (e.g., M06-S1.01, T4.S1.01)

### 4.2 Reference Stream Types

Remotely collected data of valley confinement, channel slope, and sinuosity were used to develop reference stream types for the assessed reaches according to the Rosgen (1994) and Montgomery and Buffington (1997) classification systems. Characterization of reference stream types is based on the channel forms and processes we would expect in a particular geologic and geomorphic setting without human influences. Detailed information about each reach reference stream type is found in the watershed summary data and reach reports found in Appendices A and B, respectively. Table 6 presents

general valley and channel characteristics associated with reference stream types found in the Saxtons River watershed.

**Table 6. Reference Stream Type Characteristics**

Stream Type	Valley Confinement	Channel Slope	Sinuosity	Bedform	Number of Study Reaches*
A	Confined	> 4%	Low	Cascade or Step-pool	15 (25%)
B	Confined	2 – 4%	Low	Step-pool or Plane bed	13 (22%)
C	Unconfined	< 2%	Moderate	Riffle Pool	28 (47%)
E	Unconfined	< 2%	High	Riffle Pool or Dune-Ripple	3 (5%)

\* Number of reaches and percentage of total reaches represented by type.

Figure 5 presents the location of the reference stream types developed for the Saxtons River watershed. A majority of the reaches (49%) in the watershed are C-type under reference conditions. This stream type is typically characterized by a moderately sinuous channel found in a broad, unconfined valley setting with a balance between the upslope sediment supply and the transport capacity. Forty-five (45) percent of the reaches are characterized by steep channels in confined valley settings that are dominated by sediment transport processes. These reaches are mainly found in the upper headwaters areas of the watershed. Only three (3) reaches were characterized as E-type channels, where very broad valley settings and sediment depositional processes support a sinuous channel planform.

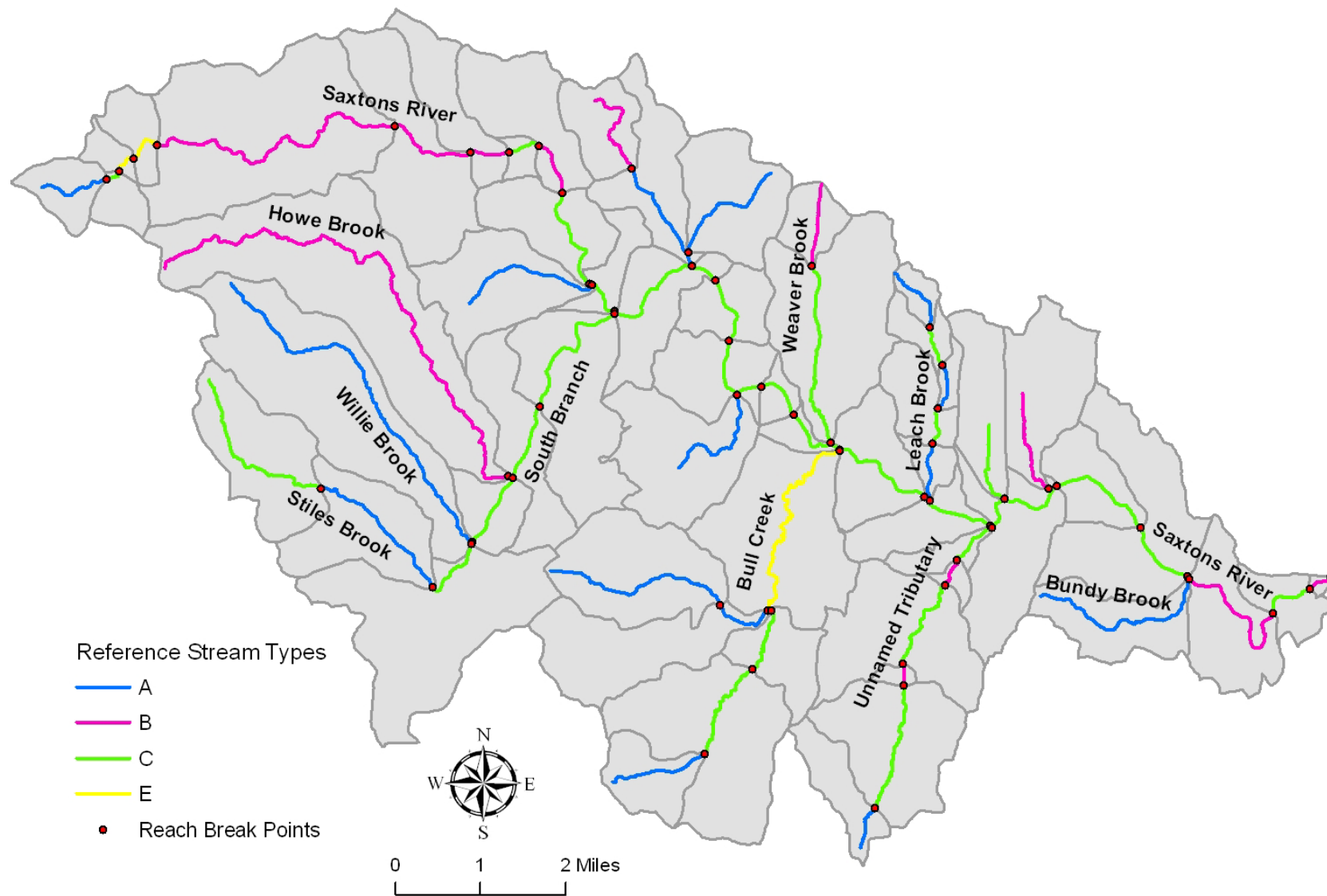


Figure 5. Reference stream types per Rosgen (1994) for the Saxtons River watershed.

Most of the reaches found along the mainstem of the Lower Saxtons River are C-type streams under reference conditions, with the exception of Reaches M01 and M03. These two reaches are found in confined valley settings where the Saxtons River descends through a bedrock terrace immediately west of the Connecticut River. Moving upslope, the reaches of the Upper Saxtons River begin to enter confined valley settings at Reach M15. With the exception of an unconfined valley associated with organic parent material (See Figure 6) in Reaches M21 through M23, the Upper Saxtons River is dominated by sediment transport streams of A and B types.

With the exception of Bull Creek (T4) and the South Branch of the Saxtons River (T6), most of the tributary and subtributary reaches are dominated by A and B stream types, with some broad valleys supporting C-type channels. Bull Creek is situated in an unconfined valley with glacial outwash and alluvial parent material on the valley floor (See Figure 6). The overall slope of the reaches within this valley is approximately 1.0% (See Table 2), and C and E type channel forms were noted during the windshield surveys. The South Branch is also situated in a wide valley comprised of outwash and alluvial materials at its base. With an overall channel slope of 1.5% through this valley, C-type channel geometry would be expected under reference conditions, and was confirmed during the windshield surveys.

#### 4.3 Watershed Geology and Soils

The NRCS soils data (NRCS, 2008) was utilized to review the parent material of the watershed. Figure 6 depicts the main classes of parent materials distributed across the watershed, as well as areas of known and potential alluvial fans. Grade controls observed in the field during the windshield surveys are also displayed in Figure 6, but do not represent exhaustive mapping of these features. The presence of numerous other grade controls in the headwaters reaches is likely where bedrock outcroppings are present. Detailed geologic information about each reach is found in the reach reports found in Appendix B.

Four alluvial fan locations have been noted in the watershed, with three of these located where steep tributary reaches meet the South Branch valley floor along its western toe. In these locations, there is an abrupt change in channel slope and the topography and outwash parent material facilitates sediment deposition. Alluvial fans are characterized by highly active channels with a propensity for lateral migration and avulsion, even where they have been historically managed (e.g., dredged and straightened).

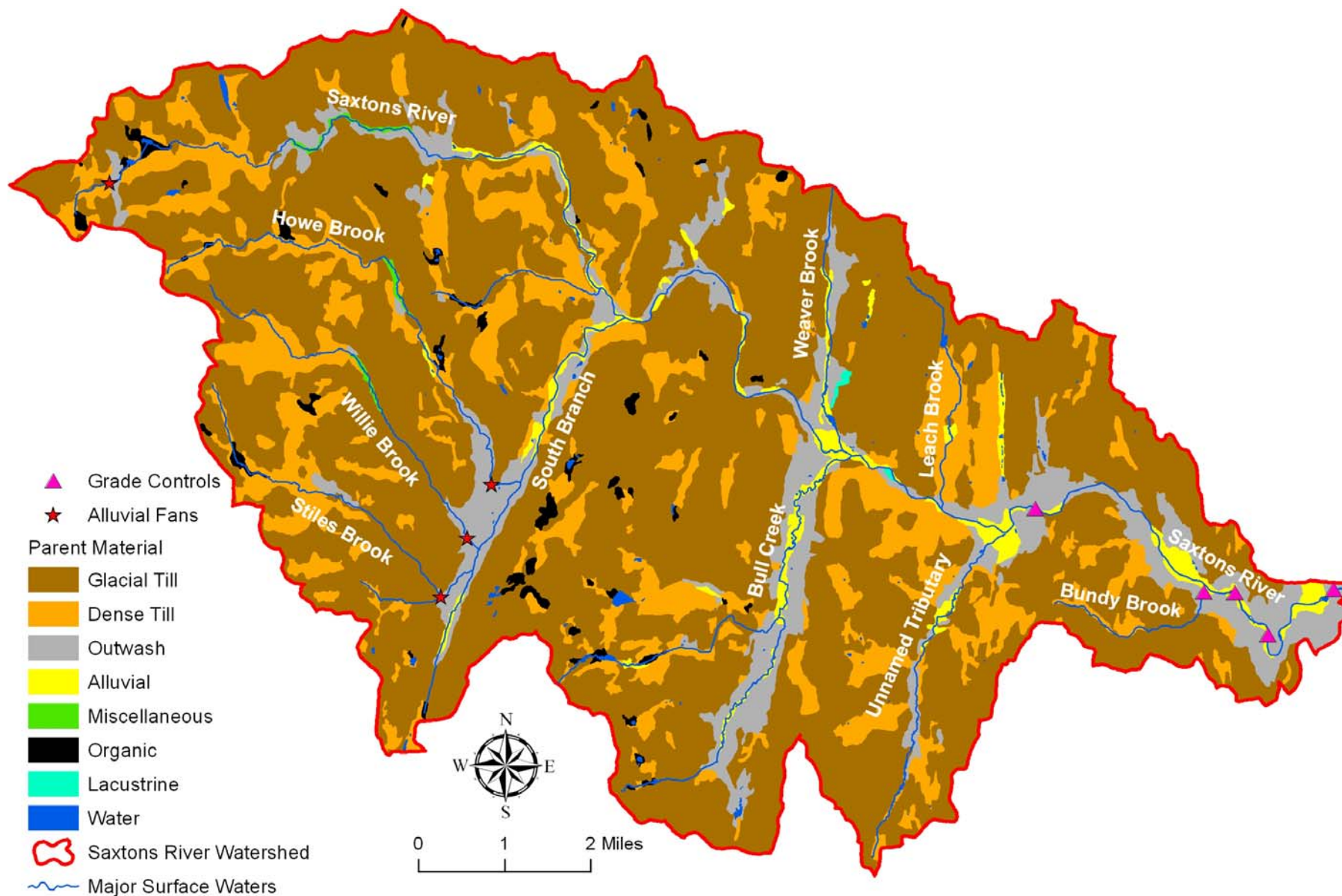


Figure 6. Parent Materials, Alluvial Fans, and Grade Controls within the Saxtons River watershed.

Dredging at these locations has been carried out following past flood events (B. Cahoon, 2008), and berming was evident during the windshield surveys (Figure 7). Another potential location for an alluvial fan has been noted on Mainstem Reach M23 where a sharp change in slope occurs where a steep headwaters channel (M24) meets a wide valley with outwash parent material.



Figure 7. Dredging through alluvial fan in T6-S2.01.



Figure 8. Grade Control in M03.

Four natural grade controls exist along the lower Mainstem in Reaches M01, M03 (Figure 8), and M06. In each of these reaches, these bedrock areas act as controls on vertical stability have caused the historical deposition of alluvium along the channel and valley bottom in the areas upslope of the controls. The grade control in M01 is known as Saxtons River Falls, and is also the site of an historic mill and dam known as Blake and Higgins Dam. Upslope, an unnamed grade control is located at the site of a former covered bridge on Covered Bridge Road. The grade control in upper M03 is known as Twin Falls, and is found just upstream of the Route 121 crossing. The grade control in M06 is found in the center of Saxtons River immediately downstream of the crossing of Westminster Road. A mill dam operated at these falls during the 1800's (UVM, 2008) and has long since been abandoned. Additionally, one human-enhanced grade control is found on lower Bundy Brook (T1.01) and is associated with an abandoned impoundment and small mill.

#### 4.4 Land Cover and Reach Hydrology

Step 4 of the Phase 1 protocols evaluates the impacts of watershed land use, riparian vegetative cover, and other reach-scale controls on hydrologic processes. Conversion of natural forest cover to urban and agricultural land uses in a watershed, even at low levels (e.g., 10% of watershed area), has been shown to have measurable deleterious effects on

channel stability and aquatic biota (Paul and Meyer, 2001; CWP, 2003). Loss of forest cover reduces the infiltration capacity of soils, and typically results in increased runoff during infrequent storm events and reduced baseflow during the dry periods of the year. In addition, direct impacts to riparian cover along the river bank and within the corridor are also known to have negative impacts on channel stability (e.g., loss of boundary resistance) and available habitat for biota (e.g., canopy shading, large woody debris, etc.). Other local-scale influences on reach hydrology include adjacent wetlands, small tributaries, and other sources of groundwater inputs. These areas provide important inputs of cooler waters that are critical for microhabitats, especially during the late summer and fall months when water temperatures can become elevated to levels that are harmful to native stenotherms.

Land cover in the Saxton River watershed was summarized with the SGAT tool using data derived from 1992 satellite imagery (VCGI, 2003). This dataset was clipped to the local watershed (e.g., area draining directly to reach) and stream corridor to understand the impacts to each reach at each scale. Impact ratings were automatically generated upon upload of the data to the DMS based on the rankings provided in Table 7. In addition to the DMS summarized data, more recent land cover data was summarized at the subwatershed scale, as previously reviewed in Table 1 in Section 2.1.

**Table 7. SGA Land Use Impact Ratings**

<b>Impact Rating</b>	<b>Land Cover Value</b>
High	10% or more of reach watershed is crop and/or urban
Low	Between 2 - 10% of reach watershed is crop and/or urban
Not Significant	Less than 2% of reach watershed is crop and/or urban

Historic land cover data for the reach watershed and corridor scales was reviewed using a series of aerial photographs of the study area from 1962 available through the UVM Baily/Howe Library. The images were georectified and overlain on the subwatershed mapping to understand land use changes over the last 40 years. In general, the watershed was well forested during the 1960's, however the forest stands were likely much younger and homogenous. Along the mainstem of the Lower Saxtons River, the residential areas that are found today were already developed. The watershed has seen little urbanization in the last 40 years. Valley-bottom crop lands that were active in the 1960's are generally



Figure 9. 1962 aerial photograph of Saxtons River village and surroundings.

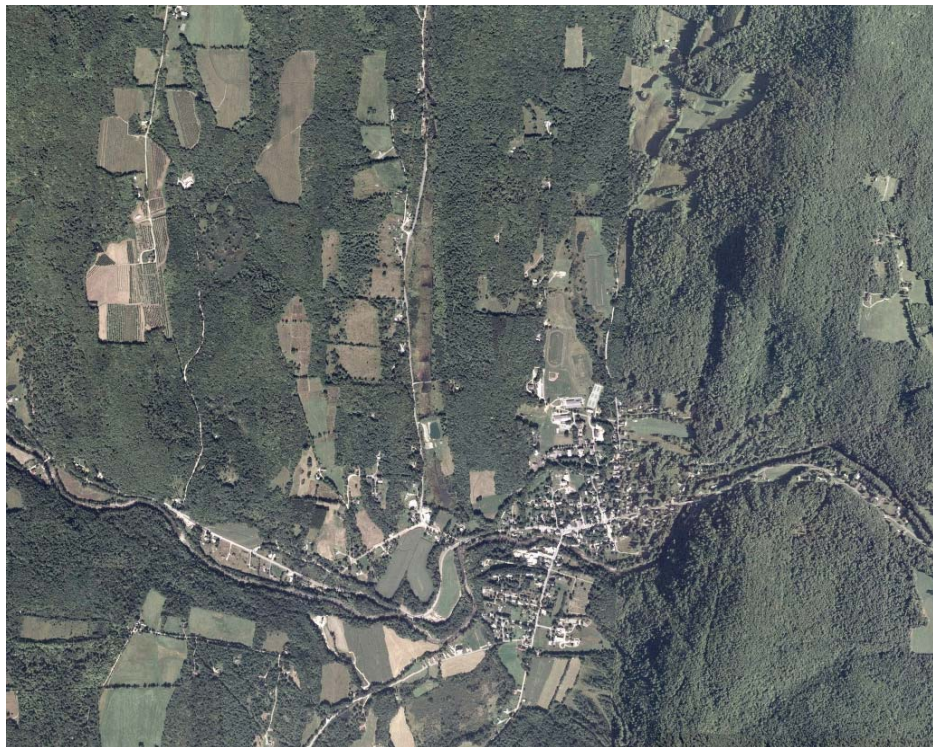


Figure 10. 2003 aerial photograph of Saxtons River village and surroundings.

still farmed today, however some marginal agricultural lands have been abandoned and are occupied by young forests today. Figures 9 and 10 depict the lack of significant change in the land cover in Saxtons River village and its surroundings that has occurred over this period.

Riparian buffer widths were estimated remotely and verified in the field where possible during the windshield surveys. Areas where the buffer widths were less than 25 feet were mapped remotely and indexed using the FIT. Areas that received high impact scores for the lack of a healthy riparian buffer were those associated with alluvial valleys where adjacent lands have been intensively used for agricultural or residential land uses for many years. Reaches in this condition included M02, M06-S2.01, T2.01, T4.01, T6.02, T6.03, and T6.04.

Groundwater and small tributary inputs were reviewed for each reach using the National Wetlands Inventory (NWI, 2003) and the Vermont Hydrography Dataset. Additional detailed information about each Step 4 parameter for all reaches is found in the watershed summary data and reach reports found in Appendices A and B, respectively.

#### 4.5 Instream Channel Modifications

Data collected as part of SGA Step 5 aids in the understanding of how direct impacts to the channel boundaries have altered the sediment supply and transport regimes at the reach scale. Flow-regulating structures that span the channel impact the natural flow variability in downstream reaches, and interrupt the sediment supply along the channel network. These features often result in reduced instream habitat as well as channel incision in downstream areas where the sediment transport capacity exceeds the limited supply from upslope. Bridges and culverts that are inadequately sized to accommodate channel forming flows have similar impacts to habitat and sediment transport as flow-regulating structures. In addition, culverts that have severely “perched” outlets create a discontinuity in habitat along the channel by preventing fish passage. Bank armoring, channel straightening, and dredging are human impacts that increase the sediment transport capacity of the channel through the increase of 1) resistance to lateral migration, and 2) channel slope. Further discussion of the impacts of instream channel modifications is provided in the SGA Phase 1 Handbook (VTANR, 2007b). Reaches with significant impacts from these features are summarized below. Additional detailed information about each Step 4 parameter for all reaches is found in the watershed summary data and reach reports found in Appendices A and B, respectively.

### *Impoundments and Flow Regulations*

Flow regulations have been reviewed and mapped using the VTANR Dam Inventory (VTANR, 2005), as well as further field observations and discussions with VTDEC staff. These features are summarized below for the mainstem and tributary reaches. Each of the flow regulations indexed with the FIT is considered a run-of-the-river feature (e.g., no current water withdrawals).

Mainstem: There are two flow regulations on the mainstem that are considered large (e.g., upstream impoundment is wider than channel width) run-of-the-river impoundments that are currently not actively managed to change discharges or volumes. Reach M01 has remnants of a large impoundment behind the old Blake and Higgins Dam that has a high degree of sedimentation upstream (Figure 11). In the upper watershed, M22 has a large impoundment associated with the Lawrence Four Corners Dam (Figure 12). Below the dam and the Route 121 crossing, some channel incision was noted where the channel enters a marshy, alluvial valley where historic straightening has been noted.



Figure 11. Sediment deposition in lower M01.



Figure 12. Impoundment in M22.

Tributaries: Six flow regulations were noted on the tributary reaches. On Reach M06-S1.01, a large run-of-the-river impoundment associated with Vermont Academy was noted mid-reach. From the field observations it was not clear whether or not water is diverted from this structure for irrigation of the adjacent athletic fields. In lower Reach T1.01 there is small run-of-the-river impoundment associated with an old stone dam (Figure 13). There is significant fine gravel deposition above this feature. In T4.S1.02 there is a large impoundment in the upper reach known as Athens Pond. In the lower section of T5.01, just upstream of the Route 121 crossing, there is a small run-of-the-river

impoundment associated with the partially breached Cambridgeport Dam at the site of an old mill (Figure 14). Upstream in T5.02 there is a large run-of-the-river impoundment that appears to be used as a private swimming pond, however detailed field observations were not possible at this site. On the lowermost reach of the South Branch, Reach T6.01, there is a small run-of-the-river impoundment that may have been historically used for agricultural purposes, however it is currently partially breached. Finally, VTDEC noted a possible water withdrawal associated with the Grafton Ponds Cross Country Ski Center, located on an unassessed tributary to the South Branch (J. Cueto, 2008). However, since this potential withdrawal is not located on an assessed surface water in the SGAT project, it has not been indexed with the FIT.



Figure 13. Defunct dam and impoundment in T1.01. Figure 14. Defunct Cambridgeport Mill and Dam.

### *Bridges and Culverts*

The locations and lengths of bridge and culvert crossings were mapped remotely and were verified in the field where possible. A total of 90 structures were noted on the 59 assessed reaches. With the exception of Reach M01, the impact of the structures were considered insignificant as they represented less than 5% of the reach channel length. In Reach M01, the Route 5 crossing impacts approximately 5% of the reach length, resulting in an impact rating of “low”. However, the bridge structure is elevated well above the channel and has little to effect on floodwater constriction and sediment and debris continuity.

### *Bank Armoring*

Bank armoring and revetments were noted in as much detail as possible during the windshield surveys. Mainstem areas where bank armoring was noted was primarily in the vicinity of village centers where properties and roads have been protected from erosion

and lateral migration of the channel. These areas included Reaches M03 and M04, where armoring protects Route 121 from bank erosion, and M13 and M14 in the vicinity of Grafton village (Figure 15). Additionally, some armoring was noted along the major tributaries where road embankments have been protected from ongoing bank erosion (e.g., T2.03, T4.01, and T6.02), and where some intensive channel modifications associated with alluvial fans were also noted (e.g., T6.S1.01). The impact of bank armoring on the reach was considered not significant for most reaches, and low for the following reaches where it impacted between 10 and 30% of the reach length: M03, M14, M14-S1.01, and T2.01. No reaches had high impact ratings (armoring impacts greater than 30% of reach length) for this parameter.



Figure 15. Hard bank armoring protecting adjacent properties in M14 in Grafton village.

### *Channel Straightening and Dredging*

Historic aerial photographs from 1962 and recent NAIP color imagery from 2003 were utilized to identify areas of inferred channel straightening. In addition, Barry Cahoon provided valuable insight into the locations and impacts associated with channel straightening and dredging following flood events in the 1970's and 1990's. In addition, field observations were made to verify areas of inferred channel straightening from available mapping. These areas are summarized below for the mainstem and tributary reaches in Table 8.

**Table 8. Summary of Channel Straightening and Dredging**

Branch/ Tributary Name	Reach ID	Channel Straightening		Dredging	
		% of Reach	Impact	Type	Impact
Saxtons Mainstem	M03	11.3	Low	None	--
Saxtons Mainstem	M05	23.9	High	None	--
Saxtons Mainstem	M06	48.3	High	None	--
SubTributary to Mainstem	M06-S2.01	27.6	High	None	--
Saxtons Mainstem	M07	43.2	High	None	--
Saxtons Mainstem	M09	4.0	Not Significant	None	--
Saxtons Mainstem	M13	0.4	Not Significant	None	--
Saxtons Mainstem	M14	32.7	High	None	--
Saxtons Mainstem	M15	27.2	High	Gravel Mining	Low
Saxtons Mainstem	M17	32.5	High	None	--
Saxtons Mainstem	M23	61.2	High	None	--
Tributary to Saxtons	T2.01	61.0	High	None	--
Tributary to Saxtons	T2.04	94.6	High	None	--
Bull Creek	T4.01	19.0	Low	None	--
Weaver Brook	T5.01	9.8	Low	None	--
South Branch Saxtons River	T6.01	54.2	High	None	--
South Branch Saxtons River	T6.02	4.3	Not Significant	None	--
South Branch Saxtons River	T6.04	57.5	High	Gravel Mining	Low
Howe Brook	T6.S1.01	3.5	Not Significant	Gravel Mining	Low
Willie Brook	T6.S2.01	4.1	Not Significant	Gravel Mining	Low

#### 4.6 Floodplain Modifications and Planform Changes

Due to the historical development of road networks and settlement patterns in the lowland areas of Vermont, many alluvial rivers in the state have been encroached upon by roads and development over the years. As discussed in the previous section, many of these areas have also been historically manipulated and straightened to maintain an unnaturally steep slope in a state of sediment transport, allowing for a short term sense of security from flooding and subsequent encroachment of infrastructure in the floodplain. In addition to historic alterations to channel slope in Vermont's alluvial rivers, the lowering of stream beds (e.g., dredging) and the raising of floodplains (e.g., berming)

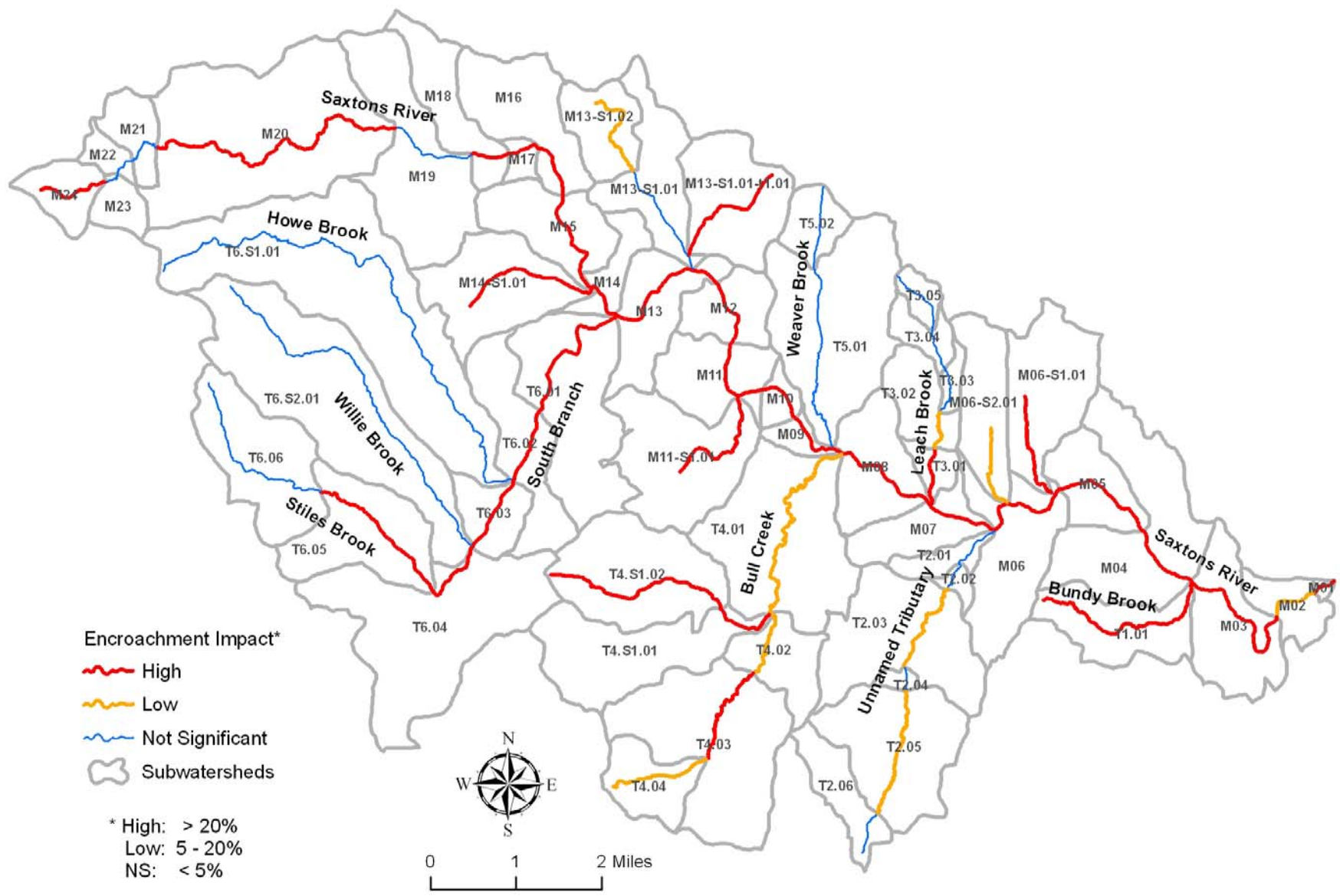


Figure 16. Impacts from corridor encroachments in the Saxtons River watershed.

has resulted in an increase in channel depth (VTANR, 2007a). Channel depths have typically been increased through the encroachment on the floodplain by roads, development and railroads and subsequent filling and armoring required to construct and maintain this infrastructure. Increases in impervious cover have also led to the deepening and eventual widening of channels throughout urbanized areas of Vermont (Fitzgerald, 2007). These human impacts tend to induce a series of channel adjustments that begin with channel incision and leads to widening and eventually a redevelopment of a sinuous planform in alluvial reaches. Reaches with significant impacts associated with the above-described human impacts are summarized below according to the SGA impact ratings listed in Table 9. Reaches affected by an increase in depositional or migrational features are also summarized below. Additional detailed information about each Step 5 parameter for all reaches is found in the watershed summary data and reach reports found in Appendices A and B, respectively.

