Phase 1 Stream Geomorphic Assessment
Middlebury River Watershed

Towns of Middlebury, Salisbury, Ripton, Hancock & Lincoln

Addison County, Vermont

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EXECUTIVE SUMMARY

- A Phase 1 Stream Geomorphic Assessment of the Middlebury River and major tributaries within the towns of Middlebury, Salisbury, Ripton, Hancock & Lincoln was completed by Arrowwood Environmental during the spring and summer of 2006. The study included the main stem of the Middlebury River and major tributaries.

- The watershed had been divided into 54 reaches based on confinement, slope, soils, and tributary influence prior to commencement of Arrowwood's assessment. In addition, several other Phase 1 steps had been completed by Vt. ANR River Management Section staff and others, including all steps involving SGAT data processing and entry.

- The study followed the Phase 1 assessment protocol developed by the Vermont Agency of Natural Resources. Information from the study came from the Vermont Department of Environmental Conservation, the Vermont Fish and Wildlife Department, the Vermont Mapping Program, the Vermont Center for Geographic Information, and the windshield survey.

- The dominant surficial geology of the Middlebury River basin consists of glacial till and ice contact deposits in the higher elevations and glacial lacustrine sediments with occasional glacial outwash and post glacial fluvial (alluvial) sediments in the lower elevations. The lower reaches are generally characterized as C and E channels. The soils around M01-M06, the lower Middlebury River, are frequently flooded, while the remainder of the lower reach soils are rarely flooded. Lower reach soils are generally highly erodable. The upper reaches are primarily B channels with till and ice contact deposits as the dominant geologic materials. These soils are rarely flooded and have very severe erodibility.

- Of the four impact categories measured during the Phase 1 Assessment, Land Cover/Land Use was the primary category identified as being at risk of causing channel adjustments. Twenty-two (22) percent of the reaches resulted in a watershed/land use impact rating of high, while fifty (50) percent of the reaches resulted in a river corridor land cover/land use impact rating of high. Sixteen (16) percent of the reaches received a high impact rating for riparian corridor, due to over seventy-five (75) percent of the reach having little or no buffer on one or more banks.

- The meander migration, meander width ratio, and meander wavelength indicate ongoing channel adjustment. Nineteen of the unconfined reaches fell outside the range of expected meander width ratio, and 23 reaches fell outside of the range of expected

meander wavelength ratio. Based on the review of current and historical orthophotos, meander migration was evident on the main stem of the Middlebury River from reach M7 downstream. Migration or movement of the channel by eroding its outer bank on meander bends, combined with avulsion, or cutting off of meander bends, appeared to be the mechanism for lateral migration of the channel.

- The watershed condition generated from the Phase I database was generally similar to the reach condition based on professional judgment and observations during the Phase I windshield survey.

- Reaches in fair condition include main stem reaches M03, M06, M07, M08 & M13. M05, and portions of T1S1 and T2S1 were found to be in poor condition. Reaches in good condition were interspersed throughout the study area. Reaches exhibiting reference conditions were primarily in the headwaters of the main stem (Middlebury River) and T3 (North Branch Middlebury River).

- Based on Phase I evaluation, Arrowwood Environmental recommends that the main stem reaches, from M01 to M12, of the Middlebury River be prioritized for Phase 2 Assessment fieldwork, with M03-M08 given the highest priority. Because Phase 2 work has previously been completed for these reaches, as well as tributaries T3 & T4, Phase 2 work on T1 and T2 is recommended next.

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1.0 INTRODUCTION

Arrowwood Environmental was retained by the Addison County Regional Planning Commission (ACRPC) in March 2006 to conduct a Phase 1 Stream Geomorphic Assessment of the Middlebury River and Major Tributaries.[1] The assessment was conducted on the main stem of the Middlebury River and the major tributaries of the Middlebury River (Figure 1 and 1b). The primary objective of the study was to provide an overview of the general physical characteristics of the Middlebury River watershed and determine which reaches may be in adjustment. A secondary objective of the study was to select reaches to be recommended for Phase 2 Assessment. The Phase 2 Assessment would then be used to provide the ACRPC, VT ANR and the towns of the watershed with information that can be used for watershed planning and restoration activities.

Table a. Phase 1 steps completed by Arrowwood

Phase 1 Step	Description
1.1	Reach Descriptions
1.2	Town
2.10	Confinement
2.11	Stream Type
4.3	Riparian Buffer Width
4.4	Groundwater/small tributary inputs
5.1	Flow Regulation/withdrawals
5.2	Bridges and Culverts
5.3	Bank Armoring/Revetments (RIT)
5.4	Channel Modifications (RIT)
5.5	Dredging/Gravel Mining
6.1	Berms and Roads (RIT)
6.2	River Corridor Development
6.3	Depositional Features
6.4	Meander Migration/Avulsion
6.5	Meander Width Ratio
6.6	Wavelength Ratio
7.1	Dominant Bedform/material
7.2	Bank Erosion
7.3	Debris and Ice Jam potential
8.1	Impact Rating
8.2	Priority Rating
9.1	Channel Adjustment Process
9.2	Reach Condition
9.3	Reach Sensitivity
10	Like Reach Evaluation

Some portions of the Phase 1 Assessment had been previously completed, and these steps were not repeated under this project contract. Phase 1 steps included in this project are listed in Table a. Although the scope of services for the project contract included the use of the Reach Indexing Tool (RIT), the VT ANR implemented a new Feature Indexing Tool (FIT) part way through the project process. The FIT was utilized for this project, and some additional features were indexed such as bank erosion.

[1] Per the ANR protocols major tributaries constitute ten percent or more of the watershed area at the confluence with the main stem. Note- reach breaks and sub-watershed determinations made by VT ANR prior to Arrowwood contract.

Data and information for the Middlebury River Watershed was obtained from the Vermont Department of Environmental Conservation (VDEC), the Vermont Fish and Wildlife Department (VF&W), the Vermont Center for Geographic Information (VCGI), and the Addison County Regional Planning Commission. Windshield surveys of the watershed were conducted on August 2nd ,3rd and 7th of 2006. A Project metadata summary is provided in the Appendix, page 1.