**Table 9. Impact Ratings for Corridor Encroachments and Development**

<b>Impact Rating</b>	<b>Impact Criteria</b>
High	Greater than 20% of reach length affected.
Low	Between 5 - 20% of reach length affected.
Not Significant	Less than 5% of reach length affected.

*Encroachments*

Following the Phase 1 protocol, any berms, roads, driveways, railroads and/or improved paths found within the stream corridor were indexed using the FIT. These areas were identified using the 2003 NAIP aerial imagery, and were confirmed and/or refined during the field observations. Figure 16 depicts the reaches where encroachment has significantly impacted the stream corridor, with ratings based on the percentage of the reach length that was impacted as indicated in Table 9. All encroachments noted in the watershed were from roads, however further Phase 2 assessments may reveal additional berm encroachments that were not observed remotely or during the coarse field surveys.

*Development*

The impact of development within the stream corridor was evaluated using the 2003 NAIP aerial imagery, and were confirmed and/or refined during the field observations. The presence of development was indexed using the FIT, and impact ratings for each reach were developed based on SGA criteria presented in Table 9. Impacts from corridor development on the mainstem were concentrated in the lower reaches in the vicinity of

Bellows Falls and Saxtons River villages, and in the upper watershed around Grafton Village (Figure 17). Mainstem and subtributary reaches with high corridor development impact ratings associated with villages included: M01, M03, M04, M05, M06, M06-S1.01, M07, M14, and M14-S1.01. Some tributary reaches are impacted by low-density residential development along secondary roads. These reaches included T2.03, T4.02, and T4.S1.01.



Figure 17. Corridor encroachment in Grafton Village in Reach M14.

### *Depositional Features*

Sediment depositional features (e.g., point bars, mid channel bars, etc.) were evaluated using the 2003 NAIP aerial imagery, and were confirmed and/or refined during the field observations. Reaches with multiple types of depositional features indicated where upslope sediment supply exceeded the transport capacity. These areas represent conditions that are favorable for increased lateral channel migration that could endanger adjacent infrastructure and properties. In general, reaches with high impacts from depositional features were found at the confluence of tributaries and subtributaries that are carrying high sediment loads. Three mainstem reaches were identified with these conditions, including M09 (Figure 18), M13, and M20. Two tributary reaches, T6.04 and T6.S2.01, located along the South Branch, were also identified as having high impacts.

Additional detailed data about the types of depositional features and their relative impacts for all reaches are found in the reach reports found in Appendix A.

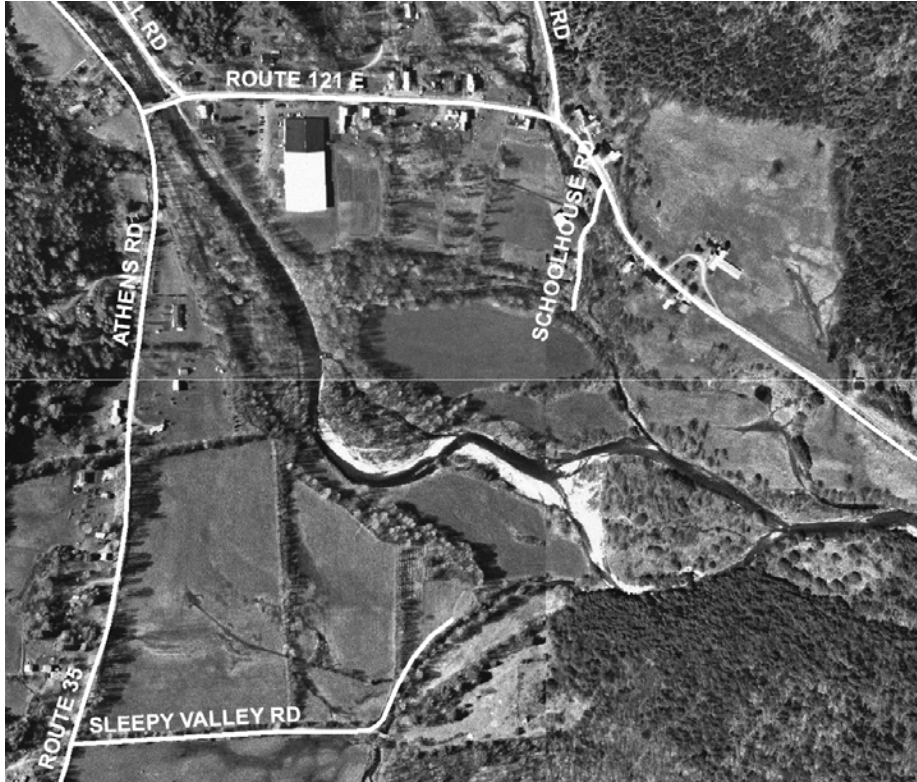


Figure 18. High degree of depositional features and migration in Reach M09 at the confluence with Bull Creek (T4) as seen in the 1990 aerial photography.

### *Meander Migration*

Recent and historic aerial photographs and imagery were reviewed to identify areas of channel migration, bifurcation, and avulsions on the Saxtons River mainstem and its tributaries. Historical topographic maps based on survey data from 1927 and 1957 were acquired from the UNH historic mapping database (UNH, 2008). Additional photographs from 1962 were also reviewed. For areas where significant channel migration was noted, the historical imagery was georectified using ArcGIS software to transform the mapping into the NAD 1983 State Plane Meter projections. Previous channel locations were compared with two recent sources of imagery: 1) the Vermont Hydrography Dataset stream centerlines developed from the aerials photographs taken in 1990 for the watershed; 2) the 2003 NAIP color imagery for Windham County. Three areas on the mainstem and two on the tributary reaches were considered to have a low or high impact (e.g., multiple migration features). Reach M02 had a high impact from multiple

migrational features in the lower reach above the Blake and Higgins Dam due to a high degree of upslope deposition. Reach M06 had a low impact due to a minor flood chute noted along the right bank in the upper reach. Reaches M09 and T4.01 both had high impacts due to multiple depositional and migrational features noted at the confluence with Bull Creek (T4). This area has experienced a very high degree of channel migration since it was straightened through agricultural lands in the early 1900's (Figure 19). Reach T5.01 has experienced minor channel migration upslope of the Cambridgeport dam at the crossing of Route 121.

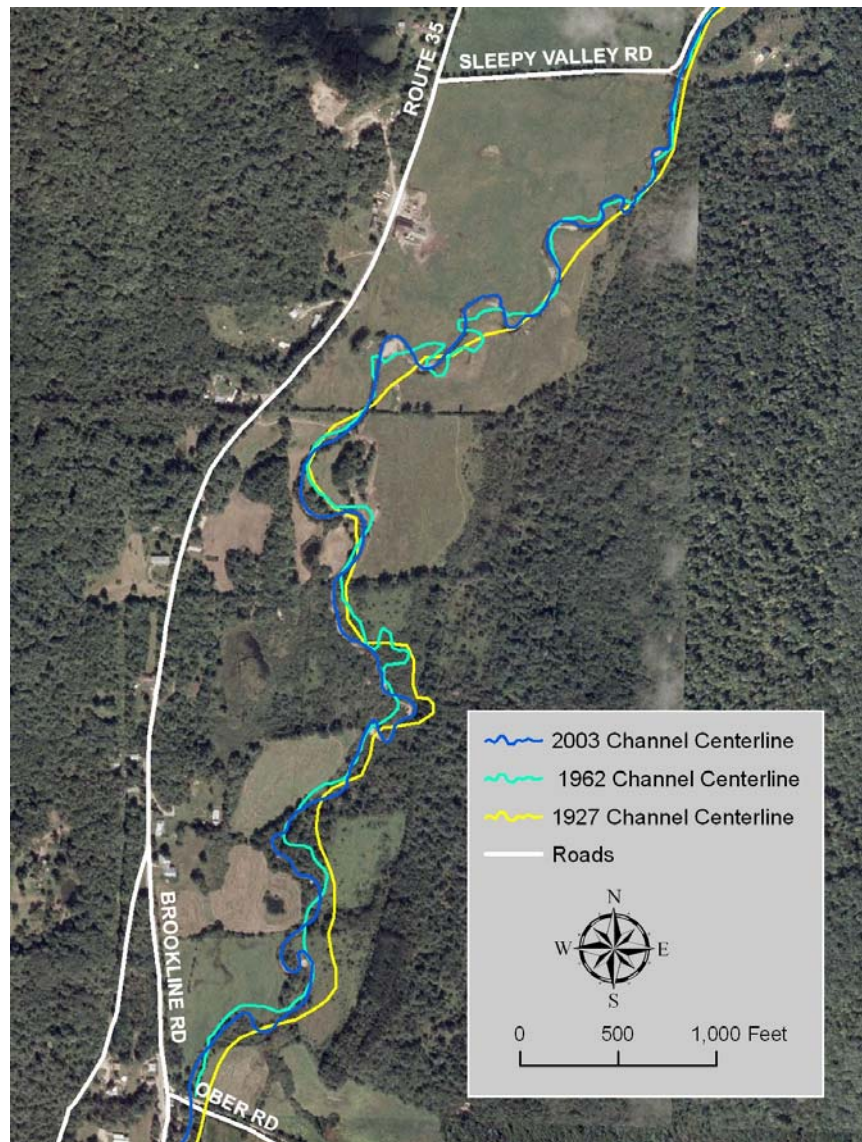


Figure 19. Redevelopment of a sinuous planform following straightening in the lowermost reach on Bull Creek (T4.01) prior to the confluence with the mainstem.

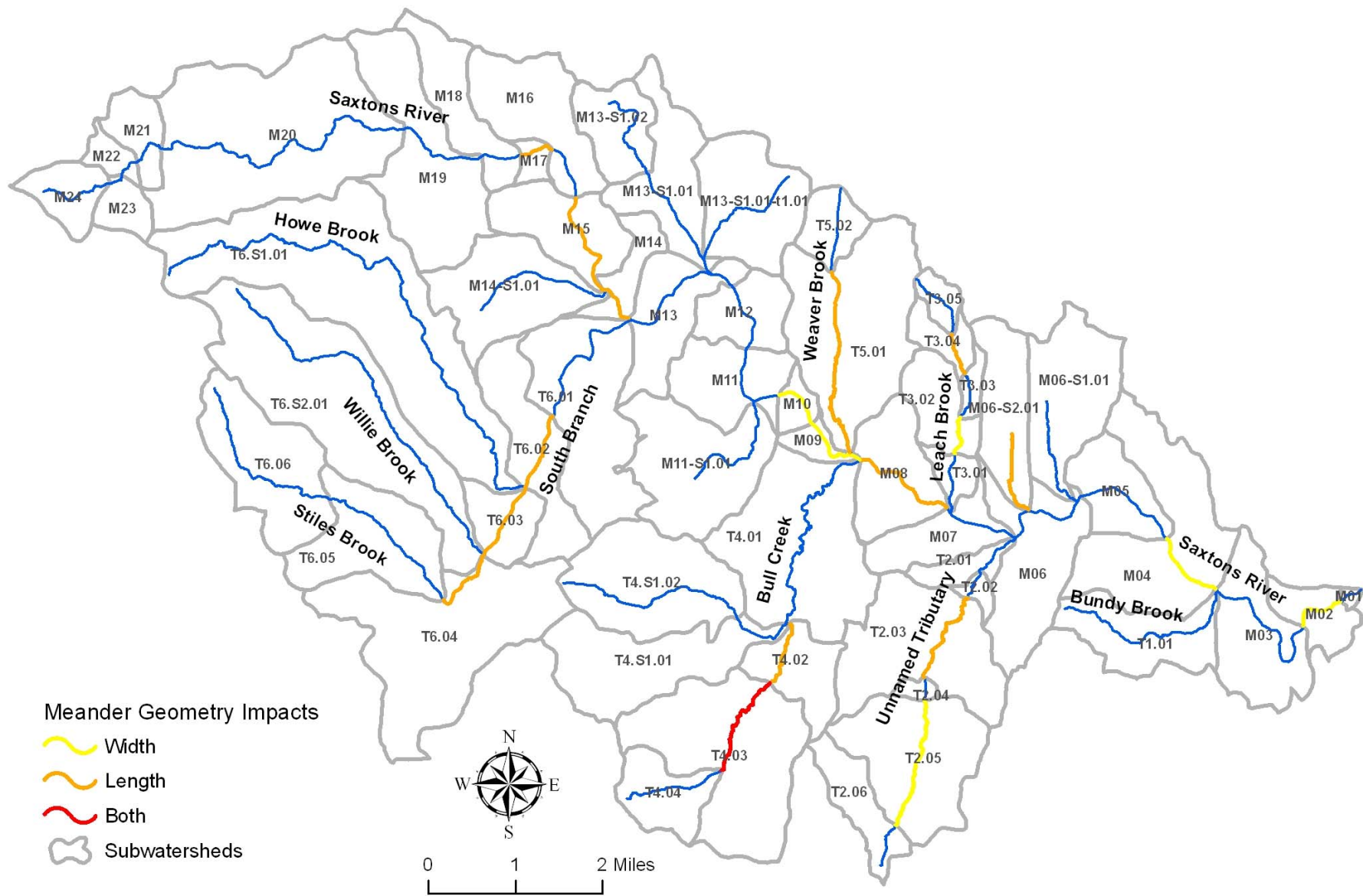


Figure 20. Meander geometry departures in the Saxtons River watershed.

### *Meander Geometry*

For reaches characterized within unconfined valley settings (C or E-type channels), meander geometry was reviewed following the Phase 1 protocols. Thirty-one (31) of the 59 reaches had meandering profiles suitable for assessment of meander width and wavelength. Shapefiles were developed to indicate the areas where meander width and wavelength was measured. In some cases, multiple meanders were measured and an average of the measurements was entered in the DMS. Where the meander wavelengths and widths fell outside of the range of expected values relative to the predicted channel width, impact ratings of high or low were assigned according to the degree of departure (VTANR, 2007b). Twenty (20) of the 59 reaches had high impact ratings for either meander width or wavelengths, and these impact ratings are stored in the DMS. Highly impacted reaches are depicted for the watershed in Figure 20.

#### 4.7 Bed and Bank Windshield Surveys

Windshield surveys were completed following the initial classification of stream type and substrate based on remotely sensed data alone. Surveys were completed in late May on all reaches accessible by public roads. Forty-four (44) of the 59 reaches in the study area were at least partially accessible by roads and were viewed. In general, all mainstem and lower elevation tributary reaches were observed, while remote headwaters reaches located in inaccessible terrain were not evaluated. The DMS metadata for Step 2 has been revised and indicates whether or not the reach was evaluated in the field. The Phase 1 parameters verified and/or evaluated during the field surveys included:

- General stream and valley geometry, including valley width and confinement, bed substrate, and bedform features (Step 2).
- Grade controls and areas of known or potential alluvial fans (Step 3).
- Impacts on the buffer and stream corridor, including areas of reduced buffer vegetation, road encroachments, and the presence of development within the stream corridor (Steps 4 and 6).
- Types of stream crossing structures (e.g., bridges and culverts), and their potential for causing ice and debris jams (Steps 5 and 7).
- Areas of bank erosion and armoring (Steps 5 and 7).
- Areas of increased sediment deposition and meander migration (Step 6).

Of the parameters listed above, particular attention was paid to recording bank erosion and ice/debris jam potential at the stream crossings. Due to limited direct accessibility on

most reaches, bank erosion along the entire channel length was not practical; rather, bank erosion plainly visible along roads or at stream crossings was indexed using the FIT. Therefore the relative length of the reach impacted by bank erosion was likely underestimated compared to typical Phase 2 field observations. Debris and ice jam potential at points of channel constrictions associated with stream crossings and sharp channel bends were recorded in the field. Qualitative ratings of the impact of these areas on sediment and debris continuity were developed and entered into the DMS. Table 10 summarizes those reaches where impacts from bank erosion or ice and debris jam potential were noted.

**Table 10. Select Reaches with Observed Bank Erosion or Ice and Debris Jam Potential**

Branch or Tributary Name	Reach ID	Bank Erosion		Ice and Debris Jams	
		% of Reach	Height (ft)	Types	Impact
Saxtons Mainstem	M03	1.5%	4.0	Bridge	Low
Tributary to Saxtons	M06-S1.01	1.2%	NE	Multiple	High
Saxtons Mainstem	M13	1.7%	5.0	Bridge	Low
Tributary to Saxtons	M13-S1.01-t1.01	--	--	Multiple	High
Saxtons Mainstem	M20	0.7%	NE	Multiple	High
Bundy Brook	T1.01	2.6%	2.0	Multiple	Low
Bull Creek	T4.01	21.9%	2.9	Bend	Low
Athens Brook	T4.S1.02	--	--	Culvert	High

\*T4.01 was the only reach with a "low" impact rating for bank erosion

\*\* "Multiple" potentials was used when no one source could be identified as dominant

NE: Not evaluated

## 5.0 Data Analysis

Impact scores have been generated for each of the Phase 1 steps for the 59 study reaches. The Phase 1 dataset in the DMS summarizes these scores under 4 separate impact categories as summarized in Table 11. Impact scores range from zero ("Not Significant") to 2 ("High") depending on the degree of impact recorded for each parameter. The 16 parameters evaluated for impacts and summarized for each study reach are presented in Table 11. Figure 21 presents the impact scores for each study reach, with the scores organized by quartiles. An additional table in Appendix A summarizes the impact scores by reach, as well as priority rankings used for recommendations for further Phase 2 assessment.

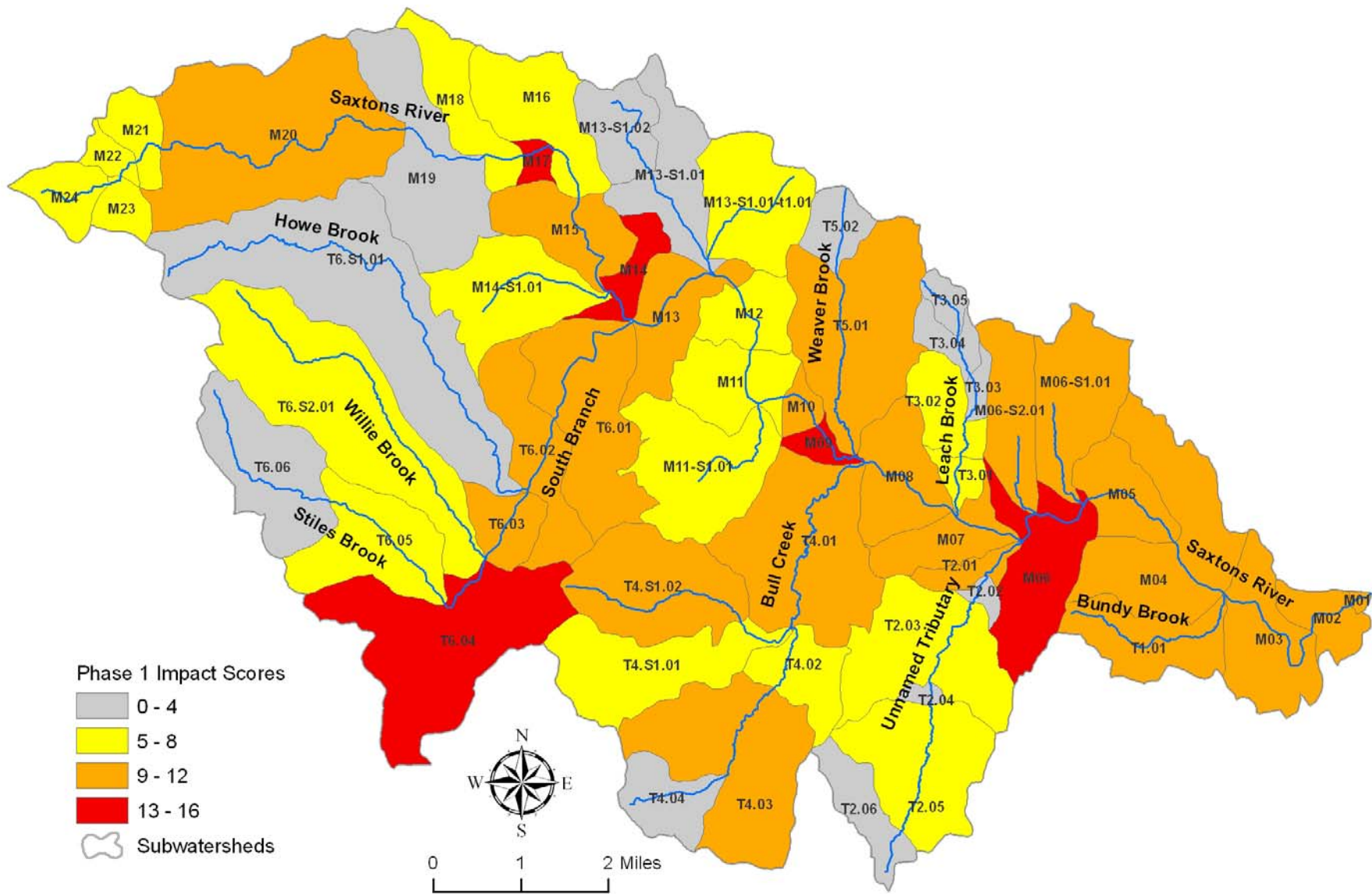


Figure 21. Phase 1 final impact scores for the Saxtons River watershed.

**Table 11. Final Impact Score Parameters for Phase 1 Dataset**

Phase 1 Step	Phase 1 Parameter	Impact Category
4.1	Local Watershed Land Cover/Land Use	Land Use
4.2	Corridor Watershed Land Cover/Land Use	
4.3	Riparian Buffer Width	
5.1	Flow Regulations	Channel Modifications
5.2	Bridges and Culverts	
5.3	Bank Armoring	
5.4	Channel Straightening	
5.5	Dredging and Gravel Mining	
6.1	River Corridor Encroachments	Floodplain Modifications and Planform Changes
6.2	River Corridor Development	
6.3	Depositional Features	
6.4	Meander Migration	
6.5	Meander Belt Width Departure	
6.6	Meander Wavelength Departure	
7.2	Bank Erosion	Bed and Bank Conditions
7.3	Debris and Ice Jam Potential	

Based on the Phase 1 impact scores, the DMS also develops predictions for channel adjustment processes (VTANR, 2007b). These predictions are based on the dominant impacts recorded for each reach, and are categorized based on the impacts typically associated with the following four channel adjustment processes: 1) Degradation (e.g., channel incision); 2) Aggradation (e.g., increased sediment deposition); 3) Channel widening (e.g., increased bank erosion); 4) Planform Changes (e.g., irregular meander patterns). Using the channel adjustment process ratings, a provisional geomorphic rating is developed for each reach based on the methods outlined in the SGA Phase 1 protocols (page 76; VTANR, 2007b). Table 12 outlines the four possible geomorphic ratings based on the SGA methods, and Figure 22 presents the provisional geomorphic condition for all study reaches. An additional table in Appendix A summarizes the predicted reach adjustment processes, as well as stream sensitivity ratings. Both of these parameters have been used in conjunction with the overall impact scores in developing recommendations for further Phase 2 assessment.