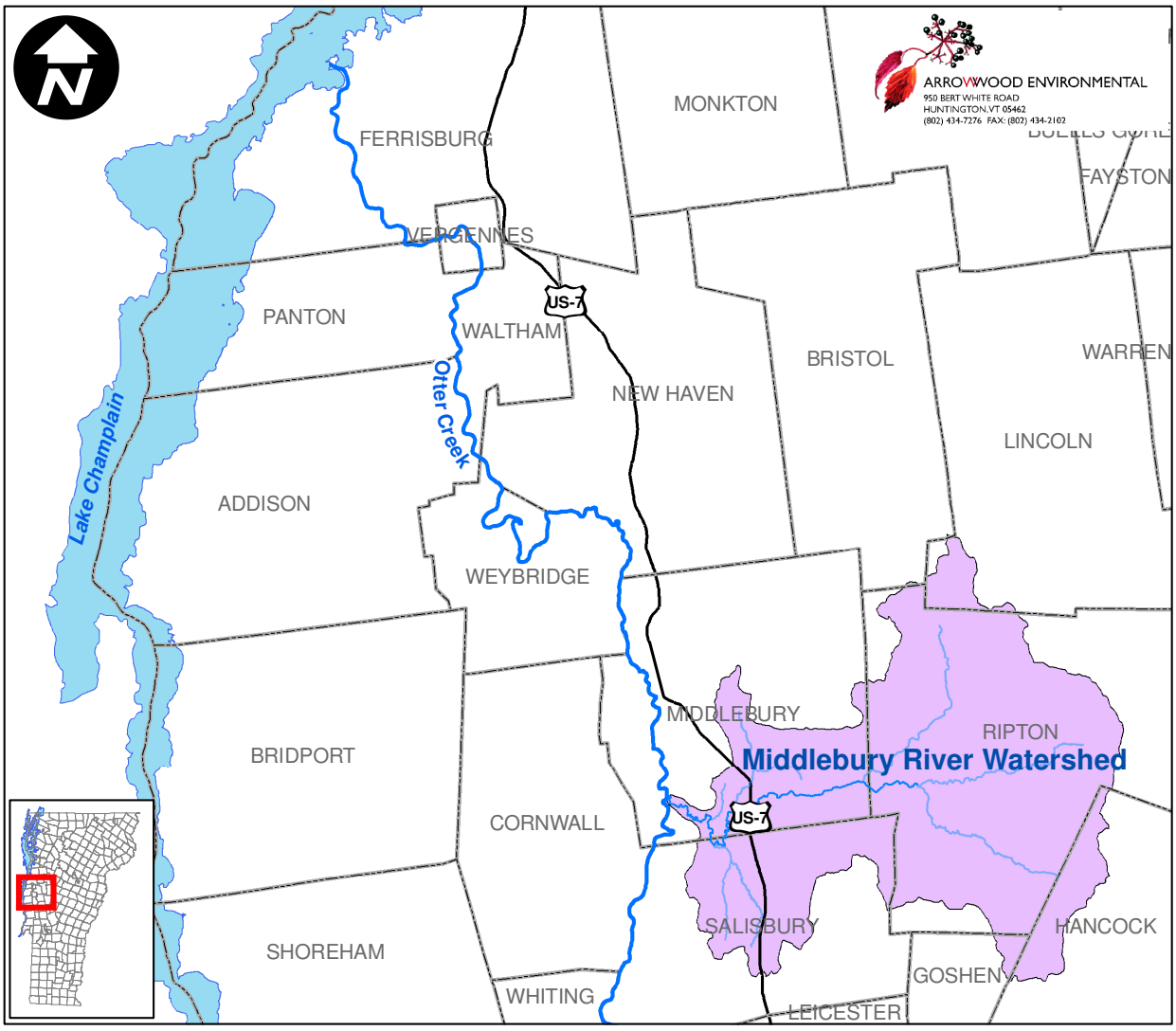

Figure 1. Project Location Map for the Phase I Assessment

2.0 BACKGROUND

The Middlebury River Watershed has a watershed area of 63 square miles. This Phase I study included stream reaches on the Middlebury River located within the towns of Middlebury, Salisbury, Ripton, Hancock & Lincoln, Vt.

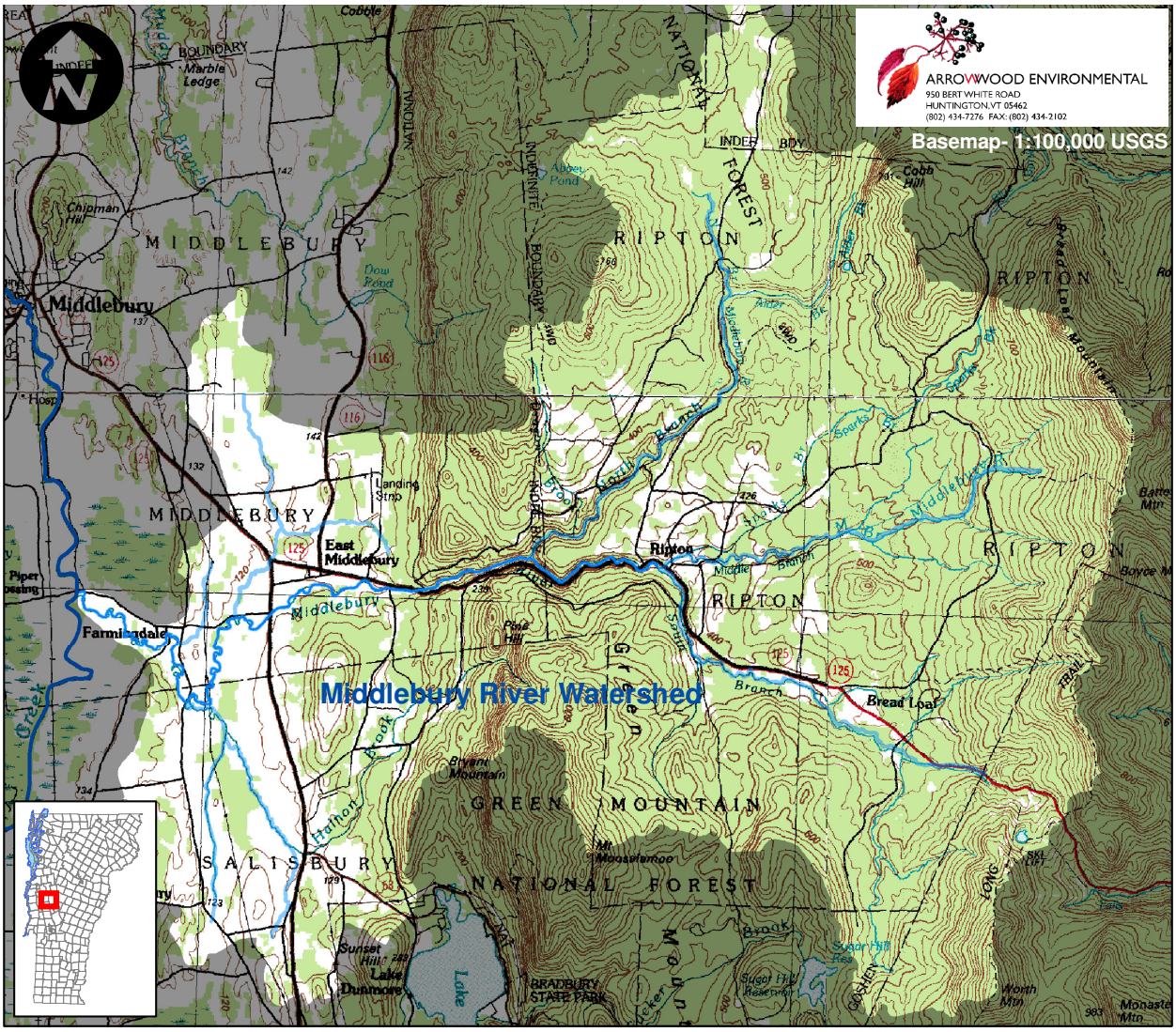

Figure 1b. Middlebury River Watershed

3.0 METHODOLOGY

The Phase I assessment followed procedures specified in the Vermont Stream Geomorphic Assessment Handbook Phase 1 (Vermont Agency of Natural Resources 2004), and used version 4.50 of the Stream Geomorphic Assessment Tool (SGAT) GIS extension for feature indexing. All assessment data were recorded on the Agency of Natural Resources (ANR) Phase I data sheets or in GIS database files, and were entered in to the most current version of the ANR Phase I Online data management system.