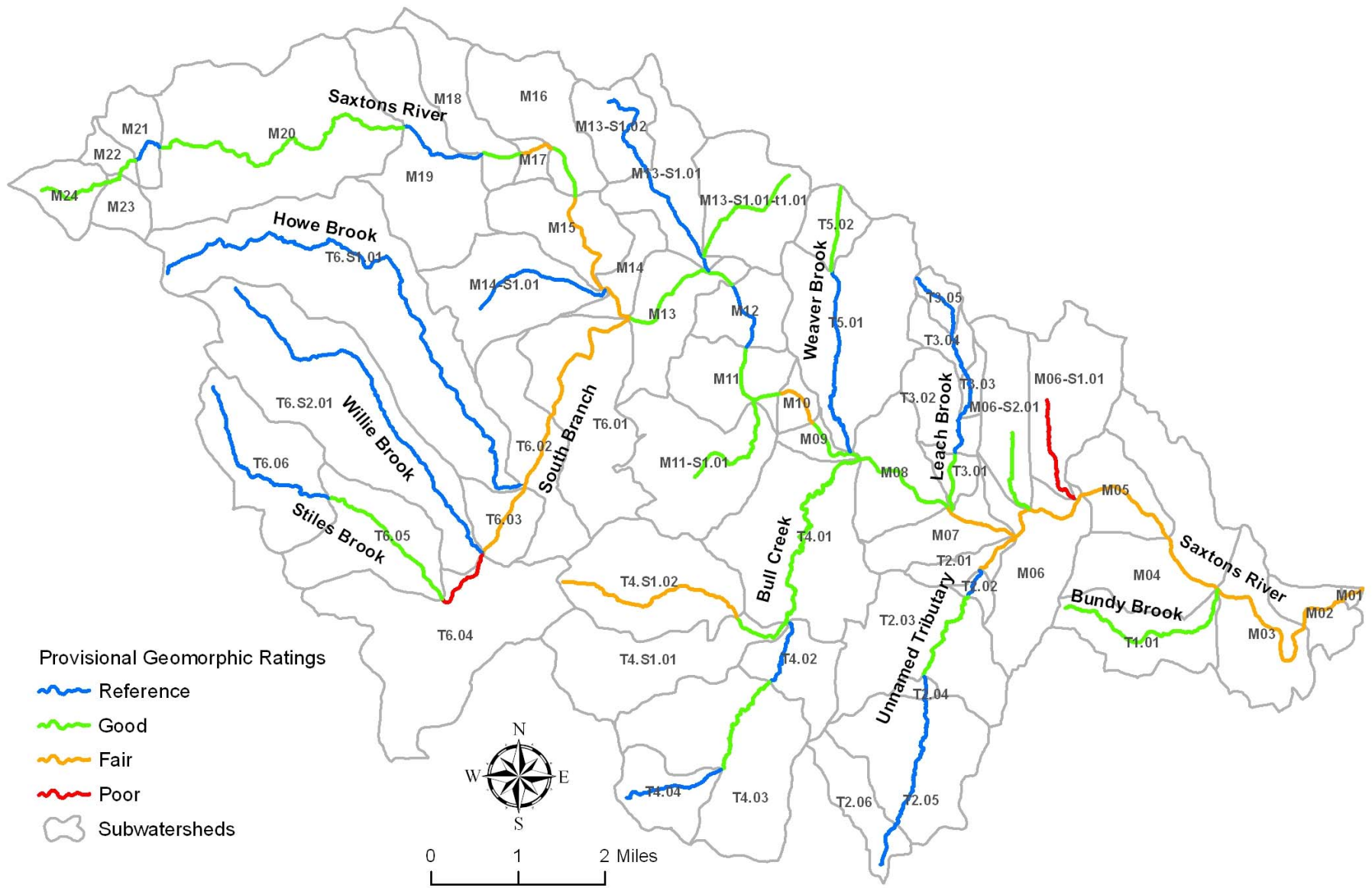


Figure 22. Provisional geomorphic ratings for the Saxtons River watershed.

**Table 12. SGA Reach Condition Ratings**

<b>SGA Rating</b>	<b>Predicted Conditions and Processes</b>
Reference	In Equilibrium – no apparent or significant channel, floodplain, or land cover modifications; channel geometry is likely to be in balance with the flow and sediment produced in its watershed.
Good	In Equilibrium but may be in transition into or out of the range of natural variability – minor erosion or lateral adjustment but adequate floodplain function; any adjustment from historic modifications nearly complete.
Fair	In Adjustment – moderate loss of floodplain function; or moderate to major planform adjustments that could lead to channel avulsions.
Poor	In Adjustment and Stream Type Departure - may have changed to a new stream type or central tendency of fluvial processes – significant channel and floodplain modifications may have altered the channel geometry such that the stream is not in balance with the flow and sediment produced in its watershed.

## 6.0 Phase 2 Recommendations

Using the Phase 1 Impact Ratings as the primary basis for reach selection, a list of high and medium-priority reaches has been compiled for further Phase 2 surveys. Figure 23 presents the selected reaches by location in the watershed. Table 13 summarizes the selected reaches based on watershed location, channel length, and preliminary reference stream type. The total impact scores have been ranked for all 59 study reaches, with the lowest values representing the highest scores and impacts.

### *High Priority Reaches*

Twenty (20) reaches are considered high-priority for assessment, including 15 reaches on the mainstem, one reach on Bull Creek, and four reaches on the South Branch. The total channel length for the selected reaches is 22.7 miles. Within the list of 20 high-priority reaches, only three reaches had impact ratings that ranked higher than 20. These mainstem reaches, M10, M11 and M12, are located in between the Saxtons River and Grafton villages where fewer impacts from corridor encroachment, development, and straightening have been noted. These reaches have been included on the high-priority list due to the importance of understanding the channel adjustment processes along the entire mainstem channel network. Assessment of these reaches will help evaluate their potential as restoration areas to meet the overarching RMP objectives of fluvial erosion hazard mitigation, sediment and nutrient load reduction, and aquatic and riparian habitat protection and restoration.

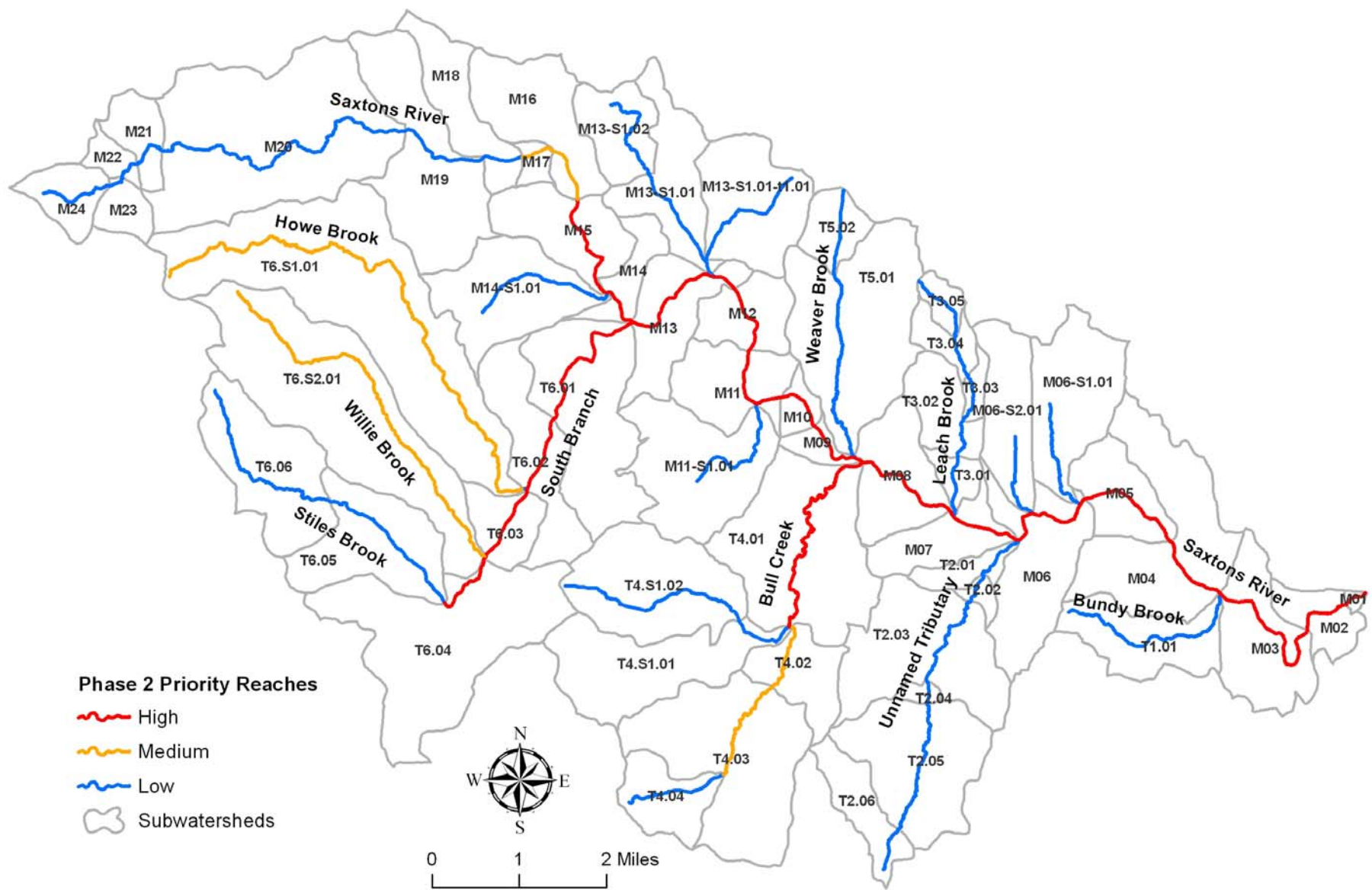


Figure 23. Selected reaches for Phase 2 assessments.

**Table 13. Selected Reaches for Phase 2 Assessments**

Reach ID	Surface Water	Channel Length (ft)	Stream Type	Bed Material	Bedform	Impact Score	Watershed Rank	Phase 2 Priority
M01	Saxtons Mainstem	1,586	B <sub>c</sub>	Cobble	Riffle-Pool	12	6	High
M02	Saxtons Mainstem	3,316	C	Cobble	Riffle-Pool	11	9	High
M03	Saxtons Mainstem	10,084	B <sub>c</sub>	Cobble	Riffle-Pool	11	10	High
M04	Saxtons Mainstem	4,666	C	Cobble	Riffle-Pool	10	16	High
M05	Saxtons Mainstem	6,809	C	Cobble	Riffle-Pool	12	7	High
M06	Saxtons Mainstem	6,550	C	Cobble	Riffle-Pool	13	3	High
M07	Saxtons Mainstem	4,690	C	Cobble	Riffle-Pool	11	11	High
M08	Saxtons Mainstem	6,878	C	Cobble	Riffle-Pool	10	19	High
M09	Saxtons Mainstem	4,262	C	Cobble	Riffle-Pool	13	4	High
M10	Saxtons Mainstem	3,174	C	Cobble	Riffle-Pool	9	22	High
M11	Saxtons Mainstem	5,211	B	Cobble	Riffle-Pool	6	36	High
M12	Saxtons Mainstem	4,458	C	Cobble	Riffle-Pool	8	28	High
M13	Saxtons Mainstem	8,439	C	Cobble	Riffle-Pool	10	20	High
M14	Saxtons Mainstem	2,697	C	Cobble	Riffle-Pool	15	2	High
M15	Saxtons Mainstem	7,114	C	Cobble	Riffle-Pool	12	8	High
M16	Saxtons Mainstem	3,535	B <sub>c</sub>	Cobble	Riffle-Pool	6	37	Medium
M17	Saxtons Mainstem	2,137	C	Cobble	Riffle-Pool	13	5	Medium
T4.01	Bull Creek	16,239	E	Gravel	Riffle-Pool	11	12	High
T4.02	Bull Creek	4,531	C	Gravel	Riffle-Pool	7	35	Medium
T4.03	Bull Creek	7,244	C	Cobble	Riffle-Pool	10	21	Medium
T6.01	South Branch	9,500	C	Cobble	Riffle-Pool	11	13	High
T6.02	South Branch	4,901	C	Cobble	Riffle-Pool	11	14	High
T6.03	South Branch	5,006	C	Boulder	Riffle-Pool	11	15	High
T6.04	South Branch	4,308	C <sub>b</sub>	Boulder	Riffle-Pool	16	1	High
T6.S1.01	Howe Brook	36,287	B	Boulder	Step-Pool	4	49	Medium
T6.S2.01	Willie Brook	25,077	A	Boulder	Step-Pool	5	46	Medium

	# Reaches	Miles
High Priority Reaches:	20	22.7
High & Medium Priority Reaches:	26	37.6

*Medium Priority Reaches*

Six (6) additional reaches have been included as medium-priority reaches due to their relative impact ranking and location in the watershed. Mainstem Reaches M16 and M17, located upstream of Grafton village, have been identified due to impacts associated with corridor encroachment and channel straightening along Route 121. Reach M17 had a

high impact rating (ranked 5<sup>th</sup> in watershed) due mainly to floodplain modifications and encroachments.

Reaches T4.02 and T4.03, found on Bull Creek, have been included due to impacts from corridor development and other floodplain modifications. The valley characteristics of Bull Creek, similar to those of the South Branch, make this area particularly important from a management standpoint. The valley is characterized by alluvial and outwash parent materials (see Figure 6), and likely had a high degree of floodplain development and channel manipulation from historical agricultural uses. Therefore these areas may play an important role in a watershed-wide strategy to reduce fluvial erosion hazards and areas of sediment and nutrient loading through corridor conservation and other restoration efforts.

Lastly, Reaches T6.S1.01 (Howe Brook) and T6.S2.01 (Willie Brook), both high-gradient subtributaries to the South Branch, have been included on the second tier list. Alluvial fans exist on both reaches where the channels meet the South Branch valley bottom. Historic dredging to maintain the channel and temporarily reduce property damage has impacted the lower sections of both reaches. Historic channel management in these reaches has likely led to an increase in sediment and nutrient loading to downstream reaches along the South Branch (T6.02 and T6.03). The total channel mileage for the medium-priority reaches could be reduced if the lower sections of Reaches T6.S1.01 and T6.S2.01 were segmented for assessment of only the areas associated with the alluvial fans. These areas likely have different stream geometry characteristics from those identified for the entire reach length, and could be field identified for segmentation.

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**Appendix A**  
**Watershed Summary Data**

**Saxtons River Preliminary Stream Types (Step 2)**

Reach ID	Elevation		Valley	Valley	Channel	Channel	Sinuosity	Watershed	Channel	Valley	Confinement Ratio	Reference Type*	Reference Stream Type	Bedform
	Up (ft.)	Down (ft.)	Length (ft.)	Slope (%)	Length (ft.)	Slope (%)		Area (sq. mi.)	Width (ft.)	Width (ft.)				
M01	250	228	1470	1.50	1586	1.39	1.08	77.93	89	155	1.7	NC	B	Riffle-Pool
M02	280	270	3084	0.32	3316	0.30	1.08	77.88	89	1175	13.2	VB	C	Riffle-Pool
M03	375	270	8550	1.23	10084	1.04	1.18	77.33	88.7	225	2.5	SC	B	Riffle-Pool
M04	393	375	4406	0.41	4666	0.39	1.06	74.69	87.4	1223	14	VB	C	Riffle-Pool
M05	427	393	6507	0.52	6809	0.50	1.05	72.25	86.1	476	5.5	NW	C	Riffle-Pool
M06	490	427	5007	1.26	6550	0.96	1.31	71.36	85.7	1959	22.9	VB	C	Riffle-Pool
M06-S1.01	669	443	6480	3.49	7098	3.18	1.1	1.59	16.1	70	4.4	NW	B	Step-Pool
M06-S2.01	564	476	5050	1.74	5386	1.63	1.07	1.08	13.6	150	11.1	VB	C	Riffle-Pool
M07	541	490	4573	1.12	4690	1.09	1.03	61.62	80.3	760	9.5	BD	C	Riffle-Pool
M08	575	541	6335	0.54	6878	0.49	1.09	59.05	78.8	509	6.5	BD	C	Riffle-Pool
M09	609	575	4144	0.82	4262	0.80	1.03	46.68	71.1	752	10.6	VB	C	Riffle-Pool
M10	637	609	2950	0.95	3174	0.88	1.08	43.13	68.6	453	6.6	BD	C	Riffle-Pool
M11	685	637	4990	0.96	5211	0.92	1.04	42.89	68.5	110	1.6	NC	B	Riffle-Pool
M11-S1.01	1191	672	7790	6.66	8264	6.28	1.06	1.99	17.7	55	3.1	SC	A	Step-Pool
M12	724	685	4226	0.92	4458	0.87	1.05	39.82	66.3	371	5.6	NW	C	Riffle-Pool
M13	830	724	8077	1.31	8439	1.26	1.04	39.04	65.7	465	7.1	BD	C	Riffle-Pool
M13-S1.01	1066	754	7397	4.22	7485	4.17	1.01	3.66	23.2	50	2.2	SC	A	Step-Pool
M13-S1.01-t1.01	1164	771	8025	4.90	8322	4.72	1.04	1.56	15.9	75	4.7	NW	A	Step-Pool
M13-S1.02	1410	1066	6475	5.31	6971	4.93	1.08	0.83	12.1	35	2.9	SC	B	Step-Pool
M14	863	830	2576	1.28	2697	1.22	1.05	14.19	42.1	496	11.8	VB	C	Riffle-Pool
M14-S1.01	1312	870	9100	4.86	9306	4.75	1.02	1.66	16.4	60	3.7	SC	A	Step-Pool
M15	954	863	6513	1.40	7114	1.28	1.09	12.03	39.1	323	8.3	BD	C	Riffle-Pool
M16	983	954	3380	0.86	3535	0.82	1.05	10.85	37.4	100	2.7	SC	B	Riffle-Pool
M17	1010	983	2072	1.30	2137	1.26	1.03	9.4	35.1	390	11.1	VB	C	Riffle-Pool
M18	1049	1010	2350	1.66	2457	1.59	1.05	9.23	34.8	75	2.2	SC	B	Riffle-Pool
M19	1245	1049	5490	3.57	5811	3.37	1.06	8.24	33.1	100	3	SC	B	Step-Pool
M20	1716	1245	17360	2.71	19160	2.46	1.1	5.94	28.7	45	1.6	NC	B	Riffle-Pool
M21	Gentle Gradient		1981	--	2563	--	1.29	1.66	16.4	586	35.8	VB	E	Riffle-Pool
M22	Gentle Gradient		1270	--	1472	--	1.16	1.15	13.9	584	41.9	VB	E	Riffle-Pool
M23	1836	1792	1101	4.00	1207	3.65	1.1	0.91	12.6	495	39.3	VB	C	Riffle-Pool
M24	2460	1836	4625	13.49	4765	13.10	1.03	0.56	10.2	18	1.8	NC	A	Cascade
T1.01	1181	383	11890	6.71	12674	6.30	1.07	1.2	14.2	20	1.4	NC	A	Step-Pool
T2.01	553	492	2999	2.03	3216	1.90	1.07	5.42	27.6	336	12.2	VB	C	Riffle-Pool

Saxtons River Preliminary Stream Types (Step 2)

Reach ID	Elevation		Valley	Valley	Channel	Channel	Sinuosity	Watershed	Channel	Valley	Confinement	Reference	Stream Type	Bedform
	Up	Down	Length	Slope	Length	Slope		Area	Width	Width				
	(ft.)	(ft.)	(ft.)	(%)	(ft.)	(%)	(sq. mi.)	(ft.)	(ft.)	(ft.)				
T2.02	598	553	1775	2.54	1993	2.26	1.12	5.1	26.8	30	1.1	NC	B	Plane Bed
T2.03	689	598	5654	1.61	6766	1.34	1.2	4.97	26.5	420	15.8	VB	C	Riffle-Pool
T2.04	715	689	1380	1.88	1417	1.83	1.03	2.79	20.6	35	1.7	NC	B	Riffle-Pool
T2.05	802	715	8122	1.07	9249	0.94	1.14	2.69	20.2	276	13.6	VB	C	Riffle-Pool
T2.06	1050	802	2730	9.08	2846	8.71	1.04	0.7	11.2	15	1.3	NC	A	Step-Pool
T3.01	694	535	3620	4.39	3726	4.27	1.03	1.73	16.7	40	2.4	SC	A	Step-Pool
T3.02	773	694	2313	3.42	2678	2.95	1.16	1.46	15.5	497	32.1	VB	C	Riffle-Pool
T3.03	932	773	2885	5.51	3107	5.12	1.08	0.75	11.6	32	2.8	SC	A	Step-Pool
T3.04	989	932	2626	2.17	2764	2.06	1.05	0.59	10.4	463	44.7	VB	C	Riffle-Pool
T3.05	1394	989	4375	9.26	4813	8.41	1.1	0.24	7	17	2.4	SC	A	Cascade
T4.01	668	568	12046	0.83	16239	0.62	1.35	11.17	37.9	818	21.6	VB	E	Riffle-Pool
T4.02	725	668	3969	1.44	4531	1.26	1.14	4.43	25.2	434	17.2	VB	C	Riffle-Pool
T4.03	844	725	6260	1.90	7244	1.64	1.16	3.6	23	175	7.6	BD	C	Riffle-Pool
T4.04	1282	844	6317	6.93	6549	6.69	1.04	0.79	11.8	35	3	SC	A	Step-Pool
T4.S1.01	866	669	3900	5.05	4014	4.91	1.03	3.91	23.9	45	1.9	NC	A	Step-Pool
T4.S1.02	1607	866	1170	63.33	12624	5.87	10.79	2.06	18	36	2	SC	A	Step-Pool
T5.01	713	583	11536	1.13	12638	1.03	1.1	3.31	22.2	400	18	VB	C	Riffle-Pool
T5.02	840	713	5125	2.48	5225	2.43	1.02	0.52	9.8	95	9.7	BD	B	Riffle-Pool
T6.01	906	816	7900	1.14	9500	0.95	1.2	20.03	49	750	15.3	VB	C	Riffle-Pool
T6.02	960	906	4842	1.12	4901	1.10	1.01	17.75	46.4	689	14.8	VB	C	Riffle-Pool
T6.03	1013	960	4700	1.13	5006	1.06	1.07	11.22	38	584	15.4	VB	C	Riffle-Pool
T6.04	1170	1013	4194	3.74	4308	3.64	1.03	6.73	30.3	551	18.2	VB	C	Riffle-Pool
T6.05	1691	1170	9620	5.42	10029	5.19	1.04	3.43	22.5	35	1.6	NC	A	Step-Pool
T6.06	2000	1691	10842	2.85	12071	2.56	1.11	1.81	17	130	7.6	BD	C	Riffle-Pool
T6.S1.01	2198	956	32940	3.77	36287	3.42	1.1	5.13	26.9	50	1.9	NC	B	Step-Pool
T6.S2.01	2150	1016	23775	4.77	25077	4.52	1.05	3.86	23.7	38	1.6	NC	A	Step-Pool

\* NC = Narrowly-confined; SC = Semi-confined; NW = Narrow; ; BD = Broad; VB = Very Broad

**Saxtons River Impact Ratings (Step 8)**

Reach ID	Step Number <sup>†</sup> with Impact Score*															Total Score	
	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	7.2		7.3
M01	1	2	0	2	1	0	0	0	2	2	1	0	0	0	0	1	12
M02	1	2	2	0	0	0	0	0	1	0	1	2	2	0	0	0	11
M03	1	2	1	0	0	1	1	0	2	1	1	0	0	0	0	1	11
M04	1	2	0	0	0	1	0	0	2	2	0	0	2	0	0	0	10
M05	1	2	0	0	0	0	2	0	2	2	0	0	1	1	0	1	12
M06	1	2	1	0	0	0	2	0	2	2	0	1	1	0	0	1	13
M06-S1.01	0	2	0	2	0	0	0	0	1	2	1	0	0	0	0	2	10
M06-S2.01	0	1	2	0	0	0	2	0	1	0	0	0	1	2	0	1	10
M07	1	2	0	0	0	0	2	0	2	2	1	0	1	0	0	0	11
M08	1	2	1	0	0	0	0	0	2	0	1	0	0	2	0	1	10
M09	1	2	1	0	0	0	0	0	2	0	2	2	2	0	0	1	13
M10	1	2	1	0	0	0	0	0	2	0	0	0	2	1	0	0	9
M11	1	2	0	0	0	0	0	0	2	0	1	0	0	0	0	0	6
M11-S1.01	0	2	1	0	0	0	0	0	2	0	0	0	0	0	0	0	5
M12	1	2	0	0	0	0	0	0	2	0	1	0	0	1	0	1	8
M13	1	2	0	0	0	0	0	0	2	0	2	0	1	1	0	1	10
M13-S1.01	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	3
M13-S1.01-t1.01	0	2	1	0	0	0	0	0	2	0	0	0	0	0	0	2	7
M13-S1.02	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	3
M14	1	2	1	0	0	1	2	0	2	2	1	0	0	2	0	1	15
M14-S1.01	0	2	0	0	0	1	0	0	2	1	0	0	0	0	0	1	7
M15	1	2	1	0	0	0	2	1	2	0	0	0	0	2	0	1	12
M16	1	2	0	0	0	0	0	0	2	0	1	0	0	0	0	0	6
M17	1	2	1	0	0	0	2	0	2	0	1	0	1	2	0	1	13
M18	1	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	5
M19	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
M20	1	2	0	0	0	0	0	0	2	0	2	0	0	0	0	2	9
M21	1	1	0	0	0	0	2	0	0	0	0	0	0	1	0	1	6
M22	1	0	0	2	0	0	0	0	0	0	0	0	1	0	0	1	5
M23	1	2	0	0	0	0	2	0	0	0	0	0	1	1	0	1	8
M24	1	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	5
T1.01	1	2	1	1	0	0	0	0	2	0	1	0	0	0	0	1	9
T2.01	1	2	2	0	0	1	2	0	0	0	0	0	0	0	0	1	9
T2.02	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
T2.03	1	1	2	0	0	0	0	0	0	1	0	0	0	2	0	0	7

**Saxtons River Impact Ratings (Step 8)**

Reach ID	Step Number <sup>†</sup> with Impact Score*															Total Score	
	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	7.2		7.3
T2.04	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3
T2.05	1	1	1	0	0	0	0	0	1	0	0	0	2	0	0	1	7
T2.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
T3.01	1	2	0	0	0	0	0	0	2	0	1	0	0	0	0	1	7
T3.02	1	1	0	0	0	0	0	0	1	0	0	0	2	0	0	1	6
T3.03	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
T3.04	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3
T3.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
T4.01	1	1	2	0	0	0	1	0	1	0	1	2	0	1	0	1	11
T4.02	1	1	1	0	0	0	0	0	1	1	0	0	0	2	0	0	7
T4.03	1	2	1	0	0	0	0	0	2	0	0	0	2	2	0	0	10
T4.04	1	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4
T4.S1.01	1	2	0	0	0	0	0	0	0	2	0	0	0	0	0	1	6
T4.S1.02	1	2	0	2	0	0	0	0	2	0	0	0	0	0	0	2	9
T5.01	1	1	0	1	0	0	1	0	0	0	1	1	0	2	0	1	9
T5.02	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	4
T6.01	1	2	1	1	0	0	2	0	2	0	1	0	0	0	0	1	11
T6.02	1	2	2	0	0	0	0	0	2	0	1	0	1	2	0	0	11
T6.03	1	2	2	0	0	0	0	0	2	0	1	0	1	2	0	0	11
T6.04	1	2	2	0	0	0	2	2	2	0	2	0	1	2	0	0	16
T6.05	1	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	5
T6.06	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3
T6.S1.01	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	1	4
T6.S2.01	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	1	5

\* 0 = Not Significant or No Data; 1 = Low; 2 = High

† Step 4: Land Cover and Reach Hydrology

Step 5: Channel Modifications

Step 6: Floodplain Modifications and Planform Changes

Step 7: Bed and Bank Condition

**Saxtons River Predicted Channel Adjustment Processes (Step 9)**

Reach ID	9.1 Predicted Adjustment Scores				9.2 Reach Condition		9.3 Reach Sensitivity
	Degradation	Aggradation	Widening	Planform	Project*	Statewide*	
M01	9	7	5	0	Fair	Good	Moderate
M02	2	5	4	6	Fair	Good	Moderate
M03	5	6	3	1	Fair	Good	Moderate
M04	6	5	3	5	Fair	Good	Moderate
M05	9	5	3	7	Fair	Good	Moderate
M06	6	6	3	7	Fair	Good	Moderate
M06-S1.01	6	8	5	8	Poor	Good	Moderate
M06-S2.01	4	3	2	4	Good	Good	High
M07	8	5	3	7	Fair	Good	Moderate
M08	4	4	0	0	Good	Reference	Moderate
M09	4	4	2	2	Good	Reference	Moderate
M10	5	6	3	3	Fair	Good	Moderate
M11	4	3	0	0	Good	Reference	Moderate
M11-S1.01	4	3	0	0	Good	Reference	High
M12	3	3	0	0	Reference	Reference	Moderate
M13	3	3	2	0	Good	Reference	Moderate
M13-S1.01	2	2	0	0	Reference	Reference	High
M13-S1.01-t1.01	4	5	2	2	Good	Good	High
M13-S1.02	2	1	0	0	Reference	Reference	Moderate
M14	8	6	3	7	Fair	Good	Moderate
M14-S1.01	4	2	0	0	Reference	Reference	High
M15	7	6	3	6	Fair	Good	Moderate
M16	4	3	0	0	Good	Reference	Moderate
M17	6	6	3	5	Fair	Good	Moderate
M18	4	3	0	0	Good	Reference	Moderate
M19	2	3	0	0	Reference	Reference	Moderate
M20	4	5	4	0	Good	Good	Moderate
M21	2	2	0	2	Reference	Reference	High
M22	2	3	2	2	Good	Reference	High
M23	3	3	0	2	Good	Reference	High
M24	4	3	0	0	Good	Reference	Very Low
T1.01	4	4	0	0	Good	Reference	Very Low
T2.01	4	5	4	6	Fair	Good	High
T2.02	2	2	0	0	Reference	Reference	Moderate
T2.03	2	4	2	2	Good	Reference	High
T2.04	4	1	0	0	Reference	Reference	Moderate
T2.05	2	3	0	0	Reference	Reference	High
T2.06	2	0	0	0	Reference	Reference	Very Low
T3.01	4	3	0	0	Good	Reference	High
T3.02	2	2	0	0	Reference	Reference	Moderate
T3.03	2	1	0	0	Reference	Reference	High
T3.04	2	1	0	0	Reference	Reference	High
T3.05	2	0	0	0	Reference	Reference	Very Low
T4.01	2	4	2	5	Good	Good	High
T4.02	2	3	0	0	Reference	Reference	High
T4.03	4	4	0	0	Good	Reference	Moderate
T4.04	2	3	0	0	Reference	Reference	Very Low
T4.S1.01	4	3	0	0	Good	Reference	High
T4.S1.02	6	9	5	3	Fair	Good	High

**Saxtons River Predicted Channel Adjustment Processes (Step 9)**

Reach ID	9.1 Predicted Adjustment Scores				9.2 Reach Condition		9.3 Reach Sensitivity
	Degradation	Aggradation	Widening	Planform	Project*	Statewide*	
T5.01	3	2	0	1	Reference	Reference	Moderate
T5.02	4	4	2	2	Good	Reference	Moderate
T6.01	<b>6</b>	<b>6</b>	3	5	Fair	Good	Moderate
T6.02	4	5	4	4	Fair	Good	Moderate
T6.03	4	5	4	4	Fair	Good	Very Low
T6.04	8	7	7	<b>10</b>	Poor	Fair	Very Low
T6.05	4	3	0	0	Good	Reference	Very Low
T6.06	0	2	0	0	Reference	Reference	Moderate
T6.S1.01	4	0	0	0	Reference	Reference	Very Low
T6.S2.01	4	0	2	0	Reference	Reference	Very Low

\* Conditions relative to the Saxtons River watershed ("project") versus overall Vermont ("statewide")  
 Note: **Bold** values indicate the dominant adjustment processes (when moderate to severe; value > 5)

## **Appendix B**

### **Phase 1 Reach Reports**

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M01**  
 Topo Maps: **WALPOLE**  
 Date Last Edited: **Wed, June 18, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From the confluence with the Connecticut River to first reach break at Westminster**  
 1.2 Towns: **Westminster**  
 1.3 Downstream Latitude: **43.12**  
 1.3 Downstream Longitude: **-72.44**

## Step 2. Stream Type

2.1 Elevation Upstream: **250**  
 2.1 Elevation Downstream: **228**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **1470 feet. 0.28Miles.**  
 2.3 Valley Slope: **1.50 %**  
 2.4 Channel Length: **1586 feet. 0.30Miles.**  
 2.5 Channel Slope: **1.39 %**  
 2.6 Sinuosity: **1.08**  
 2.7 Watershed Area: **78** Square Miles  
 2.8 Channel Width: **89** feet.  
 2.9 Valley Width: **155** feet.  
 2.10 Confinement Ratio: **2**  
 2.10 Confinement Type: **Narrowly Confined**  
 2.11 Reference Stream Type: **B**  
 Bedform: **Riffle-Pool**  
 Sub-class Slope: **c**  
 Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **Waterfall**  
 3.3 Dominant Geologic Mat.: **Ice-Contact 100. %**  
 3.3 Sub-dominant Geological Mat.:  
 3.4 Left Valley Side **Extremely Steep**  
 3.4 Right Valley Side **Extremely Steep**  
 3.5 Soils  
 Hydrologic Group: **A 100. %**  
 Flooding: **None/Rare 100. %**  
 Water Table Deep: **6.0 100. %**  
 Water Table Shallow: **6.0 100. %**  
 Erodibility: **High - 89.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Urban**  
 Current Dominant land Cover: **Forest 81.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Urban 63.0 %**  
 Current Sub-Dominant Land Cover: **Forest**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **51-100 >100**  
 Sub-dominant: **26-50 None**  
 Length w/ less than 25 ft.: **0 0**

4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **Impoundment**  
 Type: **Large Run of River**  
 Use: **Other**

5.2 Bridges and Culverts: **2 5 %**

5.3 Bank Armoring: **0.0**  
 Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **560** ft. **35 %**  
 One Side Both Sides

Road: **560** 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: **314** ft. **318** ft.

6.3 Channel Bars: **Side**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

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

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	7.2	Total
1	2	0	2	1	0	0	0	2	2	1	0	0	0	0	1	12
Low	High	N.S.	High	Low	N.S.	N.S.	N.S.	High	High	Low	N.S.	N/A	N/A	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M02**  
 Topo Maps: **WALPOLE**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break to the change in confinement (unconfined to**  
 1.2 Towns: **Westminster**  
 1.3 Downstream Latitude: **43.12**  
 1.3 Downstream Longitude: **-72.44**

## Step 2. Stream Type

2.1 Elevation Upstream: **280**  
 2.1 Elevation Downstream: **270**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **3084 feet. 0.58Miles.**  
 2.3 Valley Slope: **0.32 %**  
 2.4 Channel Length: **3316 feet. 0.63Miles.**  
 2.5 Channel Slope: **0.30 %**  
 2.6 Sinuosity: **1.08**  
 2.7 Watershed Area: **78** Square Miles  
 2.8 Channel Width: **89** feet.  
 2.9 Valley Width: **1,175** feet.  
 2.10 Confinement Ratio: **13**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Alluvial 75.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side **Very Steep**  
 3.4 Right Valley Side **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **B 69.0 %**  
 Flooding: **Frequent 75.0 %**  
 Water Table Deep: **6.0 86.0 %**  
 Water Table Shallow: **6.0 86.0 %**  
 Erodibility: **High - 23.0 %**

## 7.4 Comments:

Evidence of depositional features on orthos, but not confirmed in the field.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Field**  
 Current Dominant land Cover: **Forest 81.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Field**  
 Current Dominant land Cover: **Urban 51.0 %**  
 Current Sub-Dominant Land Cover: **Crop**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **51-100 51-100**  
 Sub-dominant: **>100 >100**  
 Length w/ less than 25 ft.: **217 771**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **0 0 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **541** ft. **16 %**

One Side Both Sides

Road: **541** 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: **Side**

6.4 Meander Migration: **Multiple**

6.5 Meander Width: **205.0** Ratio: **2.3**

6.6 Wavelength: **990.0** Ratio: **11.1**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

7.3 Ice/Debris Jam Potential: **Not Evaluated**

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	7.2	Total
1	2	2	0	0	0	0	0	1	0	1	2	2	0	0	0	11
Low	High	High	N.S.	N.S.	N.S.	N.S.	N.S.	Low	N.S.	Low	High	High	N.S.	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M03**  
 Topo Maps: **WALPOLE**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break until ~750 feet upstream of Interstate-91S road**  
 1.2 Towns: **Westminster**  
 1.3 Downstream Latitude: **43.12**  
 1.3 Downstream Longitude: **-72.45**

## Step 2. Stream Type

2.1 Elevation Upstream: **375**  
 2.1 Elevation Downstream: **270**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **8550 feet. 1.62Miles.**  
 2.3 Valley Slope: **1.23 %**  
 2.4 Channel Length: **10084 feet. 1.91Miles.**  
 2.5 Channel Slope: **1.04 %**  
 2.6 Sinuosity: **1.18**  
 2.7 Watershed Area: **77 Square Miles**  
 2.8 Channel Width: **89 feet.**  
 2.9 Valley Width: **225 feet.**  
 2.10 Confinement Ratio: **3**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **Waterfall**  
 3.3 Dominant Geologic Mat.: **Ice-Contact 62.0 %**  
 3.3 Sub-dominant Geological Mat.: **Alluvial**  
 3.4 Left Valley Side: **Steep**  
 3.4 Right Valley Side: **Steep**  
 3.5 Soils  
 Hydrologic Group: **A 58.0 %**  
 Flooding: **None/Rare 62.0 %**  
 Water Table Deep: **6.0 79.0 %**  
 Water Table Shallow: **6.0 79.0 %**  
 Erodibility: **High - 60.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 81.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Residential**  
 Current Dominant land Cover: **Urban 35.0 %**  
 Current Sub-Dominant Land Cover: **Forest**

4.3 Riparian Buffer  
 Dominant: **>100 >100**  
 Sub-dominant: **26-50 0-25**  
 Length w/ less than 25 ft.: **907 897**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **4 2 %**

5.3 Bank Armoring: **5 %**

Left **123** Right **461**

5.4 Channel Straightening: **1134 11 %**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **4302 ft. 42 %**  
 One Side Both Sides

Road: **3252 ft. 1050.2 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: **693 ft. 0.0 ft.**

6.3 Channel Bars: **Multiple**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **149.23 ft.**

7.2 Bank Height: **4.00 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	7.2	Total
1	2	1	0	0	1	1	0	2	1	1	0	0	0	0	1	11
Low	High	Low	N.S.	N.S.	Low	Low	N.S.	High	Low	Low	N.S.	N/A	N/A	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M04**  
 Topo Maps: **BELLOWS FALLS, WALPOLE**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break near I-91 crossing until the change in slope ~175**  
 1.2 Towns: **Rockingham, Westminster**  
 1.3 Downstream Latitude: **43.12**  
 1.3 Downstream Longitude: **-72.47**

## Step 2. Stream Type

2.1 Elevation Upstream: **393**  
 2.1 Elevation Downstream: **375**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **4406 feet. 0.83Miles.**  
 2.3 Valley Slope: **0.41 %**  
 2.4 Channel Length: **4666 feet. 0.88Miles.**  
 2.5 Channel Slope: **0.39 %**  
 2.6 Sinuosity: **1.06**  
 2.7 Watershed Area: **75** Square Miles  
 2.8 Channel Width: **87** feet.  
 2.9 Valley Width: **1,223** feet.  
 2.10 Confinement Ratio: **14**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Alluvial 83.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side: **Hilly**  
 3.4 Right Valley Side: **Hilly**  
 3.5 Soils  
 Hydrologic Group: **B 84.0 %**  
 Flooding: **Frequent 83.0 %**  
 Water Table Deep: **6.0 60.0 %**  
 Water Table Shallow: **6.0 60.0 %**  
 Erodibility: **High - 14.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 82.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Field**  
 Current Dominant land Cover: **Forest 32.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.3 Riparian Buffer

	Left Bank	Right Bank
Dominant:	<b>&gt;100</b>	<b>&gt;100</b>
Sub-dominant:	<b>51-100</b>	<b>51-100</b>
Length w/ less than 25 ft.:	<b>0</b>	<b>0</b>

### 4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

### 5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **1 1 %**

5.3 Bank Armoring: **12 %**

Left **327** Right **259**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **4143** ft. **88 %**

One Side Both Sides

Road: **2657** ft. **1486** 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: **972** ft. **0.0** ft.

6.3 Channel Bars: **Side**

6.4 Meander Migration:

6.5 Meander Width: **210.0** Ratio: **2.4**

6.6 Wavelength: **1050.0** Ratio: **12.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 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	7.2	Total
1	2	0	0	0	1	0	0	2	2	0	0	2	0	0	0	10
Low	High	N.S.	N.S.	N.S.	Low	N.S.	N.S.	High	High	N.S.	N.S.	High	N.S.	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M05**  
 Topo Maps: **BELLOWS FALLS, SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break to change in land use approaching the more**  
 1.2 Towns: **Rockingham**  
 1.3 Downstream Latitude: **43.13**  
 1.3 Downstream Longitude: **-72.48**

## Step 2. Stream Type

2.1 Elevation Upstream: **427**  
 2.1 Elevation Downstream: **393**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **6507** feet. **1.23**Miles.  
 2.3 Valley Slope: **0.52** %  
 2.4 Channel Length: **6809** feet. **1.29**Miles.  
 2.5 Channel Slope: **0.50** %  
 2.6 Sinuosity: **1.05**  
 2.7 Watershed Area: **72** Square Miles  
 2.8 Channel Width: **86** feet.  
 2.9 Valley Width: **476** feet.  
 2.10 Confinement Ratio: **6**  
 2.10 Confinement Type: **Narrow**  
 2.11 Reference Stream Type: **C**  
 Bedform: **Riffle-Pool**  
 Sub-class Slope: **None**  
 Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Ice-Contact 77.0** %  
 3.3 Sub-dominant Geological Mat.: **Till**  
 3.4 Left Valley Side **Very Steep**  
 3.4 Right Valley Side **Steep**  
 3.5 Soils  
 Hydrologic Group: **A 72.0** %  
 Flooding: **None/Rare 96.0** %  
 Water Table Deep: **6.0 94.0** %  
 Water Table Shallow: **6.0 94.0** %  
 Erodibility: **High - 96.0** %

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 82.0** %  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Field**  
 Current Dominant land Cover: **Urban 37.0** %  
 Current Sub-Dominant Land Cover: **Forest**

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

### 4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

### 5.1 Flow Regulation - (old): **None**

Type: **None**  
 Use:

5.2 Bridges and Culverts: **1 0** %

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **1624 23** %

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **6445** ft. **94** %  
 One Side Both Sides

Road: **5064** ft. **1380.8** 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: **1691** ft. **297** ft.

6.3 Channel Bars: **Point**

6.4 Meander Migration:

6.5 Meander Width: **260.0** Ratio: **3.0**

6.6 Wavelength: **1230.0** Ratio: **14.3**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00** ft.

7.2 Bank Height: **0.00** 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	7.2	Total
1	2	0	0	0	0	2	0	2	2	0	0	1	1	0	1	12
Low	High	N.S.	N.S.	N.S.	N.S.	High	N.S.	High	High	N.S.	N.S.	Low	Low	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M06**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break to confluence with second major tributary T2.01.**  
 1.2 Towns: **Rockingham**  
 1.3 Downstream Latitude: **43.14**  
 1.3 Downstream Longitude: **-72.50**

## Step 2. Stream Type

2.1 Elevation Upstream: **490**  
 2.1 Elevation Downstream: **427**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **5007 feet. 0.95Miles.**  
 2.3 Valley Slope: **1.26 %**  
 2.4 Channel Length: **6550 feet. 1.24Miles.**  
 2.5 Channel Slope: **0.96 %**  
 2.6 Sinuosity: **1.31**  
 2.7 Watershed Area: **71 Square Miles**  
 2.8 Channel Width: **86 feet.**  
 2.9 Valley Width: **1,959 feet.**  
 2.10 Confinement Ratio: **23**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **Waterfall**  
 3.3 Dominant Geologic Mat.: **Ice-Contact 60.0 %**  
 3.3 Sub-dominant Geological Mat.: **Alluvial**  
 3.4 Left Valley Side: **Hilly**  
 3.4 Right Valley Side: **Steep**  
 3.5 Soils  
 Hydrologic Group: **A 59.0 %**  
 Flooding: **None/Rare 70.0 %**  
 Water Table Deep: **6.0 98.0 %**  
 Water Table Shallow: **6.0 98.0 %**  
 Erodibility: **High - 69.0 %**

## 7.4 Comments:

Foundations downstream of Westminster Street crossing and historical photos suggest possible historic flood damage. In the town of Saxtons River.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Crop**  
 Current Dominant land Cover: **Forest 83.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Urban 42.0 %**  
 Current Sub-Dominant Land Cover: **Forest**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **>100 >100**  
 Sub-dominant: **51-100 26-50**  
 Length w/ less than 25 ft.: **93 474**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **3 2 %**

5.3 Bank Armoring: **1 %**

Left **120** Right **0.0**

5.4 Channel Straightening: **3164 48 %**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **4540 ft. 69 %**  
 One Side Both Sides

Road: **3707 ft. 832 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: **3073.2 ft. 2003 ft.**

6.3 Channel Bars: **Side**

6.4 Meander Migration: **Flood Chute**

6.5 Meander Width: **365.0 Ratio: 4.3**

6.6 Wavelength: **990.0 Ratio: 11.6**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

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

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	7.2	Total
1	2	1	0	0	0	2	0	2	2	0	1	1	0	0	1	13
Low	High	Low	N.S.	N.S.	N.S.	High	N.S.	High	High	N.S.	Low	Low	N.S.	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Trib to Saxtons** Reach **M06-S1.01**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Tue, June 17, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **Confluence with the main stem of the Saxtons River near the**  
 1.2 Towns: **Rockingham**  
 1.3 Downstream Latitude: **43.14**  
 1.3 Downstream Longitude: **-72.50**

## Step 2. Stream Type

2.1 Elevation Upstream: **669**  
 2.1 Elevation Downstream: **443**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **6480 feet. 1.23Miles.**  
 2.3 Valley Slope: **3.49 %**  
 2.4 Channel Length: **7098 feet. 1.34Miles.**  
 2.5 Channel Slope: **3.18 %**  
 2.6 Sinuosity: **1.10**  
 2.7 Watershed Area: **2** Square Miles  
 2.8 Channel Width: **16** feet.  
 2.9 Valley Width: **70** feet.  
 2.10 Confinement Ratio: **4**  
 2.10 Confinement Type: **Narrow**  
 2.11 Reference Stream Type: **B**  
 Bedform: **Step-Pool**  
 Sub-class Slope: **None**  
 Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.:  
 3.3 Sub-dominant Geological Mat.:  
 3.4 Left Valley Side **Hilly**  
 3.4 Right Valley Side **Steep**  
 3.5 Soils  
 Hydrologic Group: %  
 Flooding: %  
 Water Table Deep: %  
 Water Table Shallow: %  
 Erodibility: %

## 7.4 Comments:

Impoundment upstream of Vermont academy may be used for irrigation.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Crop**  
 Current Dominant land Cover: %  
 Current Sub-Dominant Land Cover:

### 4.2 Corridor

Historic Land Cover: **Field**  
 Current Dominant land Cover: **Forest 44.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **51-100 >100**  
 Sub-dominant: **26-50 51-100**  
 Length w/ less than 25 ft.: **0 0**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **Impoundment**  
 Type: **Large Run of River**  
 Use: **Other**

5.2 Bridges and Culverts: **4 2 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **1007** ft. **14 %**  
 One Side Both Sides

Road: **1007** 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: **387** ft. **1070** ft.

6.3 Channel Bars: **Delta**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **86.45 ft.**

7.2 Bank Height: **0.00 ft.**

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

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	7.2	Total
0	2	0	2	0	0	0	0	1	2	1	0	0	0	0	2	10
N.S.	High	N.S.	High	N.S.	N.S.	N.S.	N.S.	Low	High	Low	N.S.	N/A	N/A	N.S.	High	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Trib to Saxtons** Reach **M06-S2.01**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Tue, June 17, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **Confluence with main stem about mid-way through reach M06 near Rockingham**  
 1.2 Towns: **Rockingham**  
 1.3 Downstream Latitude: **43.14**  
 1.3 Downstream Longitude: **-72.51**

## Step 2. Stream Type

2.1 Elevation Upstream: **564**  
 2.1 Elevation Downstream: **476**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **5050 feet. 0.96Miles.**  
 2.3 Valley Slope: **1.74 %**  
 2.4 Channel Length: **5386 feet. 1.02Miles.**  
 2.5 Channel Slope: **1.63 %**  
 2.6 Sinuosity: **1.07**  
 2.7 Watershed Area: **1 Square Miles**  
 2.8 Channel Width: **14 feet.**  
 2.9 Valley Width: **150 feet.**  
 2.10 Confinement Ratio: **11**  
 2.10 Confinement Type: **Very Broad**  
 2.11 Reference Stream Type: **C**

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Field**  
 Current Dominant land Cover: %  
 Current Sub-Dominant Land Cover:

### 4.2 Corridor

Historic Land Cover: **Field**  
 Current Dominant land Cover: **Forest 70.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.3 Riparian Buffer

	Left Bank	Right Bank
Dominant:	<b>&gt;100</b>	<b>26-50</b>
Sub-dominant:	<b>0-25</b>	<b>0-25</b>
Length w/ less than 25 ft.:	<b>1155</b>	<b>717</b>

### 4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

### 5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **2** **1 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **1484** **27 %**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **933.0** ft. **17 %**

One Side Both Sides

Road: **933.0** 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: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **110.0** Ratio: **8.1**

6.6 Wavelength: **530.0** Ratio: **39.1**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

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

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.:  
 3.3 Sub-dominant Geological Mat.:  
 3.4 Left Valley Side **Very Steep**  
 3.4 Right Valley Side **Steep**  
 3.5 Soils  
 Hydrologic Group: %  
 Flooding: %  
 Water Table Deep: %  
 Water Table Shallow: %  
 Erodibility: %

7.4 Comments:

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	7.2	Total
0	1	2	0	0	0	2	0	1	0	0	0	1	2	0	1	10
N.S.	Low	High	N.S.	N.S.	N.S.	High	N.S.	Low	N.S.	N.S.	N.S.	Low	High	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M07**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break up to confluence with T3.01 tributary.**

1.2 Towns: **Rockingham**

1.3 Downstream Latitude: **43.13**

1.3 Downstream Longitude: **-72.52**

## Step 2. Stream Type

2.1 Elevation Upstream: **541**

2.1 Elevation Downstream: **490**

2.1 Is Gradient Gentle? **No**

2.2 Valley Length: **4573 feet. 0.87Miles.**

2.3 Valley Slope: **1.12 %**

2.4 Channel Length: **4690 feet. 0.89Miles.**

2.5 Channel Slope: **1.09 %**

2.6 Sinuosity: **1.03**

2.7 Watershed Area: **62** Square Miles

2.8 Channel Width: **80** feet.

2.9 Valley Width: **760** feet.

2.10 Confinement Ratio: **9**

2.10 Confinement Type: **Broad**

2.11 Reference Stream Type: **C**

Bedform: **Riffle-Pool**

Sub-class Slope: **None**

Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**

3.2 Grade Control: **None**

3.3 Dominant Geologic Mat.: **Alluvial 49.0 %**

3.3 Sub-dominant Geological Mat.: **Ice-Contact**

3.4 Left Valley Side: **Steep**

3.4 Right Valley Side: **Hilly**

## 3.5 Soils

Hydrologic Group: **B 80.0 %**

Flooding: **None/Rare 50.0 %**

Water Table Deep: **6.0 55.0 %**

Water Table Shallow: **6.0 55.0 %**

Erodibility: **High - 49.0 %**

7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**

Current Dominant land Cover: **Forest 83.0 %**

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

### 4.2 Corridor

Historic Land Cover: **Forest**

Current Dominant land Cover: **Forest 21.0 %**

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

4.3 Riparian Buffer Left Bank Right Bank

Dominant: **51-100 >100**

Sub-dominant: **>100 51-100**

Length w/ less than 25 ft.: **0 139**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **0 0 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **2025 43 %**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **3909** ft. **83 %**

One Side Both Sides

Road: **3909** 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: **1673** ft. **0.0** ft.