3.1 Parameters

During the Phase 1 Assessment, each parameter in Table 1 was rated according to the following menu options (NS – not significant, low impact, high impact or No info –no information). A zero was scored for options NS and No info, a one for low impact and a two for high impact.

Table 1. Parameters Included in Impact Scores

Step #	Parameter
4.1	Watershed Land Cover/ Land Use
4.2	Corridor Land Cover/ Land Use
4.3	Riparian Buffer Width
5.1	Flow Regulations and Water Withdrawals
5.2	Bridges and Culverts
5.3	Bank Armoring and Revetments
5.4	Channel Modifications
5.5	Dredging and Gravel Mining History
6.1	Berms and Roads
6.2	River Corridor Development
6.3	Depositional Features
6.4	Meander Migration / Channel Avulsion
6.5	Meander Width Ratio
6.6	Wavelength Ratio
7.2	Bank Erosion – Relative Magnitude
7.3	Ice and Debris Jam Potential

3.2 QA Review

Arrowwood Environmental completed the Phase 1 – Quality Assurance Worksheet to document: (a) the tools used to collect the Phase 1 data, (b) the confidence level in the data, (c) the date the assessment was completed, and (d) the date each Phase 1 step was checked by the local and state QA teams (see page 2-3 of the Appendix). Arrowwood Environmental then rated the confidence level in the Phase 1 data from moderate to high. A few of the reaches could not be accessed due to poor accessibility or lack of landowner permission. For these reasons, the quality of the data was rated as moderate to high rather than high. In addition, some of the historic in-stream and floodplain modifications were not known.

The ArcView shapefiles for the Middlebury River Phase 1 study were submitted to Shannon Hill of the VTANR, River Management Division. SGAT generated data and database entries were

made to the Online Geomorphic Assessment Database for a QA review from March to August 2006. Minor modifications were made to data following QA steps.

4.0 RESULTS

4.1 Reach Locations

The Middlebury River Watershed was divided into 54 reaches for the Phase I Assessment. Phase I– Step 1. Reach Locations Report on pages 4-6 of the Appendix provides the reach locations including reach description, town where the reach is located, and Latitude and

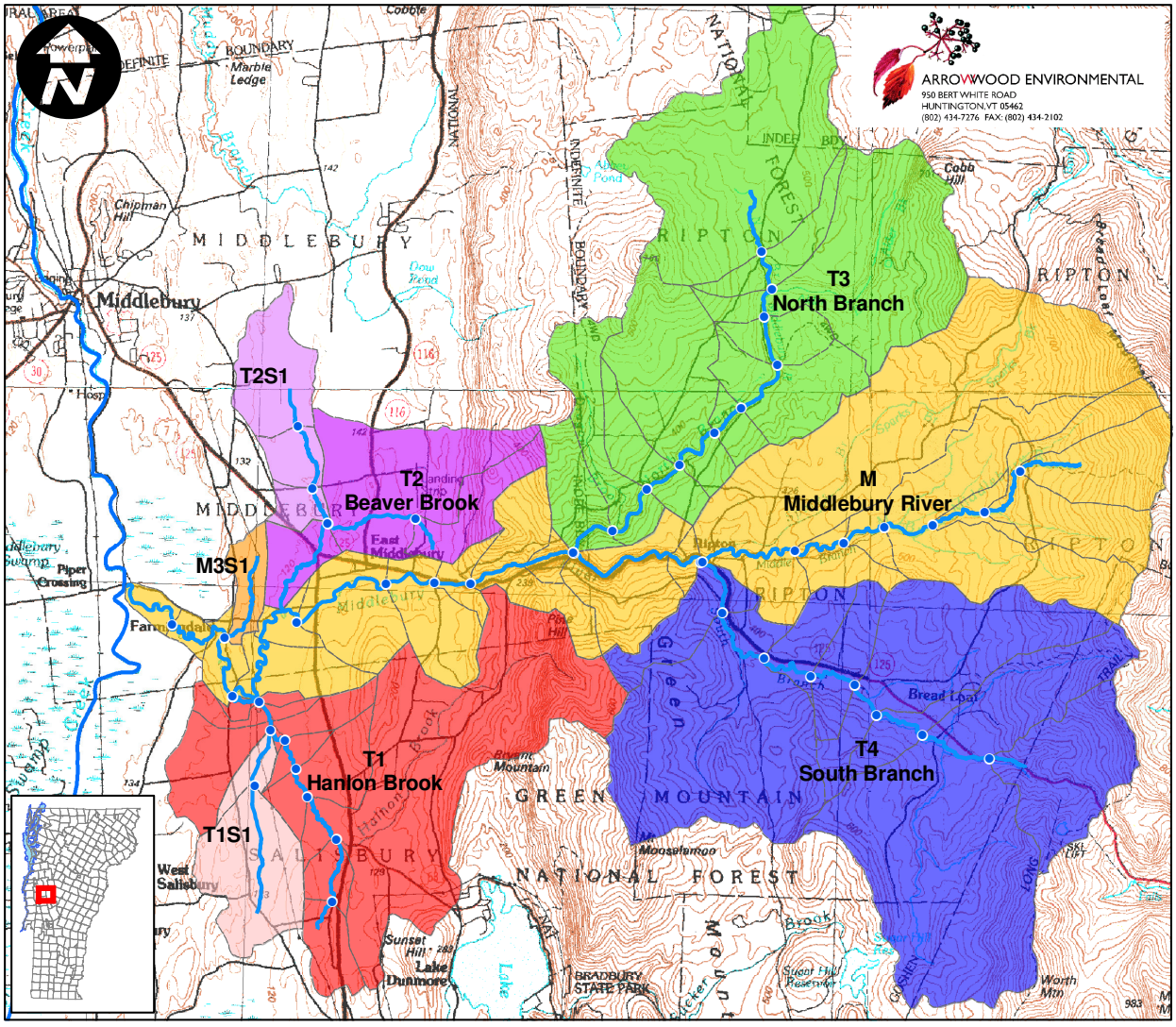

Figure 2. Reach Location Map for the Phase I Geomorphic Assessment

Longitude generated from SGAT. Figure 2 shows the location of study reaches used in the Phase I Assessment. In Figure 2, major tributary watersheds are similarly colored, and sub-watershed boundaries for each reach are delineated.

4.2 Stream Typing

Reference stream types are defined as stream channel forms and processes that would exist in the absence of human-related changes to the channel, floodplain, and/or watershed. Stream and valley characteristics including valley confinement, and slope determined through remote sensing were used to ascertain the stream type. The reference reach characteristics were later refined during the windshield survey. Reference reach typing was based on both the Rosgen (1996) and the Montgomery and Buffington (1996) classification systems.

Phase 1-Step 2. Preliminary Reference Stream Type Report on page(s) 7-8 of the Appendix provides a complete listing of reference stream types for each reach within the project area. The reference stream types, based on the Phase 1 Geomorphic Assessment are shown in Figure 3. The majority of the stream reaches fall within the C stream type, followed closely by B stream type (see Table 2 & Figure 3). A few of the reaches in the watershed were not easily accessible and were not visited during the windshield survey. Best professional judgment was used to assign a bed form (eg. step-pool, plane bed) to these reaches that were not visited during the windshield survey.