6.3 Channel Bars: **Mid-channel**

6.4 Meander Migration:

6.5 Meander Width: **280.0** Ratio: **3.5**

6.6 Wavelength: **1050.0** Ratio: **13.1**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 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	7.2	Total
1	2	0	0	0	0	2	0	2	2	1	0	1	0	0	0	11
Low	High	N.S.	N.S.	N.S.	N.S.	High	N.S.	High	High	Low	N.S.	Low	N.S.	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M08**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break following Saxtons River Rd. up to the confluence**  
 1.2 Towns: **Rockingham**  
 1.3 Downstream Latitude: **43.14**  
 1.3 Downstream Longitude: **-72.53**

## Step 2. Stream Type

2.1 Elevation Upstream: **575**  
 2.1 Elevation Downstream: **541**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **6335 feet. 1.20Miles.**  
 2.3 Valley Slope: **0.54 %**  
 2.4 Channel Length: **6878 feet. 1.30Miles.**  
 2.5 Channel Slope: **0.49 %**  
 2.6 Sinuosity: **1.09**  
 2.7 Watershed Area: **59** Square Miles  
 2.8 Channel Width: **79** feet.  
 2.9 Valley Width: **509** feet.  
 2.10 Confinement Ratio: **6**  
 2.10 Confinement Type: **Broad**  
 2.11 Reference Stream Type: **C**  
 Bedform: **Riffle-Pool**  
 Sub-class Slope: **None**  
 Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact** **32.0 %**  
 3.4 Left Valley Side: **Steep**  
 3.4 Right Valley Side: **Extremely Steep**  
 3.5 Soils  
 Hydrologic Group: **B** **74.0 %**  
 Flooding: **None/Rare** **67.0 %**  
 Water Table Deep: **3.0** **39.0 %**  
 Water Table Shallow: **1.5** **46.0 %**  
 Erodibility: **High -** **56.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 83.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 36.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer  
 Dominant: **>100** **>100**  
 Sub-dominant: **51-100** **0-25**  
 Length w/ less than 25 ft.: **0** **647**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **1** **0 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0** **0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **1622** ft. **23 %**

One Side Both Sides

Road: **1622** 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:

6.5 Meander Width: **395.0** Ratio: **5.0**

6.6 Wavelength: **1550.0** Ratio: **19.7**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 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	7.2	Total
1	2	1	0	0	0	0	0	2	0	1	0	0	2	0	1	10
Low	High	Low	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	Low	N.S.	N.S.	High	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M09**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **Broad Valley from reach break to change in valley wall where the Athens, Grafton, Rockingham**  
 1.2 Towns:  
 1.3 Downstream Latitude: **43.15**  
 1.3 Downstream Longitude: **-72.55**

## Step 2. Stream Type

2.1 Elevation Upstream: **609**  
 2.1 Elevation Downstream: **575**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **4144 feet. 0.78Miles.**  
 2.3 Valley Slope: **0.82 %**  
 2.4 Channel Length: **4262 feet. 0.81Miles.**  
 2.5 Channel Slope: **0.80 %**  
 2.6 Sinuosity: **1.03**  
 2.7 Watershed Area: **47 Square Miles**  
 2.8 Channel Width: **71 feet.**  
 2.9 Valley Width: **752 feet.**  
 2.10 Confinement Ratio: **11**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Alluvial 67.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side: **Hilly**  
 3.4 Right Valley Side: **Flat**  
 3.5 Soils  
 Hydrologic Group: **B 67.0 %**  
 Flooding: **Frequent 67.0 %**  
 Water Table Deep: **6.0 63.0 %**  
 Water Table Shallow: **6.0 63.0 %**  
 Erodibility: **High - 9.0 %**

## 7.4 Comments:

Orthophotos indicate a large avulsion and many depositional features, which have yet to be determined in the field.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Crop**  
 Current Dominant land Cover: **Forest 84.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Crop**  
 Current Dominant land Cover: **Forest 34.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **51-100 51-100**  
 Sub-dominant: **>100 26-50**  
 Length w/ less than 25 ft.: **0 436**

### 4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

### 5.1 Flow Regulation - (old): **None**

Type: **None**  
 Use:

5.2 Bridges and Culverts: **1 1 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **171 4 %**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **1055 ft. 24 %**  
 One Side Both Sides  
 Road: **0.0 ft. 1055 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: **200.0 Ratio: 2.8**

6.6 Wavelength: **680.0 Ratio: 9.6**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

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

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	7.2	Total
1	2	1	0	0	0	0	0	2	0	2	2	2	0	0	1	13
Low	High	Low	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	High	High	High	N.S.	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M10**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break to change in confinement and slope**

1.2 Towns: **Grafton**

1.3 Downstream Latitude: **43.15**

1.3 Downstream Longitude: **-72.56**

## Step 2. Stream Type

2.1 Elevation Upstream: **637**

2.1 Elevation Downstream: **609**

2.1 Is Gradient Gentle? **No**

2.2 Valley Length: **2950 feet. 0.56 Miles.**

2.3 Valley Slope: **0.95 %**

2.4 Channel Length: **3174 feet. 0.60 Miles.**

2.5 Channel Slope: **0.88 %**

2.6 Sinuosity: **1.08**

2.7 Watershed Area: **43** Square Miles

2.8 Channel Width: **69** feet.

2.9 Valley Width: **453** feet.

2.10 Confinement Ratio: **7**

2.10 Confinement Type: **Broad**

2.11 Reference Stream Type: **C**

Bedform: **Riffle-Pool**

Sub-class Slope: **None**

Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**

3.2 Grade Control: **None**

3.3 Dominant Geologic Mat.: **Ice-Contact 76.0 %**

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

3.4 Left Valley Side: **Extremely Steep**

3.4 Right Valley Side: **Steep**

## 3.5 Soils

Hydrologic Group: **A 76.0 %**

Flooding: **None/Rare 95.0 %**

Water Table Deep: **6.0 95.0 %**

Water Table Shallow: **6.0 95.0 %**

Erodibility: **High - 21.0 %**

7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Field**

Current Dominant land Cover: **Forest 85.0 %**

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

### 4.2 Corridor

Historic Land Cover: **Field**

Current Dominant land Cover: **Urban 31.0 %**

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

4.3 Riparian Buffer Left Bank Right Bank

Dominant: **>100 >100**

Sub-dominant: **51-100 51-100**

Length w/ less than 25 ft.: **0 178**

4.4 Ground Water Inputs: **None**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **0 0 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **2486** ft. **78 %**

One Side Both Sides

Road: **1659** ft. **826.7** 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:

6.5 Meander Width: **180.0** Ratio: **2.6**

6.6 Wavelength: **970.0** Ratio: **14.1**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 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	7.2	Total
1	2	1	0	0	0	0	0	2	0	0	0	2	1	0	0	9
Low	High	Low	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	N.S.	N.S.	High	Low	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M11**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Thu, June 19, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **Unconfined reach that extends up until the stream becomes confined**  
 1.2 Towns: **Grafton**  
 1.3 Downstream Latitude: **43.16**  
 1.3 Downstream Longitude: **-72.57**

## Step 2. Stream Type

2.1 Elevation Upstream: **685**  
 2.1 Elevation Downstream: **637**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **4990 feet. 0.95Miles.**  
 2.3 Valley Slope: **0.96 %**  
 2.4 Channel Length: **5211 feet. 0.99Miles.**  
 2.5 Channel Slope: **0.92 %**  
 2.6 Sinuosity: **1.04**  
 2.7 Watershed Area: **43** Square Miles  
 2.8 Channel Width: **68** feet.  
 2.9 Valley Width: **110** feet.  
 2.10 Confinement Ratio: **2**  
 2.10 Confinement Type: **Narrowly Confined**  
 2.11 Reference Stream Type: **B**  
 Bedform: **Riffle-Pool**  
 Sub-class Slope: **None**  
 Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till**  
 3.3 Sub-dominant Geological Mat.: **Alluvial** **54.0 %**  
 3.4 Left Valley Side: **Steep**  
 3.4 Right Valley Side: **Extremely Steep**  
 3.5 Soils  
 Hydrologic Group: **B** **63.0 %**  
 Flooding: **None/Rare** **70.0 %**  
 Water Table Deep: **6.0** **70.0 %**  
 Water Table Shallow: **6.0** **70.0 %**  
 Erodibility: **High -** **62.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 85.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Field**  
 Current Dominant land Cover: **Forest 44.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

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**  
 4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**  
 Type: **None**  
 Use:

5.2 Bridges and Culverts: **1 1 %**  
 5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**  
 5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **2246** ft. **43 %**  
 One Side Both Sides  
 Road: **1775.5** ft. **470** 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: **Side**

6.4 Meander Migration:  
 6.5 Meander Width: **N/A Ratio: 0.0**  
 6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**  
 7.2 Bank Height: **0.00 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	7.2	Total
1	2	0	0	0	0	0	0	2	0	1	0	0	0	0	0	6
Low	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	Low	N.S.	N/A	N/A	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Ledge Road Brook** Reach **M11-S1.01**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From confluence with the main stem about 300 ft. Southeast of the Athens, Grafton**  
 1.2 Towns:  
 1.3 Downstream Latitude: **43.16**  
 1.3 Downstream Longitude: **-72.58**

## Step 2. Stream Type

2.1 Elevation Upstream: **1191**  
 2.1 Elevation Downstream: **672**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **7790 feet. 1.48Miles.**  
 2.3 Valley Slope: **6.66 %**  
 2.4 Channel Length: **8264 feet. 1.57Miles.**  
 2.5 Channel Slope: **6.28 %**  
 2.6 Sinuosity: **1.06**  
 2.7 Watershed Area: **2** Square Miles  
 2.8 Channel Width: **18** feet.  
 2.9 Valley Width: **55** feet.  
 2.10 Confinement Ratio: **3**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.:  
 3.3 Sub-dominant Geological Mat.:  
 3.4 Left Valley Side **Steep**  
 3.4 Right Valley Side **Very Steep**  
 3.5 Soils  
 Hydrologic Group: %  
 Flooding: %  
 Water Table Deep: %  
 Water Table Shallow: %  
 Erodibility: %

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: %  
 Current Sub-Dominant Land Cover:

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 60.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **>100 >100**  
 Sub-dominant: **0-25 None**  
 Length w/ less than 25 ft.: **453 0**

### 4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

### 5.1 Flow Regulation - (old): **None**

Type: **None**  
 Use:

5.2 Bridges and Culverts: **1 0 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **3469.5ft. 41 %**  
 One Side Both Sides

Road: **3469.5** 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:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

7.3 Ice/Debris Jam Potential: **Not Evaluated**

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	7.2	Total
0	2	1	0	0	0	0	0	2	0	0	0	0	0	0	0	5
N.S.	High	Low	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	N.S.	N.S.	N/A	N/A	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M12**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break to change in valley wall near farm.**

1.2 Towns: **Grafton**

1.3 Downstream Latitude: **43.17**

1.3 Downstream Longitude: **-72.58**

## Step 2. Stream Type

2.1 Elevation Upstream: **724**

2.1 Elevation Downstream: **685**

2.1 Is Gradient Gentle? **No**

2.2 Valley Length: **4226 feet. 0.80 Miles.**

2.3 Valley Slope: **0.92 %**

2.4 Channel Length: **4458 feet. 0.84 Miles.**

2.5 Channel Slope: **0.87 %**

2.6 Sinuosity: **1.05**

2.7 Watershed Area: **40** Square Miles

2.8 Channel Width: **66** feet.

2.9 Valley Width: **371** feet.

2.10 Confinement Ratio: **6**

2.10 Confinement Type: **Narrow**

2.11 Reference Stream Type: **C**

Bedform: **Riffle-Pool**

Sub-class Slope: **None**

Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**

3.2 Grade Control: **None**

3.3 Dominant Geologic Mat.: **Till 39.0 %**

3.3 Sub-dominant Geological Mat.: **Ice-Contact**

3.4 Left Valley Side: **Extremely Steep**

3.4 Right Valley Side: **Very Steep**

## 3.5 Soils

Hydrologic Group: **B 56.0 %**

Flooding: **None/Rare 74.0 %**

Water Table Deep: **6.0 68.0 %**

Water Table Shallow: **6.0 68.0 %**

Erodibility: **High - 62.0 %**

7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**

Current Dominant land Cover: **Forest 85.0 %**

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

### 4.2 Corridor

Historic Land Cover: **Field**

Current Dominant land Cover: **Forest 32.0 %**

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

4.3 Riparian Buffer Left Bank Right Bank

Dominant: **>100 51-100**

Sub-dominant: **None None**

Length w/ less than 25 ft.: **0 0**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **1 1 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **3255** ft. **73 %**

One Side Both Sides

Road: **3255** 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: **Side**

6.4 Meander Migration:

6.5 Meander Width: **400.0** Ratio: **6.0**

6.6 Wavelength: **1030.0** Ratio: **15.5**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 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	7.2	Total
1	2	0	0	0	0	0	0	2	0	1	0	0	1	0	1	8
Low	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	Low	N.S.	N.S.	Low	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M13**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **Long unconfined reach from reach break to the confluence with**  
 1.2 Towns: **Grafton**  
 1.3 Downstream Latitude: **43.18**  
 1.3 Downstream Longitude: **-72.58**

## Step 2. Stream Type

2.1 Elevation Upstream: **830**  
 2.1 Elevation Downstream: **724**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **8077 feet. 1.53Miles.**  
 2.3 Valley Slope: **1.31 %**  
 2.4 Channel Length: **8439 feet. 1.60Miles.**  
 2.5 Channel Slope: **1.26 %**  
 2.6 Sinuosity: **1.04**  
 2.7 Watershed Area: **39** Square Miles  
 2.8 Channel Width: **66** feet.  
 2.9 Valley Width: **465** feet.  
 2.10 Confinement Ratio: **7**  
 2.10 Confinement Type: **Broad**  
 2.11 Reference Stream Type: **C**  
 Bedform: **Riffle-Pool**  
 Sub-class Slope: **None**  
 Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Ice-Contact 65.0 %**  
 3.3 Sub-dominant Geological Mat.: **Alluvial**  
 3.4 Left Valley Side **Very Steep**  
 3.4 Right Valley Side **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **A 65.0 %**  
 Flooding: **None/Rare 79.0 %**  
 Water Table Deep: **6.0 92.0 %**  
 Water Table Shallow: **6.0 92.0 %**  
 Erodibility: **High - 50.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 85.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Shrub**  
 Current Dominant land Cover: **Urban 37.0 %**  
 Current Sub-Dominant Land Cover: **Forest**

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

4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **2 1 %**

5.3 Bank Armoring: **2 %**

Left **187** Right **0.0**

5.4 Channel Straightening: **30 0 %**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **7119** ft. **84 %**

One Side Both Sides

Road: **7119** 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. **106** ft.

6.3 Channel Bars: **Multiple**

6.4 Meander Migration:

6.5 Meander Width: **300.0** Ratio: **4.6**

6.6 Wavelength: **920.0** Ratio: **14.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **143.06** ft.

7.2 Bank Height: **5.00** 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	7.2	Total
1	2	0	0	0	0	0	0	2	0	2	0	1	1	0	1	10
Low	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	High	N.S.	Low	Low	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Trib to Saxtons** Reach **M13-S1.01**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From confluence with main stem near Theron Fisher Drive up reach**  
 1.2 Towns: **Grafton**  
 1.3 Downstream Latitude: **43.18**  
 1.3 Downstream Longitude: **-72.59**

## Step 2. Stream Type

2.1 Elevation Upstream: **1066**  
 2.1 Elevation Downstream: **754**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **7397 feet. 1.40Miles.**  
 2.3 Valley Slope: **4.22 %**  
 2.4 Channel Length: **7485 feet. 1.42Miles.**  
 2.5 Channel Slope: **4.17 %**  
 2.6 Sinuosity: **1.01**  
 2.7 Watershed Area: **4 Square Miles**  
 2.8 Channel Width: **23 feet.**  
 2.9 Valley Width: **50 feet.**  
 2.10 Confinement Ratio: **2**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.:  
 3.3 Sub-dominant Geological Mat.:  
 3.4 Left Valley Side **Extremely Steep**  
 3.4 Right Valley Side **Extremely Steep**  
 3.5 Soils  
 Hydrologic Group: %  
 Flooding: %  
 Water Table Deep: %  
 Water Table Shallow: %  
 Erodibility: %

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: %  
 Current Sub-Dominant Land Cover:

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 61.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.3 Riparian Buffer

	Left Bank	Right Bank
Dominant:	<b>&gt;100</b>	<b>&gt;100</b>
Sub-dominant:	<b>0-25</b>	<b>0-25</b>
Length w/ less than 25 ft.:	<b>260</b>	<b>824</b>

### 4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

### 5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **2** **1 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0** **0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and 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: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 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	7.2	Total
0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	3
N.S.	Low	Low	N.S.	N.S.	N.S.	N.S.	N.S.	Unk.	N.S.	N.S.	N.S.	N/A	N/A	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Trib to Saxtons** Reach **M13-S1.01-t1.01**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From confluence with M13.S.01 near Fisher Hill Rd. up to headwaters.**  
 1.2 Towns: **Grafton**  
 1.3 Downstream Latitude: **43.18**  
 1.3 Downstream Longitude: **-72.59**

## Step 2. Stream Type

2.1 Elevation Upstream: **1164**  
 2.1 Elevation Downstream: **771**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **8025 feet. 1.52Miles.**  
 2.3 Valley Slope: **4.90 %**  
 2.4 Channel Length: **8322 feet. 1.58Miles.**  
 2.5 Channel Slope: **4.72 %**  
 2.6 Sinuosity: **1.04**  
 2.7 Watershed Area: **2** Square Miles  
 2.8 Channel Width: **16** feet.  
 2.9 Valley Width: **75** feet.  
 2.10 Confinement Ratio: **5**  
 2.10 Confinement Type: **Narrow**  
 2.11 Reference Stream Type: **A**  
 Bedform: **Step-Pool**  
 Sub-class Slope: **None**  
 Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.:  
 3.3 Sub-dominant Geological Mat.:  
 3.4 Left Valley Side **Very Steep**  
 3.4 Right Valley Side **Steep**  
 3.5 Soils  
 Hydrologic Group: %  
 Flooding: %  
 Water Table Deep: %  
 Water Table Shallow: %  
 Erodibility: %

## 7.4 Comments:

Windshield survey revealed the VHD and the E911 Road layers off. The channel seemed to pass under the road more than anticipated. The culverts ranged in size and the abundance of

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Field**  
 Current Dominant land Cover: %  
 Current Sub-Dominant Land Cover:

### 4.2 Corridor

Historic Land Cover: **Field**  
 Current Dominant land Cover: **Urban 29.0 %**  
 Current Sub-Dominant Land Cover: **Wetland**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **51-100 >100**  
 Sub-dominant: **>100 51-100**  
 Length w/ less than 25 ft.: **398 696**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**  
 Type: **None**  
 Use:

5.2 Bridges and Culverts: **5 1 %**  
 5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**  
 5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **4704** ft. **56 %**  
 One Side Both Sides  
 Road: **4366.7** ft. **337** 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: **No Data**

6.4 Meander Migration:  
 6.5 Meander Width: **N/A Ratio: 0.0**  
 6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**  
 7.2 Bank Height: **0.00 ft.**  
 7.3 Ice/Debris Jam Potential: **Multiple**

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	7.2	Total
0	2	1	0	0	0	0	0	2	0	0	0	0	0	0	2	7
N.S.	High	Low	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	N.S.	N.S.	N/A	N/A	N.S.	High	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Trib to Saxtons** Reach **M13-S1.02**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break up into headwaters**

1.2 Towns: **Grafton**

1.3 Downstream Latitude: **43.19**

1.3 Downstream Longitude: **-72.60**

## Step 2. Stream Type

2.1 Elevation Upstream: **1410**

2.1 Elevation Downstream: **1066**

2.1 Is Gradient Gentle? **No**

2.2 Valley Length: **6475 feet. 1.23Miles.**

2.3 Valley Slope: **5.31 %**

2.4 Channel Length: **6971 feet. 1.32Miles.**

2.5 Channel Slope: **4.93 %**

2.6 Sinuosity: **1.08**

2.7 Watershed Area: **1 Square Miles**

2.8 Channel Width: **12 feet.**

2.9 Valley Width: **35 feet.**

2.10 Confinement Ratio: **3**

2.10 Confinement Type: **Semi-confined**

2.11 Reference Stream Type: **B**

Bedform: **Step-Pool**

Sub-class Slope: **a**

Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**

3.2 Grade Control: **None**

3.3 Dominant Geologic Mat.: **None**

3.3 Sub-dominant Geological Mat.: **None**

3.4 Left Valley Side **Hilly**

3.4 Right Valley Side **Hilly**

## 3.5 Soils

Hydrologic Group: %

Flooding: %

Water Table Deep: %

Water Table Shallow: %

Erodibility: %

7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**

Current Dominant land Cover: %

Current Sub-Dominant Land Cover:

### 4.2 Corridor

Historic Land Cover: **Forest**

Current Dominant land Cover: **Forest 62.0 %**

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**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **1 0 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **469** ft. **6 %**

One Side Both Sides

Road: **469** 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: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

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

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	7.2	Total
0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	3
N.S.	Low	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	Low	N.S.	N.S.	N.S.	N/A	N/A	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M14**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **Small reach starting at the confluence with T6.01 and ending at the Grafton**  
 1.2 Towns: **Grafton**  
 1.3 Downstream Latitude: **43.17**  
 1.3 Downstream Longitude: **-72.60**

## Step 2. Stream Type

2.1 Elevation Upstream: **863**  
 2.1 Elevation Downstream: **830**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **2576 feet. 0.49Miles.**  
 2.3 Valley Slope: **1.28 %**  
 2.4 Channel Length: **2697 feet. 0.51Miles.**  
 2.5 Channel Slope: **1.22 %**  
 2.6 Sinuosity: **1.05**  
 2.7 Watershed Area: **14 Square Miles**  
 2.8 Channel Width: **42 feet.**  
 2.9 Valley Width: **496 feet.**  
 2.10 Confinement Ratio: **12**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Ice-Contact 49.0 %**  
 3.3 Sub-dominant Geological Mat.: **Alluvial**  
 3.4 Left Valley Side: **Very Steep**  
 3.4 Right Valley Side: **Hilly**  
 3.5 Soils  
 Hydrologic Group: **A 49.0 %**  
 Flooding: **None/Rare 53.0 %**  
 Water Table Deep: **6.0 95.0 %**  
 Water Table Shallow: **6.0 95.0 %**  
 Erodibility: **High - 52.0 %**

## 7.4 Comments:

Channel extensively altered through the Village of Grafton. Channel modifications include: straightening, rip-rap, and hard bank armoring.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Urban**  
 Current Dominant land Cover: **Forest 82.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Residential**  
 Current Dominant land Cover: **Urban 64.0 %**  
 Current Sub-Dominant Land Cover: **Forest**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **26-50 26-50**  
 Sub-dominant: **>100 51-100**  
 Length w/ less than 25 ft.: **138 111**

### 4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**  
 Type: **None**  
 Use:

5.2 Bridges and Culverts: **1 1 %**  
 5.3 Bank Armoring: **17 %**

Left **226** Right **240**  
 5.4 Channel Straightening: **881 32 %**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **1290 ft. 47 %**  
 One Side Both Sides  
 Road: **112 ft. 1177.9 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: **484 ft. 1373 ft.**

6.3 Channel Bars: **Point**

6.4 Meander Migration:

6.5 Meander Width: **280.0 Ratio: 6.7**  
 6.6 Wavelength: **840.0 Ratio: 20.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**  
 7.2 Bank Height: **0.00 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	7.2	Total
1	2	1	0	0	1	2	0	2	2	1	0	0	2	0	1	15
Low	High	Low	N.S.	N.S.	Low	High	N.S.	High	High	Low	N.S.	N.S.	High	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Hinkley Brook** Reach **M14-S1.01**  
 Topo Maps: **SAXTONS RIVER, WINDHAM**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From confluence with main stem near reach break up into**  
 1.2 Towns: **Grafton**  
 1.3 Downstream Latitude: **43.17**  
 1.3 Downstream Longitude: **-72.61**

## Step 2. Stream Type

2.1 Elevation Upstream: **1312**  
 2.1 Elevation Downstream: **870**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **9100 feet. 1.72Miles.**  
 2.3 Valley Slope: **4.86 %**  
 2.4 Channel Length: **9306 feet. 1.76Miles.**  
 2.5 Channel Slope: **4.75 %**  
 2.6 Sinuosity: **1.02**  
 2.7 Watershed Area: **2** Square Miles  
 2.8 Channel Width: **16** feet.  
 2.9 Valley Width: **60** feet.  
 2.10 Confinement Ratio: **4**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.:  
 3.3 Sub-dominant Geological Mat.:  
 3.4 Left Valley Side **Very Steep**  
 3.4 Right Valley Side **Extremely Steep**  
 3.5 Soils  
 Hydrologic Group: %  
 Flooding: %  
 Water Table Deep: %  
 Water Table Shallow: %  
 Erodibility: %

## 7.4 Comments:

Channel is heavily influenced by residential land in lower reaches. Many properties that the channel passes through have I modifications like rip-rap and hard bank armoring.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: %  
 Current Sub-Dominant Land Cover:

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Urban 49.0 %**  
 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.: **0 0**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **3 1 %**

5.3 Bank Armoring: **8 %**

Left **363** Right **465**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **8492** ft. **91 %**

One Side Both Sides

Road: **8492** 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. **1046** ft.

6.3 Channel Bars: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

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

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	7.2	Total
0	2	0	0	0	1	0	0	2	1	0	0	0	0	0	1	7
N.S.	High	N.S.	N.S.	N.S.	Low	N.S.	N.S.	High	Low	N.S.	N.S.	N/A	N/A	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M15**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Wed, June 18, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break the reach follows Houghtonville Rd. until the valley**  
 1.2 Towns: **Grafton**  
 1.3 Downstream Latitude: **43.17**  
 1.3 Downstream Longitude: **-72.61**

## Step 2. Stream Type

2.1 Elevation Upstream: **954**  
 2.1 Elevation Downstream: **863**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **6513 feet. 1.23Miles.**  
 2.3 Valley Slope: **1.40 %**  
 2.4 Channel Length: **7114 feet. 1.35Miles.**  
 2.5 Channel Slope: **1.28 %**  
 2.6 Sinuosity: **1.09**  
 2.7 Watershed Area: **12 Square Miles**  
 2.8 Channel Width: **39 feet.**  
 2.9 Valley Width: **323 feet.**  
 2.10 Confinement Ratio: **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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Alluvial 67.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side: **Steep**  
 3.4 Right Valley Side: **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **B 76.0 %**  
 Flooding: **Frequent 67.0 %**  
 Water Table Deep: **6.0 98.0 %**  
 Water Table Shallow: **6.0 98.0 %**  
 Erodibility: **High - 12.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 83.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Shrub**  
 Current Dominant land Cover: **Urban 35.0 %**  
 Current Sub-Dominant Land Cover: **Forest**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **26-50 >100**  
 Sub-dominant: **51-100 26-50**  
 Length w/ less than 25 ft.: **0 767**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **3 1 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **1936 27 %**

5.5 Dredging History: **Gravel Mining**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **7114 ft. 100 %**  
 One Side Both Sides

Road: **7114 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: **Side**

6.4 Meander Migration:

6.5 Meander Width: **245.0 Ratio: 6.3**

6.6 Wavelength: **970.0 Ratio: 24.8**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 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	7.2	Total
1	2	1	0	0	0	2	1	2	0	0	0	0	2	0	1	12
Low	High	Low	N.S.	N.S.	N.S.	High	Low	High	N.S.	N.S.	N.S.	N.S.	High	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M16**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break to change in confinement (from confined to Grafton**  
 1.2 Towns: **Grafton**  
 1.3 Downstream Latitude: **43.19**  
 1.3 Downstream Longitude: **-72.62**

## Step 2. Stream Type

2.1 Elevation Upstream: **983**  
 2.1 Elevation Downstream: **954**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **3380 feet. 0.64Miles.**  
 2.3 Valley Slope: **0.86 %**  
 2.4 Channel Length: **3535 feet. 0.67Miles.**  
 2.5 Channel Slope: **0.82 %**  
 2.6 Sinuosity: **1.05**  
 2.7 Watershed Area: **11 Square Miles**  
 2.8 Channel Width: **37 feet.**  
 2.9 Valley Width: **100 feet.**  
 2.10 Confinement Ratio: **3**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Alluvial 88.0 %**  
 3.3 Sub-dominant Geological Mat.: **Till**  
 3.4 Left Valley Side: **Steep**  
 3.4 Right Valley Side: **Extremely Steep**  
 3.5 Soils  
 Hydrologic Group: **B 97.0 %**  
 Flooding: **Frequent 88.0 %**  
 Water Table Deep: **6.0 100. %**  
 Water Table Shallow: **6.0 100. %**  
 Erodibility: **High - 11.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Shrub**  
 Current Dominant land Cover: **Forest 84.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 34.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer  
 Dominant: **>100 51-100**  
 Sub-dominant: **None >100**  
 Length w/ less than 25 ft.: **0 0**

4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **1 1 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **2989 ft. 84 %**

One Side Both Sides

Road: **2989 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: **Side**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 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	7.2	Total
1	2	0	0	0	0	0	0	2	0	1	0	0	0	0	0	6
Low	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	Low	N.S.	N/A	N/A	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M17**  
 Topo Maps: **SAXTONS RIVER, WINDHAM**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **Small, unconfined reach extending from break to the change in slope**  
 1.2 Towns: **Grafton**  
 1.3 Downstream Latitude: **43.20**  
 1.3 Downstream Longitude: **-72.62**

## Step 2. Stream Type

2.1 Elevation Upstream: **1010**  
 2.1 Elevation Downstream: **983**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **2072 feet. 0.39Miles.**  
 2.3 Valley Slope: **1.30 %**  
 2.4 Channel Length: **2137 feet. 0.40Miles.**  
 2.5 Channel Slope: **1.26 %**  
 2.6 Sinuosity: **1.03**  
 2.7 Watershed Area: **9** Square Miles  
 2.8 Channel Width: **35** feet.  
 2.9 Valley Width: **390** feet.  
 2.10 Confinement Ratio: **11**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Alluvial 94.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side: **Hilly**  
 3.4 Right Valley Side: **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **B 94.0 %**  
 Flooding: **Frequent 94.0 %**  
 Water Table Deep: **6.0 100. %**  
 Water Table Shallow: **6.0 100. %**  
 Erodibility: **High - 4.0 %**

## 7.4 Comments:

Some ice jam potential at bridge. Second crossing shown in E911 roads layer not present, nor is there any remnants of a historical bridge remaining.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 84.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Shrub**  
 Current Dominant land Cover: **Urban 43.0 %**  
 Current Sub-Dominant Land Cover: **Field**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **51-100 >100**  
 Sub-dominant: **None 51-100**  
 Length w/ less than 25 ft.: **267 0**

### 4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

### 5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **1 1 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **695 32 %**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **2137** ft. **100 %**  
 One Side Both Sides

Road: **2137** 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: **Side**

6.4 Meander Migration:

6.5 Meander Width: **160.0** Ratio: **4.6**

6.6 Wavelength: **640.0** Ratio: **18.2**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 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	7.2	Total
1	2	1	0	0	0	2	0	2	0	1	0	1	2	0	1	13
Low	High	Low	N.S.	N.S.	N.S.	High	N.S.	High	N.S.	Low	N.S.	Low	High	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M18**  
 Topo Maps: **WINDHAM**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break to change in slope (from ~1.7% to ~3.0%)**  
 1.2 Towns: **Grafton**  
 1.3 Downstream Latitude: **43.20**  
 1.3 Downstream Longitude: **-72.63**

## Step 2. Stream Type

2.1 Elevation Upstream: **1049**  
 2.1 Elevation Downstream: **1010**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **2350 feet. 0.45Miles.**  
 2.3 Valley Slope: **1.66 %**  
 2.4 Channel Length: **2457 feet. 0.47Miles.**  
 2.5 Channel Slope: **1.59 %**  
 2.6 Sinuosity: **1.05**  
 2.7 Watershed Area: **9 Square Miles**  
 2.8 Channel Width: **35 feet.**  
 2.9 Valley Width: **75 feet.**  
 2.10 Confinement Ratio: **2**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Alluvial 85.0 %**  
 3.3 Sub-dominant Geological Mat.: **Till**  
 3.4 Left Valley Side: **Extremely Steep**  
 3.4 Right Valley Side: **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **B 91.0 %**  
 Flooding: **Frequent 85.0 %**  
 Water Table Deep: **3.0 79.0 %**  
 Water Table Shallow: **1.5 79.0 %**  
 Erodibility: **High - 9.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 85.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 34.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **>100 >100**  
 Sub-dominant: **51-100 None**  
 Length w/ less than 25 ft.: **0 0**

4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **0 0 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **781 ft. 31 %**

One Side Both Sides

Road: **781 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: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 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	7.2	Total
1	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	5
Low	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	N.S.	N.S.	N/A	N/A	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M19**  
 Topo Maps: **WINDHAM**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break to change in confinement as the channel moves**  
 1.2 Towns: **Grafton**  
 1.3 Downstream Latitude: **43.20**  
 1.3 Downstream Longitude: **-72.64**

## Step 2. Stream Type

2.1 Elevation Upstream: **1245**  
 2.1 Elevation Downstream: **1049**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **5490 feet. 1.04Miles.**  
 2.3 Valley Slope: **3.57 %**  
 2.4 Channel Length: **5811 feet. 1.10Miles.**  
 2.5 Channel Slope: **3.37 %**  
 2.6 Sinuosity: **1.06**  
 2.7 Watershed Area: **8** Square Miles  
 2.8 Channel Width: **33** feet.  
 2.9 Valley Width: **100** feet.  
 2.10 Confinement Ratio: **3**  
 2.10 Confinement Type: **Semi-confined**  
 2.11 Reference Stream Type: **B**  
 Bedform: **Step-Pool**  
 Sub-class Slope: **None**  
 Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Ice-Contact 66.0 %**  
 3.3 Sub-dominant Geological Mat.: **Alluvial**  
 3.4 Left Valley Side: **Hilly**  
 3.4 Right Valley Side: **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **A 66.0 %**  
 Flooding: **None/Rare 70.0 %**  
 Water Table Deep: **6.0 83.0 %**  
 Water Table Shallow: **6.0 83.0 %**  
 Erodibility: **High - 50.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 85.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Field**  
 Current Dominant land Cover: **Forest 29.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer  
 Dominant: **51-100 >100** Left Bank Right Bank  
 Sub-dominant: **>100 None**  
 Length w/ less than 25 ft.: **225 0**

4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **1 0 %**

5.3 Bank Armoring: **4 %**

Left **242** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and 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: **Side**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 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	7.2	Total
1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Low	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	Unk.	N.S.	N.S.	N.S.	N/A	N/A	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M20**  
 Topo Maps: **WINDHAM**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break until change in confinement (from unconfined to Grafton, Windham)**  
 1.2 Towns: **Grafton, Windham**  
 1.3 Downstream Latitude: **43.20**  
 1.3 Downstream Longitude: **-72.66**

## Step 2. Stream Type

2.1 Elevation Upstream: **1716**  
 2.1 Elevation Downstream: **1245**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **17360 feet. 3.29Miles.**  
 2.3 Valley Slope: **2.71 %**  
 2.4 Channel Length: **19160 feet. 3.63Miles.**  
 2.5 Channel Slope: **2.46 %**  
 2.6 Sinuosity: **1.10**  
 2.7 Watershed Area: **6** Square Miles  
 2.8 Channel Width: **29** feet.  
 2.9 Valley Width: **45** feet.  
 2.10 Confinement Ratio: **2**  
 2.10 Confinement Type: **Narrowly Confined**  
 2.11 Reference Stream Type: **B**  
 Bedform: **Riffle-Pool**  
 Sub-class Slope: **None**  
 Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Other**  
 3.3 Sub-dominant Geological Mat.: **Till**  
 3.4 Left Valley Side: **Very Steep**  
 3.4 Right Valley Side: **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **Not Rated** **39.0 %**  
 Flooding: **None/Rare** **60.0 %**  
 Water Table Deep: **2.5** **29.0 %**  
 Water Table Shallow: **1.5** **29.0 %**  
 Erodibility: **High -** **55.0 %**

## 7.4 Comments:

Many small patches of erosion through this headwater region. Erosion may be more prevalent than FIT in step 7.1 indicates. Additionally, the reach is subject to many debris jams and

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 85.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 39.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer  
 Dominant: **>100** Left Bank **>100** Right Bank  
 Sub-dominant: **26-50** **51-100**  
 Length w/ less than 25 ft.: **0** **0**  
 4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**  
 Type: **None**  
 Use:

5.2 Bridges and Culverts: **8** **1 %**  
 5.3 Bank Armoring: **0 %**

Left **0.0** Right **77.7**  
 5.4 Channel Straightening: **0.0** **0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads  
 old **8725** ft. **45 %**  
 One Side Both Sides  
 Road: **8725** 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:  
 6.5 Meander Width: **N/A** Ratio: **0.0**  
 6.6 Wavelength: **N/A** Ratio: **0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **133.72 ft.**  
 7.2 Bank Height: **0.00 ft.**  
 7.3 Ice/Debris Jam Potential: **Multiple**

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	7.2	Total
1	2	0	0	0	0	0	0	2	0	2	0	0	0	0	2	9
Low	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	High	N.S.	N/A	N/A	N.S.	High	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M21**  
 Topo Maps: **WINDHAM**  
 Date Last Edited: **Mon, June 23, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break to the road crossing of Route 121.**

1.2 Towns: **Windham**

1.3 Downstream Latitude: **43.20**

1.3 Downstream Longitude: **-72.71**

## Step 2. Stream Type

2.1 Elevation Upstream:

2.1 Elevation Downstream:

2.1 Is Gradient Gentle? **Yes**

2.2 Valley Length: **1981 feet. 0.38 Miles.**

2.3 Valley Slope: **0.00 %**

2.4 Channel Length: **2563 feet. 0.49 Miles.**

2.5 Channel Slope: **0.00 %**

2.6 Sinuosity: **1.29**

2.7 Watershed Area: **2** Square Miles

2.8 Channel Width: **16** feet.

2.9 Valley Width: **586** feet.

2.10 Confinement Ratio: **36**

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 Characteristics:

3.1 Alluvial Fan: **None**

3.2 Grade Control: **None**

3.3 Dominant Geologic Mat.: **Other**

3.3 Sub-dominant Geological Mat.: **Till 82.0 %**

3.4 Left Valley Side: **Hilly**

3.4 Right Valley Side: **Steep**

## 3.5 Soils

Hydrologic Group: **D 82.0 %**

Flooding: **None/Rare 100. %**

Water Table Deep: **0.0 82.0 %**

Water Table Shallow: **-1.0 82.0 %**

Erodibility: **High - 17.0 %**

7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**

Current Dominant land Cover: **Forest 83.0 %**

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

### 4.2 Corridor

Historic Land Cover: **Wetland**

Current Dominant land Cover: **Forest 82.0 %**

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

4.3 Riparian Buffer Left Bank Right Bank

Dominant: **>100 >100**

Sub-dominant: **None None**

Length w/ less than 25 ft.: **0 0**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **No Data**

Type: **None**

Use:

5.2 Bridges and Culverts: **1 2 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **912.3 35 %**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and 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:

6.5 Meander Width: **90.0 Ratio: 5.5**

6.6 Wavelength: **100.0 Ratio: 6.1**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

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

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	7.2	Total
1	1	0	0	0	0	2	0	0	0	0	0	0	1	0	1	6
Low	Low	N.S.	N.S.	N.S.	N.S.	High	N.S.	Unk.	N.S.	N.S.	N.S.	N.S.	Low	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M22**  
 Topo Maps: **WINDHAM**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break at road to ~250 feet downstream of a large bend in**  
 1.2 Towns: **Windham**  
 1.3 Downstream Latitude: **43.20**  
 1.3 Downstream Longitude: **-72.72**

## Step 2. Stream Type

2.1 Elevation Upstream:  
 2.1 Elevation Downstream:  
 2.1 Is Gradient Gentle? **Yes**  
 2.2 Valley Length: **1270 feet. 0.24Miles.**  
 2.3 Valley Slope: **0.00 %**  
 2.4 Channel Length: **1472 feet. 0.28Miles.**  
 2.5 Channel Slope: **0.00 %**  
 2.6 Sinuosity: **1.16**  
 2.7 Watershed Area: **1** Square Miles  
 2.8 Channel Width: **14** feet.  
 2.9 Valley Width: **584** feet.  
 2.10 Confinement Ratio: **42**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Other**  
 3.3 Sub-dominant Geological Mat.: **Till**  
 3.4 Left Valley Side: **Hilly**  
 3.4 Right Valley Side: **Steep**  
 3.5 Soils  
 Hydrologic Group: **D** **67.0 %**  
 Flooding: **None/Rare** **100. %**  
 Water Table Deep: **0.0** **67.0 %**  
 Water Table Shallow: **-1.0** **67.0 %**  
 Erodibility: **High -** **32.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 83.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Wetland**  
 Current Dominant land Cover: **Forest 76.0 %**  
 Current Sub-Dominant Land Cover: **Wetland**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **>100 >100**  
 Sub-dominant: **None >100**  
 Length w/ less than 25 ft.: **0 0**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **Impoundment**  
 Type: **Large Run of River**  
 Use: **Other**

5.2 Bridges and Culverts: **0 0 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and 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: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **65.0** Ratio: **4.7**

6.6 Wavelength: **190.0** Ratio: **13.6**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

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

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	7.2	Total
1	0	0	2	0	0	0	0	0	0	0	0	1	0	0	1	5
Low	N.S.	N.S.	High	N.S.	N.S.	N.S.	N.S.	Unk.	N.S.	N.S.	N.S.	Low	N.S.	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M23**  
 Topo Maps: **WINDHAM**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break to crossing of Windham Hill Rd.**

1.2 Towns: **Windham**

1.3 Downstream Latitude: **43.19**

1.3 Downstream Longitude: **-72.72**

## Step 2. Stream Type

2.1 Elevation Upstream: **1836**

2.1 Elevation Downstream: **1792**

2.1 Is Gradient Gentle? **No**

2.2 Valley Length: **1101 feet. 0.21 Miles.**

2.3 Valley Slope: **4.00 %**

2.4 Channel Length: **1207 feet. 0.23 Miles.**

2.5 Channel Slope: **3.65 %**

2.6 Sinuosity: **1.10**

2.7 Watershed Area: **1 Square Miles**

2.8 Channel Width: **13 feet.**

2.9 Valley Width: **495 feet.**

2.10 Confinement Ratio: **39**

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 Characteristics:

3.1 Alluvial Fan: **Yes**

3.2 Grade Control: **None**

3.3 Dominant Geologic Mat.: **Ice-Contact 87.0 %**

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

3.4 Left Valley Side: **Steep**

3.4 Right Valley Side: **Hilly**

## 3.5 Soils

Hydrologic Group: **B 46.0 %**

Flooding: **None/Rare 100. %**

Water Table Deep: **2.5 57.0 %**

Water Table Shallow: **1.5 57.0 %**

Erodibility: **High - 98.0 %**

## 7.4 Comments:

Channel is very small upstream of impoundments at the four corners dam. The broad alluvial setting that the channel goes through suggests a high degree of straightening. Similar to locations on the

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**

Current Dominant land Cover: **Forest 84.0 %**

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

### 4.2 Corridor

Historic Land Cover: **Crop**

Current Dominant land Cover: **Crop 22.0 %**

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

4.3 Riparian Buffer Left Bank Right Bank

Dominant: **26-50 26-50**

Sub-dominant: **None >100**

Length w/ less than 25 ft.: **0 0**

4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **1 2 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **738 61 %**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and 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: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **60.0** Ratio: **4.8**

6.6 Wavelength: **180.0** Ratio: **14.3**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

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

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	7.2	Total
1	2	0	0	0	0	2	0	0	0	0	0	1	1	0	1	8
Low	High	N.S.	N.S.	N.S.	N.S.	High	N.S.	Unk.	N.S.	N.S.	N.S.	Low	Low	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Saxtons** Reach **M24**  
 Topo Maps: **WINDHAM**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From break to steep headwaters.**

1.2 Towns: **Windham**

1.3 Downstream Latitude: **43.19**

1.3 Downstream Longitude: **-72.72**

## Step 2. Stream Type

2.1 Elevation Upstream: **2460**

2.1 Elevation Downstream: **1836**

2.1 Is Gradient Gentle? **No**

2.2 Valley Length: **4625 feet. 0.88Miles.**

2.3 Valley Slope: **13.49 %**

2.4 Channel Length: **4765 feet. 0.90Miles.**

2.5 Channel Slope: **13.10 %**

2.6 Sinuosity: **1.03**

2.7 Watershed Area: **1** Square Miles

2.8 Channel Width: **10** feet.

2.9 Valley Width: **18** feet.

2.10 Confinement Ratio: **2**

2.10 Confinement Type: **Narrowly Confined**

2.11 Reference Stream Type: **A**

Bedform: **Cascade**

Sub-class Slope: **None**

Bed Material: **Bedrock**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**

3.2 Grade Control: **None**

3.3 Dominant Geologic Mat.: **Till 96.0 %**

3.3 Sub-dominant Geological Mat.: **Ice-Contact**

3.4 Left Valley Side: **Steep**

3.4 Right Valley Side: **Very Steep**

## 3.5 Soils

Hydrologic Group: **B 75.0 %**

Flooding: **None/Rare 100. %**

Water Table Deep: **6.0 83.0 %**

Water Table Shallow: **6.0 83.0 %**

Erodibility: **High - 99.0 %**

## 7.4 Comments:

Channel was not observed upstream along the road.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**

Current Dominant land Cover: **Forest 82.0 %**

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

### 4.2 Corridor

Historic Land Cover: **Forest**

Current Dominant land Cover: **Forest 52.0 %**

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

4.3 Riparian Buffer Left Bank Right Bank

Dominant: **51-100 >100**

Sub-dominant: **None None**

Length w/ less than 25 ft.: **0 0**

4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **3 1 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **2313** ft. **48 %**

One Side Both Sides

Road: **2313** 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: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

7.3 Ice/Debris Jam Potential: **Not Evaluated**

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	7.2	Total
1	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	5
Low	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	N.S.	N.S.	N/A	N/A	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Bundy Brook** Reach **T1.01**  
 Topo Maps: **WALPOLE, WESTMINSTER WEST**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From confluence with M03 to headwaters above Davidson Hill Rd.**  
 1.2 Towns: **Westminster**  
 1.3 Downstream Latitude: **43.12**  
 1.3 Downstream Longitude: **-72.47**

## Step 2. Stream Type

2.1 Elevation Upstream: **1181**  
 2.1 Elevation Downstream: **383**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **11890 feet. 2.25Miles.**  
 2.3 Valley Slope: **6.71 %**  
 2.4 Channel Length: **12674 feet. 2.40Miles.**  
 2.5 Channel Slope: **6.30 %**  
 2.6 Sinuosity: **1.07**  
 2.7 Watershed Area: **1 Square Miles**  
 2.8 Channel Width: **14 feet.**  
 2.9 Valley Width: **20 feet.**  
 2.10 Confinement Ratio: **1**  
 2.10 Confinement Type: **Narrowly Confined**  
 2.11 Reference Stream Type: **A**  
 Bedform: **Step-Pool**  
 Sub-class Slope: **None**  
 Bed Material: **Boulder**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **Dam**  
 3.3 Dominant Geologic Mat.: **Till 85.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side: **Very Steep**  
 3.4 Right Valley Side: **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **C 62.0 %**  
 Flooding: **None/Rare 98.0 %**  
 Water Table Deep: **6.0 56.0 %**  
 Water Table Shallow: **6.0 56.0 %**  
 Erodibility: **High - 98.0 %**

## 7.4 Comments:

Throughout the reach the tributary is laden with debris, and along with several culverts their is multiple potentials for debris and ice jams. The downstream end of the channel where it crosses

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 81.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 43.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.3 Riparian Buffer

	Left Bank	Right Bank
Dominant:	<b>&gt;100</b>	<b>&gt;100</b>
Sub-dominant:	<b>51-100</b>	<b>26-50</b>
Length w/ less than 25 ft.:	<b>755</b>	<b>0</b>

### 4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **Impoundment**  
 Type: **Small Run of River**  
 Use: **Other**

5.2 Bridges and Culverts: **5 2 %**

5.3 Bank Armoring: **0.0**

	Left	Right
0.0	<b>0.0</b>	<b>0.0</b>

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **2539 ft. 20 %**  
 One Side Both Sides

	ft.	ft.	ft.	ft.
Road:	<b>2539</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Railroad:	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Berm:	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Improved Path:	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

6.2 Development: **0.0 ft. 0.0**

6.3 Channel Bars: **Side**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **324.78 ft.**

7.2 Bank Height: **2.00 ft.**

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

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	7.2	Total
1	2	1	1	0	0	0	0	2	0	1	0	0	0	0	1	9
Low	High	Low	Low	N.S.	N.S.	N.S.	N.S.	High	N.S.	Low	N.S.	N/A	N/A	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Trib to Saxtons** Reach **T2.01**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From the confluence with the main stem of the Saxtons River to area**  
 1.2 Towns: **Rockingham**  
 1.3 Downstream Latitude: **43.13**  
 1.3 Downstream Longitude: **-72.52**

## Step 2. Stream Type

2.1 Elevation Upstream: **553**  
 2.1 Elevation Downstream: **492**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **2999 feet. 0.57Miles.**  
 2.3 Valley Slope: **2.03 %**  
 2.4 Channel Length: **3216 feet. 0.61Miles.**  
 2.5 Channel Slope: **1.90 %**  
 2.6 Sinuosity: **1.07**  
 2.7 Watershed Area: **5 Square Miles**  
 2.8 Channel Width: **28 feet.**  
 2.9 Valley Width: **336 feet.**  
 2.10 Confinement Ratio: **12**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Ice-Contact 58.0 %**  
 3.3 Sub-dominant Geological Mat.: **Alluvial**  
 3.4 Left Valley Side: **Flat**  
 3.4 Right Valley Side: **Hilly**  
 3.5 Soils  
 Hydrologic Group: **A 58.0 %**  
 Flooding: **None/Rare 58.0 %**  
 Water Table Deep: **6.0 99.0 %**  
 Water Table Shallow: **6.0 99.0 %**  
 Erodibility: **High - 57.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Crop**  
 Current Dominant land Cover: **Forest 83.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Crop**  
 Current Dominant land Cover: **Forest 38.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer  
 Dominant: **>100 51-100**  
 Sub-dominant: **0-25 0-25**  
 Length w/ less than 25 ft.: **733 875**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **No Data**

Type: **None**

Use:

5.2 Bridges and Culverts: **1 1 %**

5.3 Bank Armoring: **5 %**

Left **188** Right **0.0**

5.4 Channel Straightening: **1961 60 %**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and 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:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

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

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	7.2	Total
1	2	2	0	0	1	2	0	0	0	0	0	0	0	0	1	9
Low	High	High	N.S.	N.S.	Low	High	N.S.	Unk.	N.S.	N.S.	N.S.	N/A	N/A	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Trib to Saxtons** Reach **T2.02**  
 Topo Maps: **SAXTONS RIVER, WESTMINSTER WEST**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break at change in confinement (unconfined to confined)**  
 1.2 Towns: **Rockingham, Westminster**  
 1.3 Downstream Latitude: **43.13**  
 1.3 Downstream Longitude: **-72.52**

## Step 2. Stream Type

2.1 Elevation Upstream: **598**  
 2.1 Elevation Downstream: **553**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **1775 feet. 0.34Miles.**  
 2.3 Valley Slope: **2.54 %**  
 2.4 Channel Length: **1993 feet. 0.38Miles.**  
 2.5 Channel Slope: **2.26 %**  
 2.6 Sinuosity: **1.12**  
 2.7 Watershed Area: **5** Square Miles  
 2.8 Channel Width: **27** feet.  
 2.9 Valley Width: **30** feet.  
 2.10 Confinement Ratio: **1**  
 2.10 Confinement Type: **Narrowly Confined**  
 2.11 Reference Stream Type: **B**  
 Bedform: **Plane Bed**  
 Sub-class Slope: **None**  
 Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till 64.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side: **Very Steep**  
 3.4 Right Valley Side: **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **C 71.0 %**  
 Flooding: **None/Rare 86.0 %**  
 Water Table Deep: **2.5 58.0 %**  
 Water Table Shallow: **1.5 58.0 %**  
 Erodibility: **High - 86.0 %**

## 7.4 Comments:

Channel not accessed during windshield survey.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Crop**  
 Current Dominant land Cover: **Forest 84.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 52.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **>100 >100**  
 Sub-dominant: **None None**  
 Length w/ less than 25 ft.: **--- ---**

4.4 Ground Water Inputs: **None**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type:

Use:

5.2 Bridges and Culverts: **0 0 %**

5.3 Bank Armoring: **0.0**

Left Right

5.4 Channel Straightening: **0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and 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: ft. ft.

6.3 Channel Bars: **Side**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion:

7.2 Bank Height:

7.3 Ice/Debris Jam Potential: **Not Evaluated**

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	7.2	Total
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Low	Low	N.D.	N.S.	N.S.	N.S.	N.S.	N.S.	Unk.	Unk.	N.S.	N.S.	N/A	N/A	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Trib to Saxtons** Reach **T2.03**  
 Topo Maps: **WESTMINSTER WEST**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break up to change in confinement (unconfined to**  
 1.2 Towns: **Westminster**  
 1.3 Downstream Latitude: **43.12**  
 1.3 Downstream Longitude: **-72.53**

## Step 2. Stream Type

2.1 Elevation Upstream: **689**  
 2.1 Elevation Downstream: **598**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **5654 feet. 1.07Miles.**  
 2.3 Valley Slope: **1.61 %**  
 2.4 Channel Length: **6766 feet. 1.28Miles.**  
 2.5 Channel Slope: **1.34 %**  
 2.6 Sinuosity: **1.20**  
 2.7 Watershed Area: **5 Square Miles**  
 2.8 Channel Width: **27 feet.**  
 2.9 Valley Width: **420 feet.**  
 2.10 Confinement Ratio: **16**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Alluvial 62.0 %**  
 3.3 Sub-dominant Geological Mat.: **Till**  
 3.4 Left Valley Side: **Steep**  
 3.4 Right Valley Side: **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **B 49.0 %**  
 Flooding: **Frequent 62.0 %**  
 Water Table Deep: **3.0 41.0 %**  
 Water Table Shallow: **1.5 58.0 %**  
 Erodibility: **High - 37.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 83.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Crop**  
 Current Dominant land Cover: **Forest 39.0 %**  
 Current Sub-Dominant Land Cover: **Crop**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **51-100 >100**  
 Sub-dominant: **0-25 0-25**  
 Length w/ less than 25 ft.: **779 726**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **1 0 %**

5.3 Bank Armoring: **2 %**

Left **164** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and 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. **425** ft.

6.3 Channel Bars: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **195.0 Ratio: 7.4**

6.6 Wavelength: **520.0 Ratio: 19.6**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

7.3 Ice/Debris Jam Potential: **Not Evaluated**

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	7.2	Total
1	1	2	0	0	0	0	0	0	1	0	0	0	2	0	0	7
Low	Low	High	N.S.	N.S.	N.S.	N.S.	N.S.	Unk.	Low	N.S.	N.S.	N.S.	High	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Trib to Saxtons** Reach **T2.04**  
 Topo Maps: **WESTMINSTER WEST**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **Small confined reach ending near the intersection of Westminster**  
 1.2 Towns: **Westminster**  
 1.3 Downstream Latitude: **43.11**  
 1.3 Downstream Longitude: **-72.54**

## Step 2. Stream Type

2.1 Elevation Upstream: **715**  
 2.1 Elevation Downstream: **689**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **1380 feet. 0.26Miles.**  
 2.3 Valley Slope: **1.88 %**  
 2.4 Channel Length: **1417 feet. 0.27Miles.**  
 2.5 Channel Slope: **1.83 %**  
 2.6 Sinuosity: **1.03**  
 2.7 Watershed Area: **3 Square Miles**  
 2.8 Channel Width: **21 feet.**  
 2.9 Valley Width: **35 feet.**  
 2.10 Confinement Ratio: **2**  
 2.10 Confinement Type: **Narrowly Confined**  
 2.11 Reference Stream Type: **B**  
     Bedform: **Riffle-Pool**  
     Sub-class Slope: **c**  
     Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Ice-Contact 93.0 %**  
 3.3 Sub-dominant Geological Mat.: **Till**  
 3.4 Left Valley Side: **Steep**  
 3.4 Right Valley Side: **Extremely Steep**  
 3.5 Soils  
     Hydrologic Group: **B 85.0 %**  
     Flooding: **None/Rare 100. %**  
     Water Table Deep: **3.0 85.0 %**  
     Water Table Shallow: **1.5 92.0 %**  
     Erodibility: **High - 99.0 %**

## 7.4 Comments:

Channel not accessed during windshield survey.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 87.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Field**  
 Current Dominant land Cover: **Forest 61.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer  
     Dominant: **>100 >100**  
     Sub-dominant: **None None**  
     Length w/ less than 25 ft.: **0 0**

4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**  
 Use:

5.2 Bridges and Culverts: **0 0 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **1340 94 %**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and 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: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

7.3 Ice/Debris Jam Potential: **Not Evaluated**

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	7.2	Total
1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3
Low	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	Unk.	N.S.	N.S.	N.S.	N/A	N/A	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Trib to Saxtons** Reach **T2.05**  
 Topo Maps: **WESTMINSTER WEST**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **Unconfined reach that parallels Westminster West and North Goddard**  
 1.2 Towns: **Westminster**  
 1.3 Downstream Latitude: **43.11**  
 1.3 Downstream Longitude: **-72.54**

## Step 2. Stream Type

2.1 Elevation Upstream: **802**  
 2.1 Elevation Downstream: **715**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **8122 feet. 1.54Miles.**  
 2.3 Valley Slope: **1.07 %**  
 2.4 Channel Length: **9249 feet. 1.75Miles.**  
 2.5 Channel Slope: **0.94 %**  
 2.6 Sinuosity: **1.14**  
 2.7 Watershed Area: **3 Square Miles**  
 2.8 Channel Width: **20 feet.**  
 2.9 Valley Width: **276 feet.**  
 2.10 Confinement Ratio: **14**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till 51.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side: **Very Steep**  
 3.4 Right Valley Side: **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **B 70.0 %**  
 Flooding: **None/Rare 100. %**  
 Water Table Deep: **3.0 42.0 %**  
 Water Table Shallow: **1.5 45.0 %**  
 Erodibility: **High - 99.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 87.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Shrub**  
 Current Dominant land Cover: **Forest 53.0 %**  
 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.: **290 725**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**  
 Use:

5.2 Bridges and Culverts: **0 0 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **720 ft. 7 %**  
 One Side Both Sides

Road: **720 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: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **60.0 Ratio: 3.0**

6.6 Wavelength: **215.0 Ratio: 10.6**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

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

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	7.2	Total
1	1	1	0	0	0	0	0	1	0	0	0	2	0	0	1	7
Low	Low	Low	N.S.	N.S.	N.S.	N.S.	N.S.	Low	N.S.	N.S.	N.S.	High	N.S.	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Trib to Saxtons** Reach **T2.06**  
 Topo Maps: **WESTMINSTER WEST**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From change in confinement up to headwaters.**

1.2 Towns: **Westminster**

1.3 Downstream Latitude: **43.09**

1.3 Downstream Longitude: **-72.54**

## Step 2. Stream Type

2.1 Elevation Upstream: **1050**

2.1 Elevation Downstream: **802**

2.1 Is Gradient Gentle? **No**

2.2 Valley Length: **2730 feet. 0.52Miles.**

2.3 Valley Slope: **9.08 %**

2.4 Channel Length: **2846 feet. 0.54Miles.**

2.5 Channel Slope: **8.71 %**

2.6 Sinuosity: **1.04**

2.7 Watershed Area: **1** Square Miles

2.8 Channel Width: **11** feet.

2.9 Valley Width: **15** feet.

2.10 Confinement Ratio: **1**

2.10 Confinement Type: **Narrowly Confined**

2.11 Reference Stream Type: **A**

Bedform: **Step-Pool**

Sub-class Slope: **None**

Bed Material: **Boulder**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**

3.2 Grade Control: **None**

3.3 Dominant Geologic Mat.: **Till 99.0 %**

3.3 Sub-dominant Geological Mat.:

3.4 Left Valley Side **Extremely Steep**

3.4 Right Valley Side **Steep**

## 3.5 Soils

Hydrologic Group: **C 56.0 %**

Flooding: **None/Rare 100. %**

Water Table Deep: **3.5 49.0 %**

Water Table Shallow: **2.0 49.0 %**

Erodibility: **High - 99.0 %**

7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 91.0 %**  
 Current Sub-Dominant Land Cover:

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 64.0 %**  
 Current Sub-Dominant Land Cover:

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **>100 >100**  
 Sub-dominant: **None None**  
 Length w/ less than 25 ft.: **--- ---**

4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type:

Use:

5.2 Bridges and Culverts: **0 0 %**

5.3 Bank Armoring: **0.0**

Left Right

5.4 Channel Straightening: **0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and 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: ft. ft.