Table 2- Reference stream types

Reference Stream	total chan length	percentage of total
A/Plane Bed	2419.45	1%
A/Step-Pool	6636.765	3%
B/Dune-Ripple	2163.714	1%
B/Plane Bed	9302.741	5%
B/Riffle-Pool	10712.692	5%
B/Step-Pool	57255.662	28%
C/Dune-Ripple	37786.911	19%
C/Plane Bed	22084.557	11%
C/Riffle-Pool	15394.301	8%
C/Step-Pool	4623.431	2%
E/Dune-Ripple	26027.148	13%
E/Riffle-Pool	8244.64	4%

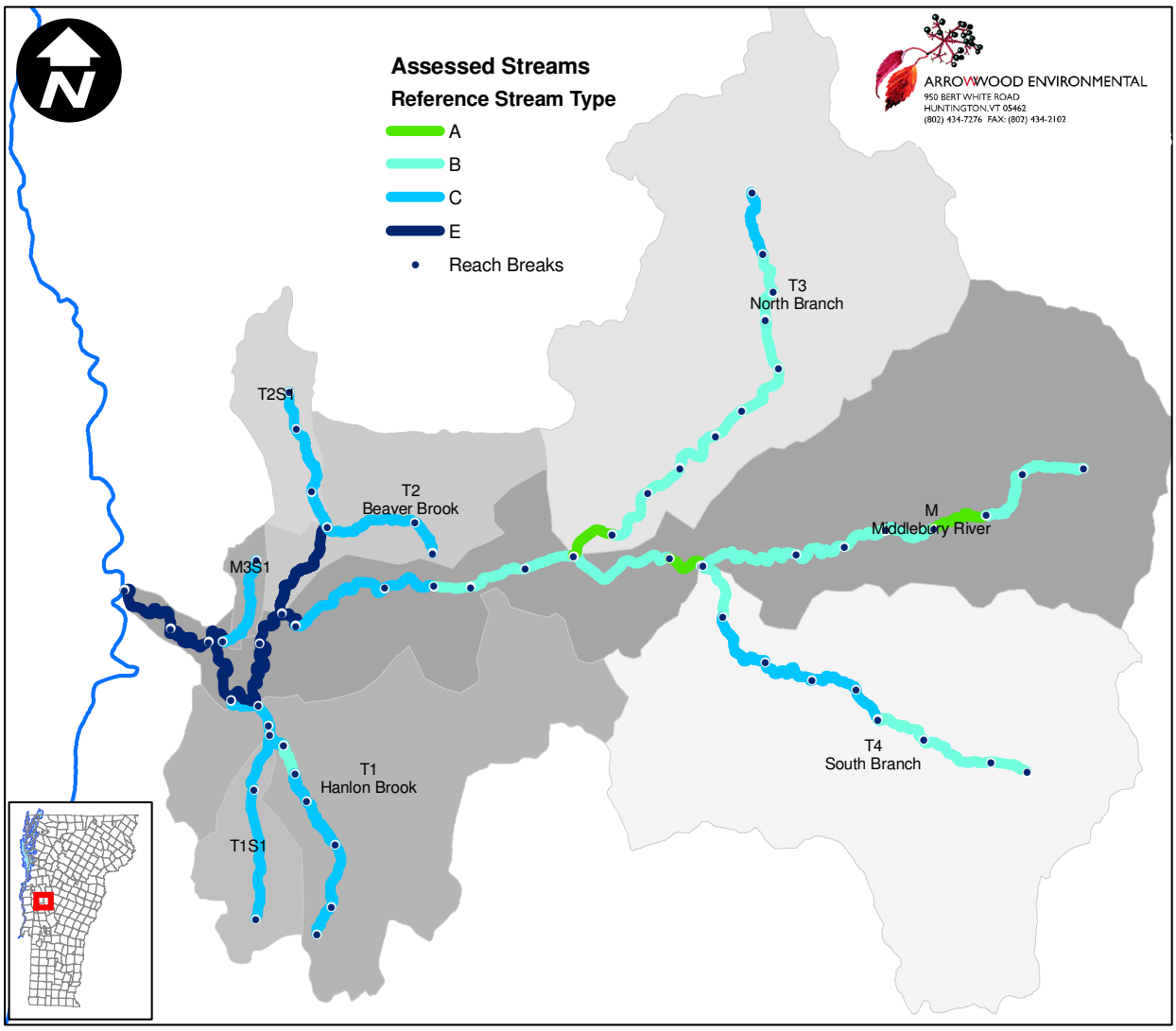

Figure 3. Stream Typing for Phase I Assessment Reaches

Twenty two reaches, comprising approximately 40 percent of the study area, by length, fall into the C stream type and were generally noted to be dune ripple or riffle pool systems.

Twenty-three of the 54 reaches (approximately 38 percent of the study area by stream length) fall within the B stream type and were generally noted to be step-pool systems.

Six of the 54 reaches (approximately 17 percent by stream length) are E stream type and are typically dune ripple systems. These are located in the lower reaches of the watershed.

4.3 Basin Geology and Soils

The characteristics of the Middlebury River watershed were determined using a combination of soils data, review of topographic maps, and information acquired during the windshield survey. Phase 1-Step 3. Basin Characteristics: Geology Report, located on pages 9-10 of the Appendix, provides a summary of the basin characteristics, such as alluvial fans, grade control structures, geologic materials, valley side slopes, and soil characteristics.

In prior work, some alluvial fans were identified within the study reaches. Grade control structures such as ledge and dams were noted during the windshield survey. Channel spanning