6.3 Channel Bars: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion:

7.2 Bank Height:

7.3 Ice/Debris Jam Potential: **Not Evaluated**

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	7.2	Total
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N.S.	N.S.	N.D.	N.S.	N.S.	N.S.	N.S.	N.S.	Unk.	Unk.	N.S.	N.S.	N/A	N/A	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Leach Brook** Reach **T3.01**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 23, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From the confluence with the main stem near the intersection of Rockingham**  
 1.2 Towns: **Rockingham**  
 1.3 Downstream Latitude: **43.14**  
 1.3 Downstream Longitude: **-72.53**

## Step 2. Stream Type

2.1 Elevation Upstream: **694**  
 2.1 Elevation Downstream: **535**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **3620 feet. 0.69 Miles.**  
 2.3 Valley Slope: **4.39 %**  
 2.4 Channel Length: **3726 feet. 0.71 Miles.**  
 2.5 Channel Slope: **4.27 %**  
 2.6 Sinuosity: **1.03**  
 2.7 Watershed Area: **2** Square Miles  
 2.8 Channel Width: **17** feet.  
 2.9 Valley Width: **40** feet.  
 2.10 Confinement Ratio: **2**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till 85.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side: **Steep**  
 3.4 Right Valley Side: **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **C 85.0 %**  
 Flooding: **None/Rare 100. %**  
 Water Table Deep: **3.5 85.0 %**  
 Water Table Shallow: **2.0 85.0 %**  
 Erodibility: **High - 99.0 %**

## 7.4 Comments:

Several culverts and lots of woody debris along first reach of this tributary.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 76.0 %**  
 Current Sub-Dominant Land Cover: **Field**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Urban 41.0 %**  
 Current Sub-Dominant Land Cover: **Forest**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **>100 >100**  
 Sub-dominant: **26-50 26-50**  
 Length w/ less than 25 ft.: **0 84**

4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **4 3 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **2874 ft. 77 %**  
 One Side Both Sides

Road: **2780 ft. 94** 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:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

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

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	7.2	Total
1	2	0	0	0	0	0	0	2	0	1	0	0	0	0	1	7
Low	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	Low	N.S.	N/A	N/A	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Leach Brook** Reach **T3.02**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break where confinement changes (from confined to Rockingham**  
 1.2 Towns: **Rockingham**  
 1.3 Downstream Latitude: **43.15**  
 1.3 Downstream Longitude: **-72.53**

## Step 2. Stream Type

2.1 Elevation Upstream: **773**  
 2.1 Elevation Downstream: **694**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **2313 feet. 0.44Miles.**  
 2.3 Valley Slope: **3.42 %**  
 2.4 Channel Length: **2678 feet. 0.51Miles.**  
 2.5 Channel Slope: **2.95 %**  
 2.6 Sinuosity: **1.16**  
 2.7 Watershed Area: **1 Square Miles**  
 2.8 Channel Width: **15 feet.**  
 2.9 Valley Width: **497 feet.**  
 2.10 Confinement Ratio: **32**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till**  
 3.3 Sub-dominant Geological Mat.: **Alluvial** **55.0 %**  
 3.4 Left Valley Side: **Steep**  
 3.4 Right Valley Side: **Steep**  
 3.5 Soils  
 Hydrologic Group: **C** **74.0 %**  
 Flooding: **None/Rare** **56.0 %**  
 Water Table Deep: **1.5** **63.0 %**  
 Water Table Shallow: **0.0** **43.0 %**  
 Erodibility: **High -** **56.0 %**

## 7.4 Comments:

Used orthographic photos to evaluate the culvert ice potential

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Field**  
 Current Dominant land Cover: **Forest 75.0 %**  
 Current Sub-Dominant Land Cover: **Field**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 76.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **>100 >100**  
 Sub-dominant: **None None**  
 Length w/ less than 25 ft.: **0 0**  
 4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**  
 Type: **None**  
 Use:

5.2 Bridges and Culverts: **0 0 %**  
 5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**  
 5.4 Channel Straightening: **0.0 0.0**  
 5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **237.1 ft. 8 %**  
 One Side Both Sides  
 Road: **237.1 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: **No Data**

6.4 Meander Migration:  
 6.5 Meander Width: **40.0 Ratio: 2.6**  
 6.6 Wavelength: **125.0 Ratio: 8.1**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**  
 7.2 Bank Height: **0.00 ft.**  
 7.3 Ice/Debris Jam Potential: **Culvert**

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	7.2	Total
1	1	0	0	0	0	0	0	1	0	0	0	2	0	0	1	6
Low	Low	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	Low	N.S.	N.S.	N.S.	High	N.S.	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Leach Brook** Reach **T3.03**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break to just upstream (~250') of the Leach Rd crossing.**  
 1.2 Towns: **Rockingham**  
 1.3 Downstream Latitude: **43.15**  
 1.3 Downstream Longitude: **-72.53**

## Step 2. Stream Type

2.1 Elevation Upstream: **932**  
 2.1 Elevation Downstream: **773**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **2885 feet. 0.55Miles.**  
 2.3 Valley Slope: **5.51 %**  
 2.4 Channel Length: **3107 feet. 0.59Miles.**  
 2.5 Channel Slope: **5.12 %**  
 2.6 Sinuosity: **1.08**  
 2.7 Watershed Area: **1 Square Miles**  
 2.8 Channel Width: **12 feet.**  
 2.9 Valley Width: **32 feet.**  
 2.10 Confinement Ratio: **3**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till 100. %**  
 3.3 Sub-dominant Geological Mat.:  
 3.4 Left Valley Side **Steep**  
 3.4 Right Valley Side **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **C 100. %**  
 Flooding: **None/Rare 100. %**  
 Water Table Deep: **3.5 100. %**  
 Water Table Shallow: **2.0 100. %**  
 Erodibility: **High - 100. %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Shrub**  
 Current Dominant land Cover: **Forest 76.0 %**  
 Current Sub-Dominant Land Cover: **Field**

### 4.2 Corridor

Historic Land Cover: **Shrub**  
 Current Dominant land Cover: **Forest 54.0 %**  
 Current Sub-Dominant Land Cover: **Crop**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **>100 >100**  
 Sub-dominant: **None None**  
 Length w/ less than 25 ft.: **--- ---**

4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type:  
 Use:

5.2 Bridges and Culverts: **0 0 %**

5.3 Bank Armoring: **0.0**

Left Right  
 5.4 Channel Straightening: **0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and 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: ft. ft.

6.3 Channel Bars: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion:

7.2 Bank Height:

7.3 Ice/Debris Jam Potential: **Not Evaluated**

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	7.2	Total
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Low	N.S.	N.D.	N.S.	N.S.	N.S.	N.S.	N.S.	Unk.	Unk.	N.S.	N.S.	N/A	N/A	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Leach Brook** Reach **T3.04**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **Unconfined reach extending from road crossing to break at a change**  
 1.2 Towns: **Rockingham**  
 1.3 Downstream Latitude: **43.16**  
 1.3 Downstream Longitude: **-72.53**

## Step 2. Stream Type

2.1 Elevation Upstream: **989**  
 2.1 Elevation Downstream: **932**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **2626 feet. 0.50Miles.**  
 2.3 Valley Slope: **2.17 %**  
 2.4 Channel Length: **2764 feet. 0.52Miles.**  
 2.5 Channel Slope: **2.06 %**  
 2.6 Sinuosity: **1.05**  
 2.7 Watershed Area: **1 Square Miles**  
 2.8 Channel Width: **10 feet.**  
 2.9 Valley Width: **463 feet.**  
 2.10 Confinement Ratio: **45**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till 99.0 %**  
 3.3 Sub-dominant Geological Mat.:  
 3.4 Left Valley Side **Hilly**  
 3.4 Right Valley Side **Steep**  
 3.5 Soils  
 Hydrologic Group: **C 79.0 %**  
 Flooding: **None/Rare 100. %**  
 Water Table Deep: **3.5 79.0 %**  
 Water Table Shallow: **2.0 79.0 %**  
 Erodibility: **High - 99.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 82.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Shrub**  
 Current Dominant land Cover: **Forest 57.0 %**  
 Current Sub-Dominant Land Cover: **Wetland**

### 4.3 Riparian Buffer

	Left Bank	Right Bank
Dominant:	<b>&gt;100</b>	<b>&gt;100</b>
Sub-dominant:	<b>26-50</b>	<b>26-50</b>
Length w/ less than 25 ft.:	<b>0</b>	<b>0</b>

### 4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

### 5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **1 1 %**

5.3 Bank Armoring: **0.0**

	Left	Right
5.4 Channel Straightening:	<b>0.0</b>	<b>0.0</b>

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads **old 0.0 ft. 0.0**

	One Side	Both Sides
Road:	<b>0.0</b>	<b>0.0</b>
Railroad:	<b>0.0</b>	<b>0.0</b>
Berm:	<b>0.0</b>	<b>0.0</b>
Improved Path:	<b>0.0</b>	<b>0.0</b>

6.2 Development: **0.0**

6.3 Channel Bars: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **60.0 Ratio: 5.8**

6.6 Wavelength: **300.0 Ratio: 28.9**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

7.3 Ice/Debris Jam Potential: **Not Evaluated**

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	7.2	Total
0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3
N.S.	Low	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	Unk.	N.S.	N.S.	N.S.	N.S.	High	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Leach Brook** Reach **T3.05**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **Headwater reach extending from change in confinement up toward**  
 1.2 Towns: **Rockingham**  
 1.3 Downstream Latitude: **43.17**  
 1.3 Downstream Longitude: **-72.53**

## Step 2. Stream Type

2.1 Elevation Upstream: **1394**  
 2.1 Elevation Downstream: **989**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **4375 feet. 0.83 Miles.**  
 2.3 Valley Slope: **9.26 %**  
 2.4 Channel Length: **4813 feet. 0.91 Miles.**  
 2.5 Channel Slope: **8.41 %**  
 2.6 Sinuosity: **1.10**  
 2.7 Watershed Area: **0** Square Miles  
 2.8 Channel Width: **7** feet.  
 2.9 Valley Width: **17** feet.  
 2.10 Confinement Ratio: **2**  
 2.10 Confinement Type: **Semi-confined**  
 2.11 Reference Stream Type: **A**  
 Bedform: **Cascade**  
 Sub-class Slope: **None**  
 Bed Material: **Boulder**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till 100. %**  
 3.3 Sub-dominant Geological Mat.:  
 3.4 Left Valley Side **Steep**  
 3.4 Right Valley Side **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **D 100. %**  
 Flooding: **None/Rare 100. %**  
 Water Table Deep: **6.0 100. %**  
 Water Table Shallow: **6.0 100. %**  
 Erodibility: **High - 100. %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 84.0 %**  
 Current Sub-Dominant Land Cover:

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 54.0 %**  
 Current Sub-Dominant Land Cover:

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **>100 >100**  
 Sub-dominant: **None None**  
 Length w/ less than 25 ft.: **--- ---**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type:

Use:

5.2 Bridges and Culverts: **0 0 %**

5.3 Bank Armoring: **0.0**

Left Right

5.4 Channel Straightening: **0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and 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: ft. ft.

6.3 Channel Bars: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion:

7.2 Bank Height:

7.3 Ice/Debris Jam Potential: **Not Evaluated**

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	7.2	Total
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N.S.	N.S.	N.D.	N.S.	N.S.	N.S.	N.S.	N.S.	Unk.	Unk.	N.S.	N.S.	N/A	N/A	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Bull Creek** Reach **T4.01**  
 Topo Maps: **SAXTONS RIVER, WESTMINSTER WEST**  
 Date Last Edited: **Wed, June 18, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From confluence with the main stem (Reach M03) up to the**  
 1.2 Towns: **Athens, Rockingham**  
 1.3 Downstream Latitude: **43.15**  
 1.3 Downstream Longitude: **-72.55**

## Step 2. Stream Type

2.1 Elevation Upstream: **668**  
 2.1 Elevation Downstream: **568**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **12046 feet. 2.28Miles.**  
 2.3 Valley Slope: **0.83 %**  
 2.4 Channel Length: **16239 feet. 3.08Miles.**  
 2.5 Channel Slope: **0.62 %**  
 2.6 Sinuosity: **1.35**  
 2.7 Watershed Area: **11 Square Miles**  
 2.8 Channel Width: **38 feet.**  
 2.9 Valley Width: **818 feet.**  
 2.10 Confinement Ratio: **22**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Alluvial 86.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side: **Hilly**  
 3.4 Right Valley Side: **Hilly**  
 3.5 Soils  
 Hydrologic Group: **B 79.0 %**  
 Flooding: **Frequent 86.0 %**  
 Water Table Deep: **3.0 68.0 %**  
 Water Table Shallow: **1.5 69.0 %**  
 Erodibility: **High - 11.0 %**

## 7.4 Comments:

The entire reach could not be accessed, but it is likely that erosion is continuous throughout.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Crop**  
 Current Dominant land Cover: **Forest 81.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Crop**  
 Current Dominant land Cover: **Forest 40.0 %**  
 Current Sub-Dominant Land Cover: **Field**

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.: **6045 3889**

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**  
 Use:

5.2 Bridges and Culverts: **1 0 %**

5.3 Bank Armoring: **0 %**

Left **0.0** Right **72**

5.4 Channel Straightening: **3082 18 %**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **2363 ft. 14 %**  
 One Side Both Sides  
 Road: **2363 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: **Multiple**

6.5 Meander Width: **270.0 Ratio: 7.1**

6.6 Wavelength: **550.0 Ratio: 14.5**

## Step 7. Windshield Survey

7.1 Bank Erosion: **3,563.43 ft.**

7.2 Bank Height: **2.88 ft.**

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

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	7.2	Total
1	1	2	0	0	0	1	0	1	0	1	2	0	1	0	1	11
Low	Low	High	N.S.	N.S.	N.S.	Low	N.S.	Low	N.S.	Low	High	N.S.	Low	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Bull Creek** Reach **T4.02**  
 Topo Maps: **WESTMINSTER WEST**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break to the intersection of Brookline Rd. and Valley**  
 1.2 Towns: **Athens**  
 1.3 Downstream Latitude: **43.12**  
 1.3 Downstream Longitude: **-72.57**

## Step 2. Stream Type

2.1 Elevation Upstream: **725**  
 2.1 Elevation Downstream: **668**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **3969 feet. 0.75Miles.**  
 2.3 Valley Slope: **1.44 %**  
 2.4 Channel Length: **4531 feet. 0.86Miles.**  
 2.5 Channel Slope: **1.26 %**  
 2.6 Sinuosity: **1.14**  
 2.7 Watershed Area: **4 Square Miles**  
 2.8 Channel Width: **25 feet.**  
 2.9 Valley Width: **434 feet.**  
 2.10 Confinement Ratio: **17**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Ice-Contact 52.0 %**  
 3.3 Sub-dominant Geological Mat.: **Alluvial**  
 3.4 Left Valley Side: **Hilly**  
 3.4 Right Valley Side: **Steep**  
 3.5 Soils  
 Hydrologic Group: **B 79.0 %**  
 Flooding: **None/Rare 52.0 %**  
 Water Table Deep: **3.0 47.0 %**  
 Water Table Shallow: **1.5 79.0 %**  
 Erodibility: **High - 51.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 85.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Field**  
 Current Dominant land Cover: **Forest 49.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer  
 Dominant: **Left Bank 26-50 Right Bank >100**  
 Sub-dominant: **0-25 0-25**  
 Length w/ less than 25 ft.: **749 61**

### 4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

### 5.1 Flow Regulation - (old): **None**

Type: **None**  
 Use:

5.2 Bridges and Culverts: **1 0 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads **old 293 ft. 6 %**  
 One Side Both Sides

Road: **293 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. 592 ft.**

6.3 Channel Bars: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **190.0 Ratio: 7.5**

6.6 Wavelength: **485.0 Ratio: 19.2**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

7.3 Ice/Debris Jam Potential: **Not Evaluated**

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	7.2	Total
1	1	1	0	0	0	0	0	1	1	0	0	0	2	0	0	7
Low	Low	Low	N.S.	N.S.	N.S.	N.S.	N.S.	Low	Low	N.S.	N.S.	N.S.	High	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Bull Creek** Reach **T4.03**  
 Topo Maps: **WESTMINSTER WEST**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From change in confinement the reach follows Brookline Rd. until**  
 1.2 Towns: **Athens**  
 1.3 Downstream Latitude: **43.11**  
 1.3 Downstream Longitude: **-72.57**

## Step 2. Stream Type

2.1 Elevation Upstream: **844**  
 2.1 Elevation Downstream: **725**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **6260 feet. 1.19Miles.**  
 2.3 Valley Slope: **1.90 %**  
 2.4 Channel Length: **7244 feet. 1.37Miles.**  
 2.5 Channel Slope: **1.64 %**  
 2.6 Sinuosity: **1.16**  
 2.7 Watershed Area: **4 Square Miles**  
 2.8 Channel Width: **23 feet.**  
 2.9 Valley Width: **175 feet.**  
 2.10 Confinement Ratio: **8**  
 2.10 Confinement Type: **Broad**  
 2.11 Reference Stream Type: **C**

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 86.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Field**  
 Current Dominant land Cover: **Forest 34.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.3 Riparian Buffer

	Left Bank	Right Bank
Dominant:	<b>51-100</b>	<b>&gt;100</b>
Sub-dominant:	<b>0-25</b>	<b>26-50</b>
Length w/ less than 25 ft.:	<b>594</b>	<b>15</b>

### 4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

### 5.1 Flow Regulation - (old): **None**

Type: **None**  
 Use:

5.2 Bridges and Culverts: **1 0 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **2571 ft. 35 %**

One Side Both Sides

Road: **2571 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. 33 ft.**

6.3 Channel Bars: **Side**

6.4 Meander Migration:

6.5 Meander Width: **250.0 Ratio: 10.9**

6.6 Wavelength: **470.0 Ratio: 20.4**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

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

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Alluvial 57.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side **Steep**  
 3.4 Right Valley Side **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **B 59.0 %**  
 Flooding: **Frequent 57.0 %**  
 Water Table Deep: **3.0 57.0 %**  
 Water Table Shallow: **1.5 59.0 %**  
 Erodibility: **High - 39.0 %**

## 7.4 Comments:

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	7.2	Total
1	2	1	0	0	0	0	0	2	0	0	0	2	2	0	0	10
Low	High	Low	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	N.S.	N.S.	High	High	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Bull Creek** Reach **T4.04**  
 Topo Maps: **WESTMINSTER WEST**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From Brookline Rd. crossing the channel has a rapid change in slope**  
 1.2 Towns: **Athens, Townshend**  
 1.3 Downstream Latitude: **43.09**  
 1.3 Downstream Longitude: **-72.58**

## Step 2. Stream Type

2.1 Elevation Upstream: **1282**  
 2.1 Elevation Downstream: **844**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **6317 feet. 1.20Miles.**  
 2.3 Valley Slope: **6.93 %**  
 2.4 Channel Length: **6549 feet. 1.24Miles.**  
 2.5 Channel Slope: **6.69 %**  
 2.6 Sinuosity: **1.04**  
 2.7 Watershed Area: **1 Square Miles**  
 2.8 Channel Width: **12 feet.**  
 2.9 Valley Width: **35 feet.**  
 2.10 Confinement Ratio: **3**  
 2.10 Confinement Type: **Semi-confined**  
 2.11 Reference Stream Type: **A**  
 Bedform: **Step-Pool**  
 Sub-class Slope: **None**  
 Bed Material: **Boulder**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till**  
 3.3 Sub-dominant Geological Mat.: **Other 69.0 %**  
 3.4 Left Valley Side: **Steep**  
 3.4 Right Valley Side: **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **C 53.0 %**  
 Flooding: **None/Rare 100. %**  
 Water Table Deep: **6.0 78.0 %**  
 Water Table Shallow: **6.0 78.0 %**  
 Erodibility: **High - 84.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 90.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 47.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.3 Riparian Buffer

	Left Bank	Right Bank
Dominant:	<b>&gt;100</b>	<b>&gt;100</b>
Sub-dominant:	<b>None</b>	<b>None</b>
Length w/ less than 25 ft.:	<b>0</b>	<b>0</b>

### 4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

### 5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **2 1 %**

5.3 Bank Armoring: **0.0**

	Left	Right
Bank Armoring:	<b>0.0</b>	<b>0.0</b>

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads **old 652 ft. 9 %**

	One Side	Both Sides
Road:	<b>652</b>	<b>ft. 0.0</b>
Railroad:	<b>0.0</b>	<b>ft. 0.0</b>
Berm:	<b>0.0</b>	<b>ft. 0.0</b>
Improved Path:	<b>0.0</b>	<b>ft. 0.0</b>

Road: **652** 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: **None**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

7.3 Ice/Debris Jam Potential: **Not Evaluated**

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	7.2	Total
1	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4
Low	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	Low	N.S.	N.S.	N.S.	N/A	N/A	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Athens Brook** Reach **T4.S1.01**  
 Topo Maps: **WESTMINSTER WEST**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From confluence with T4.01 the reach extends to Change in slope**  
 1.2 Towns: **Athens**  
 1.3 Downstream Latitude: **43.12**  
 1.3 Downstream Longitude: **-72.57**

## Step 2. Stream Type

2.1 Elevation Upstream: **866**  
 2.1 Elevation Downstream: **669**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **3900 feet. 0.74Miles.**  
 2.3 Valley Slope: **5.05 %**  
 2.4 Channel Length: **4014 feet. 0.76Miles.**  
 2.5 Channel Slope: **4.91 %**  
 2.6 Sinuosity: **1.03**  
 2.7 Watershed Area: **4 Square Miles**  
 2.8 Channel Width: **24 feet.**  
 2.9 Valley Width: **45 feet.**  
 2.10 Confinement Ratio: **2**  
 2.10 Confinement Type: **Narrowly Confined**  
 2.11 Reference Stream Type: **A**  
 Bedform: **Step-Pool**  
 Sub-class Slope: **None**  
 Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till 51.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side: **Very Steep**  
 3.4 Right Valley Side: **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **B 56.0 %**  
 Flooding: **None/Rare 93.0 %**  
 Water Table Deep: **6.0 90.0 %**  
 Water Table Shallow: **6.0 90.0 %**  
 Erodibility: **High - 71.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 82.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 44.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

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

### 4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**  
 Type: **None**  
 Use:

5.2 Bridges and Culverts: **1 1 %**  
 5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**  
 5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and 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: **1207.0** ft. **0.0** ft.

6.3 Channel Bars: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 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	7.2	Total
1	2	0	0	0	0	0	0	0	2	0	0	0	0	0	1	6
Low	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	Unk.	High	N.S.	N.S.	N/A	N/A	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Athens Brook** Reach **T4.S1.02**  
 Topo Maps: **SAXTONS RIVER, WESTMINSTER WEST**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **Headwater reach of tributary extends starting downstream of Ernst**  
 1.2 Towns: **Athens**  
 1.3 Downstream Latitude: **43.12**  
 1.3 Downstream Longitude: **-72.58**

## Step 2. Stream Type

2.1 Elevation Upstream: **1607**  
 2.1 Elevation Downstream: **866**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **1170 feet. 0.22Miles.**  
 2.3 Valley Slope: **63.33 %**  
 2.4 Channel Length: **12624 feet. 2.39Miles.**  
 2.5 Channel Slope: **5.87 %**  
 2.6 Sinuosity: **10.79**  
 2.7 Watershed Area: **2** Square Miles  
 2.8 Channel Width: **18** feet.  
 2.9 Valley Width: **36** feet.  
 2.10 Confinement Ratio: **2**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till**  
 3.3 Sub-dominant Geological Mat.: **Alluvial** **72.0 %**  
 3.4 Left Valley Side: **Hilly**  
 3.4 Right Valley Side: **Steep**  
 3.5 Soils  
 Hydrologic Group: **C** **49.0 %**  
 Flooding: **None/Rare** **87.0 %**  
 Water Table Deep: **6.0** **36.0 %**  
 Water Table Shallow: **6.0** **36.0 %**  
 Erodibility: **High -** **76.0 %**

## 7.4 Comments:

Large culvert at Reed Rd. Crossing has failed!  
 See photographs.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 82.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 40.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

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

4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **Impoundment**  
 Type: **Large Run of River**  
 Use: **Other**

5.2 Bridges and Culverts: **6** **2 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0** **0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **4521** ft. **35 %**  
 One Side Both Sides

Road: **3934** ft. **586.7** 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: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

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

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	7.2	Total
1	2	0	2	0	0	0	0	2	0	0	0	0	0	0	2	9
Low	High	N.S.	High	N.S.	N.S.	N.S.	N.S.	High	N.S.	N.S.	N.S.	N/A	N/A	N.S.	High	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Weaver Brook** Reach **T5.01**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From confluence with main stem up to change in slope and**  
 1.2 Towns: **Grafton, Rockingham**  
 1.3 Downstream Latitude: **43.15**  
 1.3 Downstream Longitude: **-72.55**

## Step 2. Stream Type

2.1 Elevation Upstream: **713**  
 2.1 Elevation Downstream: **583**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **11536 feet. 2.18Miles.**  
 2.3 Valley Slope: **1.13 %**  
 2.4 Channel Length: **12638 feet. 2.39Miles.**  
 2.5 Channel Slope: **1.03 %**  
 2.6 Sinuosity: **1.10**  
 2.7 Watershed Area: **3 Square Miles**  
 2.8 Channel Width: **22 feet.**  
 2.9 Valley Width: **400 feet.**  
 2.10 Confinement Ratio: **18**  
 2.10 Confinement Type: **Very Broad**  
 2.11 Reference Stream Type: **C**

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 82.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Field**  
 Current Dominant land Cover: **Forest 60.0 %**  
 Current Sub-Dominant Land Cover: **Wetland**

### 4.3 Riparian Buffer

	Left Bank	Right Bank
Dominant:	<b>&gt;100</b>	<b>&gt;100</b>
Sub-dominant:	<b>51-100</b>	<b>26-50</b>
Length w/ less than 25 ft.:	<b>0</b>	<b>0</b>

### 4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

### 5.1 Flow Regulation - (old): **Impoundment**

Type: **Small Run of River**  
 Use: **Other**

5.2 Bridges and Culverts: **3 1 %**

5.3 Bank Armoring: **0 %**

Left **37** Right **73**

5.4 Channel Straightening: **1232 9 %**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **314** ft. **2 %**  
 One Side Both Sides

Road: **314** 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: **631** ft. **0.0** ft.

6.3 Channel Bars: **Multiple**

6.4 Meander Migration: **Migration**

6.5 Meander Width: **160.0** Ratio: **7.2**

6.6 Wavelength: **370.0** Ratio: **16.7**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

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

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Alluvial 73.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side **Hilly**  
 3.4 Right Valley Side **Steep**  
 3.5 Soils  
 Hydrologic Group: **C 66.0 %**  
 Flooding: **Frequent 73.0 %**  
 Water Table Deep: **1.5 63.0 %**  
 Water Table Shallow: **0.0 63.0 %**  
 Erodibility: **High - 25.0 %**

## 7.4 Comments:

Several bridges and shallow areas gave this reach multiple sources of ice and debris jam potential. The historical structure's foundation that straddles the stream, a possible mill, seems

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	7.2	Total
1	1	0	1	0	0	1	0	0	0	1	1	0	2	0	1	9
Low	Low	N.S.	Low	N.S.	N.S.	Low	N.S.	N.S.	N.S.	Low	Low	N.S.	High	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Weaver Brook** Reach **T5.02**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break up into head waters along Cambridgeport Rd.**  
 1.2 Towns: **Grafton, Rockingham**  
 1.3 Downstream Latitude: **43.18**  
 1.3 Downstream Longitude: **-72.56**

## Step 2. Stream Type

2.1 Elevation Upstream: **840**  
 2.1 Elevation Downstream: **713**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **5125 feet. 0.97Miles.**  
 2.3 Valley Slope: **2.48 %**  
 2.4 Channel Length: **5225 feet. 0.99Miles.**  
 2.5 Channel Slope: **2.43 %**  
 2.6 Sinuosity: **1.02**  
 2.7 Watershed Area: **1 Square Miles**  
 2.8 Channel Width: **10 feet.**  
 2.9 Valley Width: **95 feet.**  
 2.10 Confinement Ratio: **10**  
 2.10 Confinement Type: **Broad**  
 2.11 Reference Stream Type: **B**  
 Bedform: **Riffle-Pool**  
 Sub-class Slope: **None**  
 Bed Material: **Gravel**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till 58.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side: **Very Steep**  
 3.4 Right Valley Side: **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **A 38.0 %**  
 Flooding: **None/Rare 96.0 %**  
 Water Table Deep: **6.0 96.0 %**  
 Water Table Shallow: **6.0 96.0 %**  
 Erodibility: **High - 95.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 86.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Field**  
 Current Dominant land Cover: **Forest 54.0 %**  
 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**

### 4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **Impoundment**  
 Type: **Large Run of River**  
 Use: **Recreation**

5.2 Bridges and Culverts: **0 0 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and 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: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

7.3 Ice/Debris Jam Potential: **Not Evaluated**

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	7.2	Total
1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	4
Low	Low	N.S.	High	N.S.	N.S.	N.S.	N.S.	Unk.	N.S.	N.S.	N.S.	N/A	N/A	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **South Branch Saxtons River** Reach **T6.01**  
 Topo Maps: **SAXTONS RIVER**  
 Date Last Edited: **Mon, June 23, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From confluence with main stem reach M13 up to reach break near Grafton**  
 1.2 Towns: **Grafton**  
 1.3 Downstream Latitude: **43.17**  
 1.3 Downstream Longitude: **-72.60**

## Step 2. Stream Type

2.1 Elevation Upstream: **906**  
 2.1 Elevation Downstream: **816**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **7900 feet. 1.50Miles.**  
 2.3 Valley Slope: **1.14 %**  
 2.4 Channel Length: **9500 feet. 1.80Miles.**  
 2.5 Channel Slope: **0.95 %**  
 2.6 Sinuosity: **1.20**  
 2.7 Watershed Area: **20** Square Miles  
 2.8 Channel Width: **49** feet.  
 2.9 Valley Width: **750** feet.  
 2.10 Confinement Ratio: **15**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Alluvial 71.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side **Very Steep**  
 3.4 Right Valley Side **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **B 73.0 %**  
 Flooding: **Frequent 71.0 %**  
 Water Table Deep: **6.0 88.0 %**  
 Water Table Shallow: **6.0 88.0 %**  
 Erodibility: **High - 18.0 %**

## 7.4 Comments:

Several sharp bends and bridges yields the high debris and ice jam potential.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 87.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Crop**  
 Current Dominant land Cover: **Urban 27.0 %**  
 Current Sub-Dominant Land Cover: **Forest**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **51-100 51-100**  
 Sub-dominant: **>100 >100**  
 Length w/ less than 25 ft.: **477 230**

4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **Impoundment**  
 Type: **Small Run of River**  
 Use: **Other**

5.2 Bridges and Culverts: **3 1 %**  
 5.3 Bank Armoring: **3 %**

Left **291** Right **0.0**  
 5.4 Channel Straightening: **5148 54 %**  
 5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **2686** ft. **28 %**  
 One Side Both Sides  
 Road: **2686** 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: **232** ft. **0.0** ft.

6.3 Channel Bars: **Multiple**

6.4 Meander Migration:

6.5 Meander Width: **N/A Ratio: 0.0**

6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 ft.**

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

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	7.2	Total
1	2	1	1	0	0	2	0	2	0	1	0	0	0	0	1	11
Low	High	Low	Low	N.S.	N.S.	High	N.S.	High	N.S.	Low	N.S.	N/A	N/A	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **South Branch Saxtons River** Reach **T6.02**  
 Topo Maps: **SAXTONS RIVER, WINDHAM**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break up to where channel is met by tributary T6.S1.01.**  
 1.2 Towns: **Grafton**  
 1.3 Downstream Latitude: **43.15**  
 1.3 Downstream Longitude: **-72.62**

## Step 2. Stream Type

2.1 Elevation Upstream: **960**  
 2.1 Elevation Downstream: **906**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **4842 feet. 0.92Miles.**  
 2.3 Valley Slope: **1.12 %**  
 2.4 Channel Length: **4901 feet. 0.93Miles.**  
 2.5 Channel Slope: **1.10 %**  
 2.6 Sinuosity: **1.01**  
 2.7 Watershed Area: **18** Square Miles  
 2.8 Channel Width: **46** feet.  
 2.9 Valley Width: **689** feet.  
 2.10 Confinement Ratio: **15**  
 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 Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Alluvial 50.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side: **Very Steep**  
 3.4 Right Valley Side: **Steep**  
 3.5 Soils  
 Hydrologic Group: **B 53.0 %**  
 Flooding: **Frequent 50.0 %**  
 Water Table Deep: **6.0 98.0 %**  
 Water Table Shallow: **6.0 98.0 %**  
 Erodibility: **High - 19.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 87.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Crop**  
 Current Dominant land Cover: **Forest 36.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **51-100 >100**  
 Sub-dominant: **0-25 26-50**  
 Length w/ less than 25 ft.: **1512 0**

### 4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

### 5.1 Flow Regulation - (old): **None**

Type: **None**  
 Use:

5.2 Bridges and Culverts: **2 1 %**  
 5.3 Bank Armoring: **2 %**

Left **134** Right **0.0**  
 5.4 Channel Straightening: **211 4 %**

### 5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **4234** ft. **86 %**  
 One Side Both Sides  
 Road: **4234** 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:  
 6.5 Meander Width: **230.0 Ratio: 5.0**  
 6.6 Wavelength: **1160.0 Ratio: 25.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**  
 7.2 Bank Height: **0.00 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	7.2	Total
1	2	2	0	0	0	0	0	2	0	1	0	1	2	0	0	11
Low	High	High	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	Low	N.S.	Low	High	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **South Branch Saxtons River** Reach **T6.03**  
 Topo Maps: **WINDHAM**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break near the confluence with T6.S1.01 up to the**  
 1.2 Towns: **Grafton**  
 1.3 Downstream Latitude: **43.14**  
 1.3 Downstream Longitude: **-72.63**

## Step 2. Stream Type

2.1 Elevation Upstream: **1013**  
 2.1 Elevation Downstream: **960**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **4700 feet. 0.89Miles.**  
 2.3 Valley Slope: **1.13 %**  
 2.4 Channel Length: **5006 feet. 0.95Miles.**  
 2.5 Channel Slope: **1.06 %**  
 2.6 Sinuosity: **1.07**  
 2.7 Watershed Area: **11 Square Miles**  
 2.8 Channel Width: **38 feet.**  
 2.9 Valley Width: **584 feet.**  
 2.10 Confinement Ratio: **15**  
 2.10 Confinement Type: **Very Broad**  
 2.11 Reference Stream Type: **C**  
 Bedform: **Riffle-Pool**  
 Sub-class Slope: **None**  
 Bed Material: **Boulder**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Ice-Contact 100. %**  
 3.3 Sub-dominant Geological Mat.:  
 3.4 Left Valley Side **Hilly**  
 3.4 Right Valley Side **Steep**  
 3.5 Soils  
 Hydrologic Group: **A 97.0 %**  
 Flooding: **None/Rare 100. %**  
 Water Table Deep: **6.0 97.0 %**  
 Water Table Shallow: **6.0 97.0 %**  
 Erodibility: **High - 72.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 86.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Crop**  
 Current Dominant land Cover: **Forest 34.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **0-25 >100**  
 Sub-dominant: **26-50 None**  
 Length w/ less than 25 ft.: **1238 0**

4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **0 0 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **0.0 0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **4082 ft. 81 %**

One Side Both Sides

Road: **4082 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: **Side**

6.4 Meander Migration:

6.5 Meander Width: **160.0 Ratio: 4.2**

6.6 Wavelength: **900.0 Ratio: 23.7**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 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	7.2	Total
1	2	2	0	0	0	0	0	2	0	1	0	1	2	0	0	11
Low	High	High	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	Low	N.S.	Low	High	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **South Branch Saxtons River** Reach **T6.04**  
 Topo Maps: **TOWNSHEND, WINDHAM**  
 Date Last Edited: **Mon, June 23, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From reach break to bend in tributary by Stiles Brook Rd.**  
 1.2 Towns: **Grafton, Townshend**  
 1.3 Downstream Latitude: **43.13**  
 1.3 Downstream Longitude: **-72.64**

## Step 2. Stream Type

2.1 Elevation Upstream: **1170**  
 2.1 Elevation Downstream: **1013**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **4194 feet. 0.79Miles.**  
 2.3 Valley Slope: **3.74 %**  
 2.4 Channel Length: **4308 feet. 0.82Miles.**  
 2.5 Channel Slope: **3.64 %**  
 2.6 Sinuosity: **1.03**  
 2.7 Watershed Area: **7** Square Miles  
 2.8 Channel Width: **30** feet.  
 2.9 Valley Width: **551** feet.  
 2.10 Confinement Ratio: **18**  
 2.10 Confinement Type: **Very Broad**  
 2.11 Reference Stream Type: **C**  
 Bedform: **Riffle-Pool**  
 Sub-class Slope: **b**  
 Bed Material: **Boulder**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **Yes**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Ice-Contact 98.0 %**  
 3.3 Sub-dominant Geological Mat.: **Till**  
 3.4 Left Valley Side: **Steep**  
 3.4 Right Valley Side: **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **A 73.0 %**  
 Flooding: **None/Rare 100. %**  
 Water Table Deep: **6.0 74.0 %**  
 Water Table Shallow: **6.0 74.0 %**  
 Erodibility: **High - 74.0 %**

## 7.4 Comments:

Records indicate historical gravel mining/dredging in alluvial fan, where the channel changes slope quickly in the alluvial valley.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 84.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Crop**  
 Current Dominant land Cover: **Forest 32.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **26-50 26-50**  
 Sub-dominant: **>100 >100**  
 Length w/ less than 25 ft.: **1254 0**

4.4 Ground Water Inputs: **Minimal**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**

Type: **None**

Use:

5.2 Bridges and Culverts: **1 1 %**

5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**

5.4 Channel Straightening: **2475 57 %**

5.5 Dredging History: **Dredging**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **1442 ft. 33 %**  
 One Side Both Sides

Road: **1442 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:

6.5 Meander Width: **140.0 Ratio: 4.6**

6.6 Wavelength: **550.0 Ratio: 18.1**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**

7.2 Bank Height: **0.00 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	7.2	Total
1	2	2	0	0	0	2	2	2	0	2	0	1	2	0	0	16
Low	High	High	N.S.	N.S.	N.S.	High	High	High	N.S.	High	N.S.	Low	High	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **South Branch Saxtons River** Reach **T6.05**  
 Topo Maps: **TOWNSHEND, WINDHAM**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **Stiles Brook: From reach break near the end of Stiles Brook Rd. to**  
 1.2 Towns: **Grafton, Townshend**  
 1.3 Downstream Latitude: **43.12**  
 1.3 Downstream Longitude: **-72.65**

## Step 2. Stream Type

2.1 Elevation Upstream: **1691**  
 2.1 Elevation Downstream: **1170**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **9620 feet. 1.82Miles.**  
 2.3 Valley Slope: **5.42 %**  
 2.4 Channel Length: **10029 feet. 1.90Miles.**  
 2.5 Channel Slope: **5.19 %**  
 2.6 Sinuosity: **1.04**  
 2.7 Watershed Area: **3 Square Miles**  
 2.8 Channel Width: **23 feet.**  
 2.9 Valley Width: **35 feet.**  
 2.10 Confinement Ratio: **2**  
 2.10 Confinement Type: **Narrowly Confined**  
 2.11 Reference Stream Type: **A**  
 Bedform: **Step-Pool**  
 Sub-class Slope: **None**  
 Bed Material: **Boulder**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till 85.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side: **Steep**  
 3.4 Right Valley Side: **Very Steep**  
 3.5 Soils  
 Hydrologic Group: **B 85.0 %**  
 Flooding: **None/Rare 100. %**  
 Water Table Deep: **6.0 99.0 %**  
 Water Table Shallow: **6.0 99.0 %**  
 Erodibility: **High - 99.0 %**

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 86.0 %**  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Urban 43.0 %**  
 Current Sub-Dominant Land Cover: **Forest**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **>100 >100**  
 Sub-dominant: **None None**  
 Length w/ less than 25 ft.: **0 0**  
 4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**  
 Type: **None**  
 Use:

5.2 Bridges and Culverts: **0 0 %**  
 5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**  
 5.4 Channel Straightening: **0.0 0.0**  
 5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **3126 ft. 31 %**  
 One Side Both Sides  
 Road: **3126 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: **None**

6.4 Meander Migration:  
 6.5 Meander Width: **N/A Ratio: 0.0**  
 6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**  
 7.2 Bank Height: **0.00 ft.**  
 7.3 Ice/Debris Jam Potential: **Not Evaluated**

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	7.2	Total
1	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	5
Low	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	N.S.	N.S.	N/A	N/A	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **South Branch Saxtons River** Reach **T6.06**  
 Topo Maps: **WINDHAM**  
 Date Last Edited: **Mon, June 16, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **Stiles Brook: From reach break up into headwaters.**  
 1.2 Towns: **Grafton, Windham**  
 1.3 Downstream Latitude: **43.14**  
 1.3 Downstream Longitude: **-72.67**

## Step 2. Stream Type

2.1 Elevation Upstream: **2000**  
 2.1 Elevation Downstream: **1691**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **10842** feet. **2.05**Miles.  
 2.3 Valley Slope: **2.85** %  
 2.4 Channel Length: **12071** feet. **2.29**Miles.  
 2.5 Channel Slope: **2.56** %  
 2.6 Sinuosity: **1.11**  
 2.7 Watershed Area: **2** Square Miles  
 2.8 Channel Width: **17** feet.  
 2.9 Valley Width: **130** feet.  
 2.10 Confinement Ratio: **8**  
 2.10 Confinement Type: **Broad**  
 2.11 Reference Stream Type: **C**  
 Bedform: **Riffle-Pool**  
 Sub-class Slope: **b**  
 Bed Material: **Cobble**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **None**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till**  
 3.3 Sub-dominant Geological Mat.: **Other** **69.0** %  
 3.4 Left Valley Side: **Hilly**  
 3.4 Right Valley Side: **Hilly**  
 3.5 Soils  
 Hydrologic Group: **D** **83.0** %  
 Flooding: **None/Rare** **100.** %  
 Water Table Deep: **1.0** **53.0** %  
 Water Table Shallow: **0.0** **53.0** %  
 Erodibility: **High -** **70.0** %

## 7.4 Comments:

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest** **89.0** %  
 Current Sub-Dominant Land Cover: **Urban**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest** **68.0** %  
 Current Sub-Dominant Land Cover: **Urban**

### 4.3 Riparian Buffer

	Left Bank	Right Bank
Dominant:	<b>&gt;100</b>	<b>&gt;100</b>
Sub-dominant:	<b>None</b>	<b>None</b>
Length w/ less than 25 ft.:	<b>0</b>	<b>0</b>

### 4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

### 5.1 Flow Regulation - (old): **None**

Type: **None**  
 Use:

5.2 Bridges and Culverts: **1** **0** %

5.3 Bank Armoring: **0.0**

	Left	Right
0.0	<b>0.0</b>	<b>0.0</b>

5.4 Channel Straightening: **0.0** **0.0**

5.5 Dredging History: **None**

## Step 6. Floodplain Modifications

6.1 Berms and Roads old **0.0** ft. **0.0**

	One Side	Both Sides
Road:	<b>0.0</b> ft.	<b>0.0</b> ft.
Railroad:	<b>0.0</b> ft.	<b>0.0</b> ft.
Berm:	<b>0.0</b> ft.	<b>0.0</b> ft.
Improved Path:	<b>0.0</b> ft.	<b>0.0</b> ft.

6.2 Development: **0.0** ft. **0.0** ft.

6.3 Channel Bars: **No Data**

6.4 Meander Migration:

6.5 Meander Width: **70.0** Ratio: **4.1**

6.6 Wavelength: **165.0** Ratio: **9.7**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00** ft.

7.2 Bank Height: **0.00** ft.

7.3 Ice/Debris Jam Potential: **Not Evaluated**

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	7.2	Total
1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3
Low	Low	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	Unk.	N.S.	N.S.	N.S.	Low	N.S.	N.S.	N.S.	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Howe Brook** Reach **T6.S1.01**  
 Topo Maps: **WINDHAM**  
 Date Last Edited: **Mon, June 23, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **From confluence with T6.02 extending up into the mountains.**  
 1.2 Towns: **Grafton, Windham**  
 1.3 Downstream Latitude: **43.14**  
 1.3 Downstream Longitude: **-72.63**

## Step 2. Stream Type

2.1 Elevation Upstream: **2198**  
 2.1 Elevation Downstream: **956**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **32940 feet. 6.24Miles.**  
 2.3 Valley Slope: **3.77 %**  
 2.4 Channel Length: **36287 feet. 6.87Miles.**  
 2.5 Channel Slope: **3.42 %**  
 2.6 Sinuosity: **1.10**  
 2.7 Watershed Area: **5** Square Miles  
 2.8 Channel Width: **27** feet.  
 2.9 Valley Width: **50** feet.  
 2.10 Confinement Ratio: **2**  
 2.10 Confinement Type: **Narrowly Confined**  
 2.11 Reference Stream Type: **B**  
 Bedform: **Step-Pool**  
 Sub-class Slope: **None**  
 Bed Material: **Boulder**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **Yes**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact** **61.0 %**  
 3.4 Left Valley Side: **Steep**  
 3.4 Right Valley Side: **Steep**  
 3.5 Soils  
 Hydrologic Group: **C** **45.0 %**  
 Flooding: **None/Rare** **89.0 %**  
 Water Table Deep: **6.0** **39.0 %**  
 Water Table Shallow: **6.0** **39.0 %**  
 Erodibility: **High -** **84.0 %**

## 7.4 Comments:

Records indicate historical gravel mining/dredging in alluvial fan, where the channel changes slope quickly in the alluvial valley.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 90.0 %**  
 Current Sub-Dominant Land Cover: **Crop**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 62.0 %**  
 Current Sub-Dominant Land Cover: **Crop**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **>100 >100**  
 Sub-dominant: **None None**  
 Length w/ less than 25 ft.: **0 0**  
 4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**  
 Type: **None**  
 Use:

5.2 Bridges and Culverts: **0 0 %**  
 5.3 Bank Armoring: **0 %**

Left **40.6** Right **0.0**  
 5.4 Channel Straightening: **1283 3 %**

5.5 Dredging History: **Dredging**

## Step 6. Floodplain Modifications

6.1 Berms and 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:  
 6.5 Meander Width: **N/A Ratio: 0.0**  
 6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**  
 7.2 Bank Height: **0.00 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	7.2	Total
0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	1	4
N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	High	Unk.	N.S.	Low	N.S.	N/A	N/A	N.S.	Low	

# Saxtons

# Phase 1 - Reach Summary Report

Basin: **West, Saxton's, Williams**  
 Stream Name: **Willie Brook** Reach **T6.S2.01**  
 Topo Maps: **WINDHAM**  
 Date Last Edited: **Mon, June 23, 2008**  
 Watershed: **West River**  
 Sub-watershed: **Saxtons River**  
 Is Reach an Impoundment? **No** Quality Control Status: **Step 2 done**

## Step 1. Reach Location

1.1 Reach Description: **Headwater reach from confluence with main stem reach T6.02 up into Grafton, Townshend, Windham**  
 1.2 Towns: **Grafton, Townshend, Windham**  
 1.3 Downstream Latitude: **43.13**  
 1.3 Downstream Longitude: **-72.64**

## Step 2. Stream Type

2.1 Elevation Upstream: **2150**  
 2.1 Elevation Downstream: **1016**  
 2.1 Is Gradient Gentle? **No**  
 2.2 Valley Length: **23775 feet. 4.50Miles.**  
 2.3 Valley Slope: **4.77 %**  
 2.4 Channel Length: **25077 feet. 4.75Miles.**  
 2.5 Channel Slope: **4.52 %**  
 2.6 Sinuosity: **1.05**  
 2.7 Watershed Area: **4 Square Miles**  
 2.8 Channel Width: **24 feet.**  
 2.9 Valley Width: **38 feet.**  
 2.10 Confinement Ratio: **2**  
 2.10 Confinement Type: **Narrowly Confined**  
 2.11 Reference Stream Type: **A**  
 Bedform: **Step-Pool**  
 Sub-class Slope: **None**  
 Bed Material: **Boulder**

## Step 3. Basin Characteristics:

3.1 Alluvial Fan: **Yes**  
 3.2 Grade Control: **None**  
 3.3 Dominant Geologic Mat.: **Till 68.0 %**  
 3.3 Sub-dominant Geological Mat.: **Ice-Contact**  
 3.4 Left Valley Side: **Extremely Steep**  
 3.4 Right Valley Side: **Extremely Steep**  
 3.5 Soils  
 Hydrologic Group: **C 28.0 %**  
 Flooding: **None/Rare 84.0 %**  
 Water Table Deep: **6.0 56.0 %**  
 Water Table Shallow: **6.0 56.0 %**  
 Erodibility: **High - 84.0 %**

## 7.4 Comments:

Records indicate historical gravel mining/dredging in alluvial fan, where the channel changes slope quickly in the alluvial valley.

## Step 4. Land Cover - Reach Hydrology

### 4.1 Watershed

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 88.0 %**  
 Current Sub-Dominant Land Cover: **Crop**

### 4.2 Corridor

Historic Land Cover: **Forest**  
 Current Dominant land Cover: **Forest 48.0 %**  
 Current Sub-Dominant Land Cover: **Crop**

4.3 Riparian Buffer Left Bank Right Bank  
 Dominant: **>100 >100**  
 Sub-dominant: **None None**  
 Length w/ less than 25 ft.: **0 0**  
 4.4 Ground Water Inputs: **Abundant**

## Step 5. Instream Channel Modifications

5.1 Flow Regulation - (old): **None**  
 Type: **None**  
 Use:

5.2 Bridges and Culverts: **1 0 %**  
 5.3 Bank Armoring: **0.0**

Left **0.0** Right **0.0**  
 5.4 Channel Straightening: **1040 4 %**  
 5.5 Dredging History: **Dredging**

## Step 6. Floodplain Modifications

6.1 Berms and 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:  
 6.5 Meander Width: **N/A Ratio: 0.0**  
 6.6 Wavelength: **N/A Ratio: 0.0**

## Step 7. Windshield Survey

7.1 Bank Erosion: **0.00 ft.**  
 7.2 Bank Height: **0.00 ft.**  
 7.3 Ice/Debris Jam Potential: **Bend**

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	7.2	Total
0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	1	5
N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	High	Unk.	N.S.	High	N.S.	N/A	N/A	N.S.	Low	

**Appendix C**  
**QA/QC Summary**

## Appendix D. VTDEC Biotic Sampling Data

### Macroinvertebrate Sampling Data

Date Sampled	VTDEC Site ID	River Location	SGA Mile Reach	Mean Density	Mean Species Richness	Mean EPT* Richness	Community Assessment
10/1/2003	60000000038	Saxtons River	3.8 M05	1624	39	23	Very Good
10/4/1993	60000000045	Saxtons River	4.5 M05	2100	44	22	Good
10/5/1993	60000000062	Saxtons River	6.2 M06	1892	50	28	Excellent
10/4/1994	60000000062	Saxtons River	6.2 M06	2526	59	36	Excellent
10/2/1995	60000000062	Saxtons River	6.2 M06	2346	47	27	Excellent
9/20/2006	60000000094	Saxtons River	9.4 M09	3256	55	31	Excellent
9/25/2003	60500000001	Leach Brook	0.1 T3.01	485	42	23	Excellent

\* EPT: Pollution sensitive families of Ephemeropter, Plecoptera, and Trichoptera

### Fish Sampling Data

Date Sampled	VTDEC Site ID	River Location	SGA Mile Reach	Community Assessment
10/4/1994	60000000062	Saxtons River	6.2 M06	33 Good
10/2/1995	60000000062	Saxtons River	6.2 M06	31 Good
9/20/2006	60000000094	Saxtons River	9.4 M09	33 Good
9/20/2006	60000000144	Saxtons River	14.4 M15	37 Very Good
9/25/2003	60500000001	Leach Brook	0.1 T3.01	9 Poor
9/20/2006	60500000001	Leach Brook	0.1 T3.01	18 Poor

† Index of Biological Integrity: Mixed Water (MW) index for Saxtons River, Cold Water (CW) index for Leach Brook