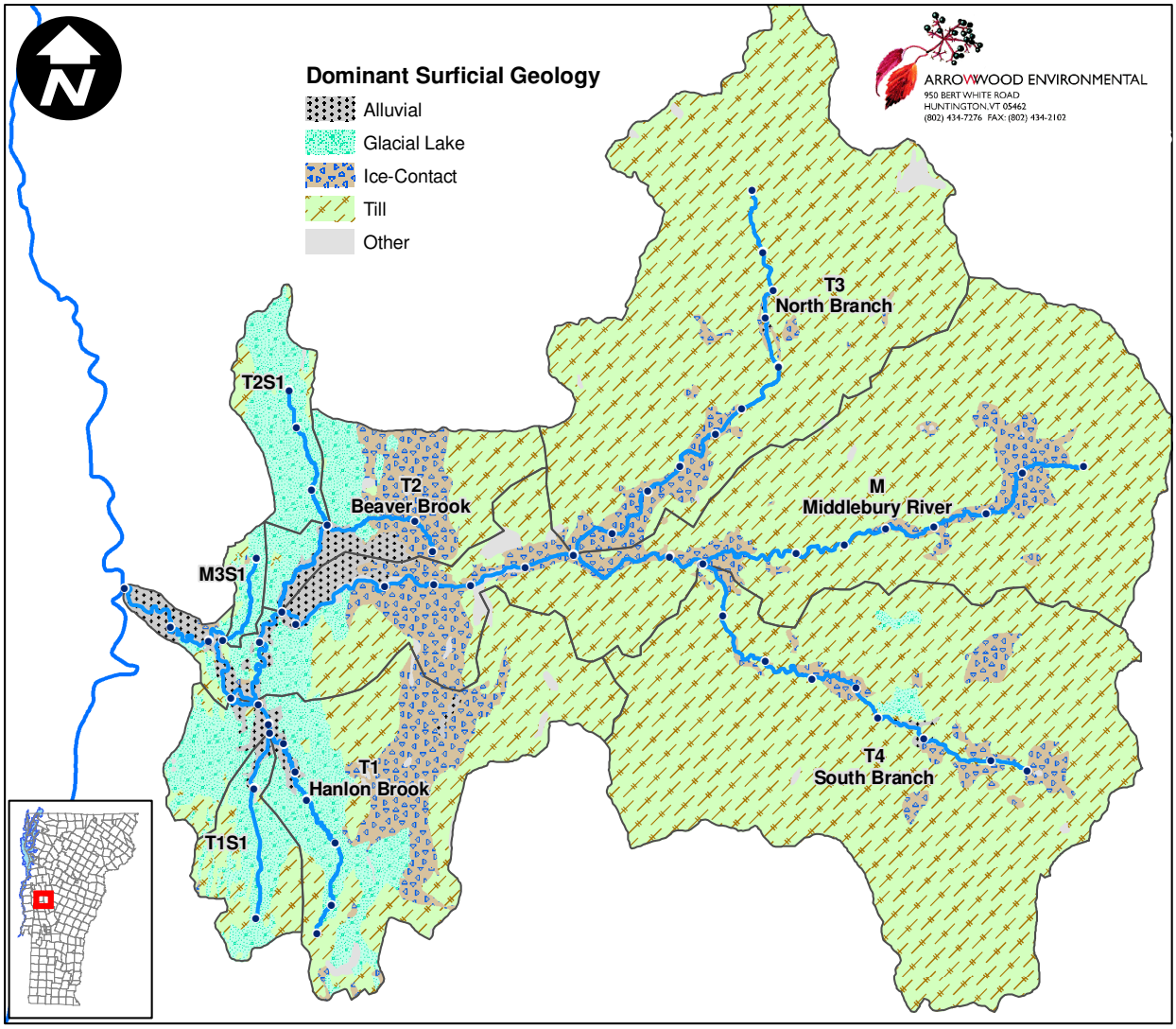

Figure 4. Dominant surficial geology

ledge was noted in 11 of the 54 reaches. Ledge acts as a grade control by keeping the base elevation of a river from being lowered, and prevents the river from incising in that location. No dams are located within the study area.

The steepness of the valley side slopes was determined using a combination of a topographic map and the soils digital data layer. The valley side slope steepness was variable, but overall hilly to steep side slopes dominated the higher elevation reaches, while hilly to flat dominated the lower reaches.

The dominant surficial geology of the Middlebury River consists of alluvium, glacial till, glacial lake and ice contact deposits (see Figure 4.). The reaches characterized as E channels within the Middlebury River watershed have alluvium as the dominant geologic material. These soils are frequently flooded, however are only slightly to moderately erodable. The majority of the C type channels have glacial lake deposits as the dominant geologic materials which are frequently to occasionally flooded and have low erodibility. The B type channels typically have glacial till and ice contact deposits as the dominant geologic material, which are rarely flooded, but have high erodibility.

4.4 Land Cover – Reach Hydrology

The land use within the watershed plays a significant role in the hydrology of the receiving waters. The percentage of urban and cropland development within the watershed are factors which change a watershed's response to precipitation. The most common effects of urban and cropland development is increasing peak discharges and runoff by reducing infiltration and travel time (United States Department of Agriculture 1986). The land use/land cover within the stream corridor itself is also an important parameter to evaluate. The land use/land cover plays an important role in the sediment deposition and erosion which occurs during annual flood events (Vermont Agency of Natural Resources 2006).

As outlined in the Phase I Protocols, impact ratings were assigned for watershed land cover/land use and stream corridor land cover/land use as follow:

High – 10% or more is crop and/or urban
Low – Between 2 and 10 % is crop and/or urban
NS – Not Significant – Less than 2 % is crop and/or urban

As provided in Phase 1-Step 4. Land Cover-Reach Hydrology Report (see Appendix, pages 13-14), the dominant watershed land cover/land use within the Middlebury River watershed is forest. Twelve of the reaches resulted in a watershed /land use impact rating of high.

The dominant land cover/land use within the river corridor is also summarized in Phase 1-Step 4. Land Cover-Reach Hydrology Report. Twenty-seven of the reaches resulted in a high impact rating for corridor land cover/use (see Figure 5.)

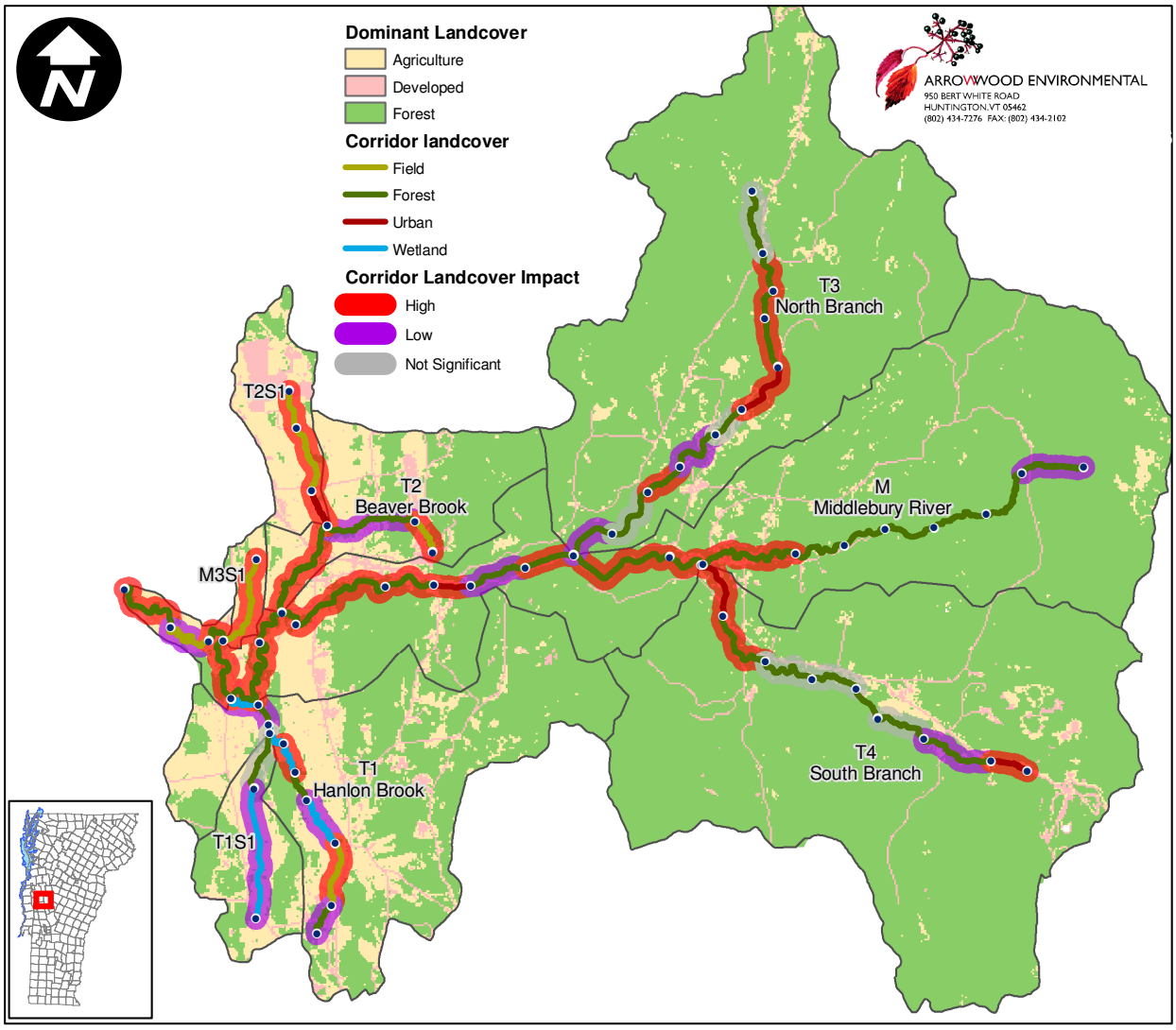

Figure 5. Watershed and corridor landcover

Riparian buffers provide many benefits. Some of these benefits are protecting and enhancing water quality, providing fish and wildlife habitat, providing streamside shade, and providing root structure to prevent bank erosion. Nine of the stream reaches had at least 75 percent of the reach with little or no buffer on one or more banks. These stream reaches which lack a high

quality riparian buffer are a significantly higher risk of experiencing high rates of lateral erosion. Riparian buffer conditions are summarized in the Phase 1-Step 4. Riparian Condition Summary Report located in the Appendix, page (s) 15-16.

4.5 Historic Channel Modifications

Channel modifications may impact a stream reach by affecting the hydraulics and the sediment regime. Historic channel modifications were assessed in this Phase I study by evaluating flow regulations, bridges and culverts impacts, bank armoring, windrowing, straightening, and dredging. The percentage by length of reach impacted by one or more of these channel modifications was estimated and is summarized in Phase 1-Step 5. Instream Channel Modification Report (see Appendix pages, 17-18).

Flow Regulations

None of the stream reaches were found to be currently impacted by flow regulation.

Bridges and Culverts

As part of the Phase I Stream Geomorphic Assessment, the number of bridges and culverts within the study reach was counted by identifying stream crossings on the topographic map and orthophotos. These stream crossings were confirmed during the windshield survey and bridge and culvert assessment. The percentage of the reach impacted by stream crossing structures was estimated during the windshield survey and from orthophotos. Impact ratings for bridge and culverts were evaluated by determining the percentage of the reach length that is channelized, has split flow, or makes a sharp "S" bend upstream or downstream of bridges or culverts. With the exception of reach M05, the impact from bridges and culverts on stream dimension, pattern or profile appears to be low or not significant. M05 is significantly impacted by several bridges in the village of East Middlebury. This reach also includes a great deal of bank armoring and other revetments due to the numerous bridges and corridor encroaching development.

Bank Armoring

The amount of bank armoring within a watershed is often indicative of the occurrence of channel processes, which result in bank erosion. Bank armoring, also called revetments, can be

made of a variety of material including wooden cribs, concrete, and rock riprap. The most common type of revetment in Vermont is rock riprap.

Rock riprap and concrete retaining walls were noted within the study area. The amount of revetment mapped from the Phase I windshield survey is likely an underestimation of the total amount of revetment, since the windshield surveys evaluated only a portion of the reaches. The following criterion was used to provide an impact rating for human placed bank armoring.

Table 3- Armoring impact rating	
H	High – Greater than 30% of the reach length is armored
L	Low – Between 10 and 30% of the reach length is armored
NS	Not Significant – Less than 10% of the reach length is armored
No Info	Bank armoring has not been evaluated for the entire reach and impact at the reach level is unknown

During the windshield survey, rock riprap was noted in 6 reaches, one of the reaches also included concrete retaining walls (M05). Of these reaches, armoring received an impact rating of low for 1 of the reaches (M05) and not significant for 5.

Channel Modifications (Windrowing and Straightening)

During the windshield survey and orthophoto examination, evidence of historic channelization projects were recorded. The total reach length (in feet) and the percentage of the reach length directly impacted by the channel modification were noted. Categories considered as part of the Step 5.4 (Channel Modifications) included the following menu options:

- Windrowing – pushing gravel up from the stream bed onto the top of either bank
- Straightening – Dredging, windrowing, and bulldozing the stream into a straight course
- Multiple – Multiple channel modifications, where neither windrowing nor straightening are the dominant channelization type
- None – No known modifications

The only channel modification noted within the Middlebury River was straightening. Channel straightening was identified by reviewing orthophotos and through field confirmation during the

windshield survey. Portions of stream reaches that have been historically channelized or straightened are identified below in Figure 6.

Dredging History

We discussed the possibility of dredging and gravel mining in the Middlebury River with Addison County Regional Planning officials. Requests for information from the regional Stream

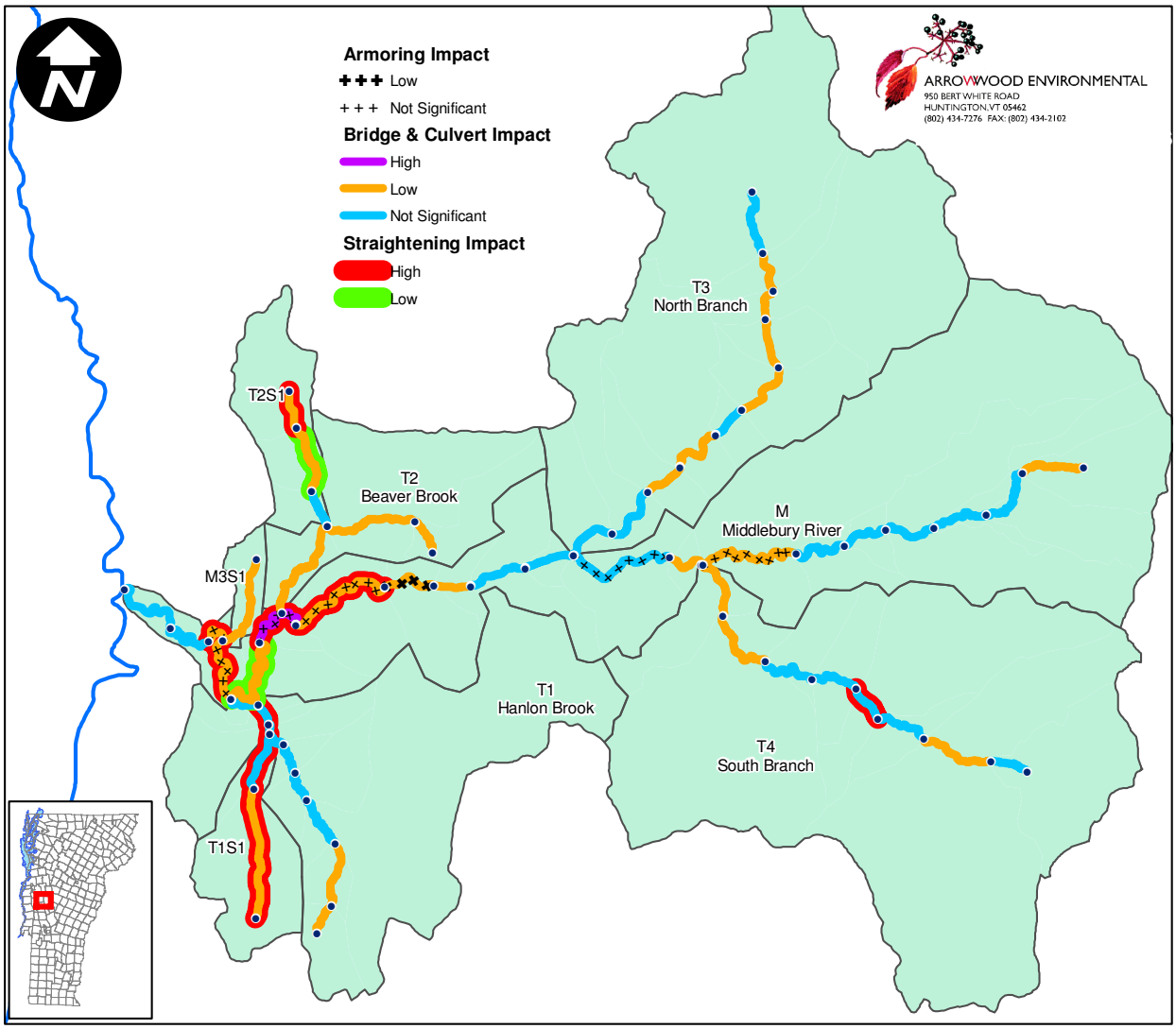

Figure 6. Instream Channel Modifications Identified for Phase I Reaches

Alteration Engineer were not returned. According to the ACRPC, the local communities did undertake significant gravel or sediment mining operations for the Middlebury River watershed, particularly in and around the village of East Middlebury.

4.6 Floodplain Modifications

In this step of the Phase I assessment, careful attention is paid to infrastructure and other development which restricts access to the floodplain, resulting in vertical or lateral confinement of flood flows. The parameters included in this step are: Berms and Roads, River Corridor Development, Depositional Features, Meander Migration/Channel Avulsion, Meander Width Ratio, and Wavelength Ratio. Some of the primary factors which may influence floodplain function in the Middlebury River are discussed below. Phase 1-Step 6. Floodplain Modification and Planform Changes Report, which is included on pages 19-21 of the Appendix, contains the Phase I information for Floodplain and Planform changes.

Berms and Roads

Using information from maps, orthophotos, and the windshield survey, the areas of the river corridor along which berms, roads, railroad, or improved paths run parallel to the stream were delineated. Reaches where berms, roads, railroads or improved paths were located along 20 percent or more of the river corridor were given impacted ratings of high. Main stem reaches (M05, M08, M11 & M12), three reaches of the North Branch (T3.06, T3.07 & T3.09) and two reaches of the South Branch (T4.01 & T4.08) received an impact rating of high primarily because of the presence of roads immediately adjacent to the stream.

River Corridor Development

The river corridor development parameter looks at whether developments within the river corridor are effectively decreasing the belt width. The percentage of the reach length with houses, fill, parking lots or other development within the river corridor was tabulated using maps, E-911 data, orthophotos, and knowledge from the windshield survey. Four reaches had development of the corridor greater than 20 percent, and thus, were given an impact rating of high.

Channel Bars

The 1990s orthophoto series (1:5000), as well as results from the windshield survey were used to evaluate depositional features within the Middlebury River watershed. The presence of bars (mid channel or point bars) and deltas were noted in each of the study reaches. The ANR has included depositional features as a component of the Phase I analysis because these features are

indicative of an increased sediment load and a high likelihood that the streambed is actively aggrading and/or undergoing lateral migration. An unvegetated bar indicates the bar has recently formed or is in the process of growing.

Multiple channel bars were the predominant depositional feature noted within the Middlebury River watershed. Of the 29 reaches assessed, 4 reaches had an impact rating of high for channel bars; 3 additional reaches had an impact rating of low for channel bars, while the other 22 reaches were given ratings of not significant.

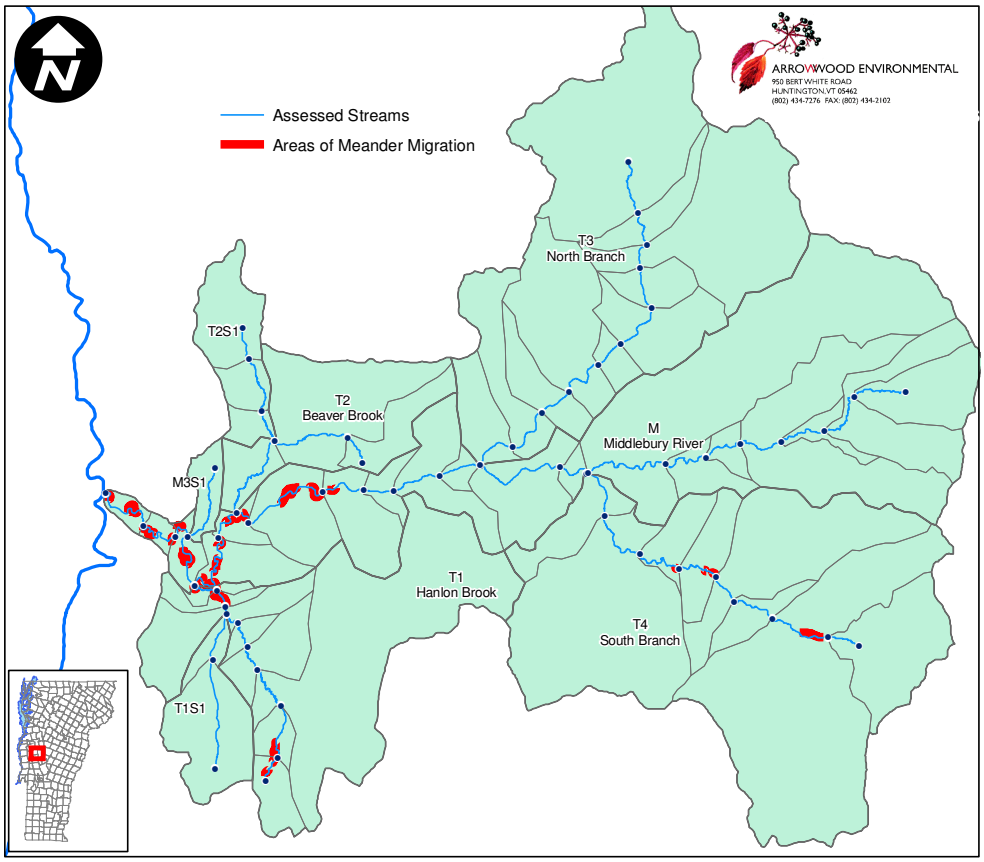

Figure 7. meander migration/avulsion

Meander Migration

Orthophotos were used to evaluate areas where the Middlebury River has migrated, bifurcated, or avulsed[2]. Current orthophotos from 1995 and 2003 and historic orthophotos from the 1970s were overlayed to compare the location of the river channel over time. The current and the historic orthophotos span a range of approximately 20-25 years. Nine reaches, seven of which are on the main stem of the Middlebury River received an impact rating of high for meander migration, while five reaches (one on the main stem and the remaining on tributaries) received an impact rating of low. Migration, or movement of the channel by eroding its outer bank on meander bends as

[2] An avulsion is a change in planform resulting from a meander cut-off.

well as avulsion, the cutting off of meander bends, appear to be the primary mechanism for lateral migration of the channel.

Meander Width and Wavelength

The 1990 series (1:5000) & 2003 NAIP orthophotos in conjunction with topographic maps were used to determine the meander belt width and the meander wavelength for streams typed in Step 2.10 as C or E riffle-pool or ripple dune reference stream types (i.e. unconfined systems). The topographic maps were used to determine the valley direction, while the most current orthophoto series was used to provide the accurate location of channel meanders.

The meander belt width is the horizontal distance to opposite, outside banks on fully developed meanders. The meander width ratio is calculated by dividing the average belt width for the reach by the bankfull width. The ANR Phase I protocol considers unconfined, gravel dominated streams with moderate to gentle gradients, which are in regime, to have belt widths in the range of 5 to 8 times the channel width. Twenty-three of the unconfined reaches fell outside of the range expected for channels which are in regime. Seven of the study reaches were rated as high impact for meander width ratio, and sixteen reaches received an impact rating of low.

Of the twenty-two stream reaches which resulted in a low or high impact rating 19 had meander width ratios of less than 5. These low values may indicate the stream has become straighter and steeper, possibly resulting in degradation and loss of access to its floodplain. Field observations confirm the finding that the Middlebury River has lost access to its floodplain in many locations, often due to road and other development.

The meander wavelength consists of two bendways. The wavelength ratio is calculated by dividing the average wavelength by the bankfull channel width. Leopold 1994 and Williams 1985 (cited in Vermont Agency of Natural Resources, 2006) have shown unconfined, gravel dominated streams in shallow-sloped valleys to have wavelengths in the range of 10 to 12 times the channel width. Twenty-four of the reaches fell outside the range of expected meander

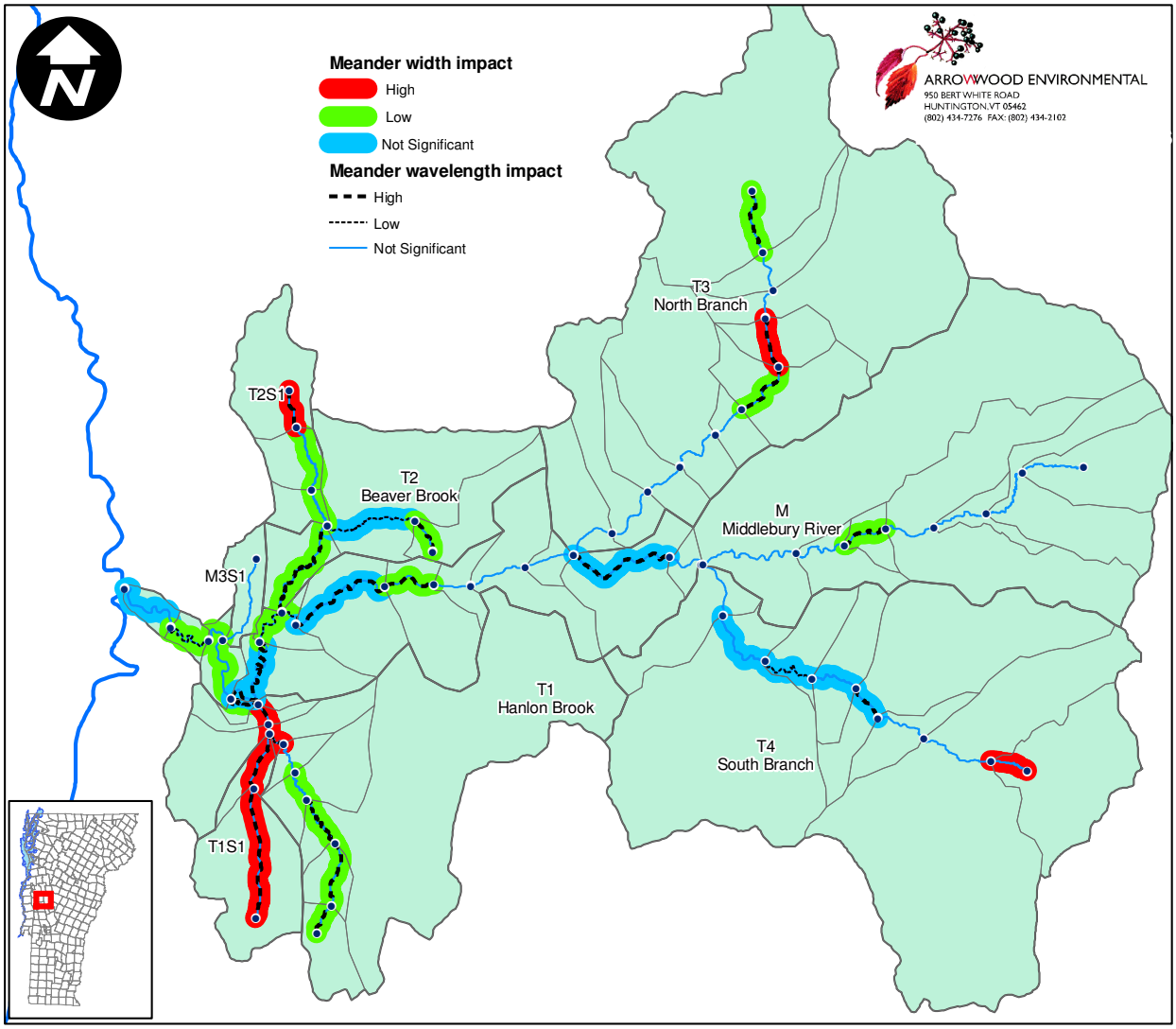

Figure 8. Meander width and wavelength impacts.

wavelength ratio: five of the reaches resulted in a low impact rating and nineteen of the stream reaches received an impact rating of high for wavelength ratio. The wavelength ratio was equal to 1.0 in four reaches, indicating a straightened condition. The wavelength ratio was less than 8 for nine other reaches (but greater than 1.0), suggesting the stream is starting to aggrade and become more sinuous. This has resulted in a decrease in channel slope as the stream migrates laterally. The degree of meander migration and bank erosion noted on the main stem supports the finding that the Middlebury River is aggrading.

4.7 Bed and Bank Windshield Survey

The dominant bed form, dominant bank material, bank erosion/bank height, and debris/ ice jam potential were recorded during the windshield survey, and these results are summarized in

Phase 1-Step 7. Bed and Bank Windshield Survey Report, on pages 22-24 of the Appendix. The dominant bed form and dominant bank material were previously discussed under Section 4.2, Stream Typing. The amount of bank erosion observed along a reach and the bank height were evaluated in conjunction with each other to provide a bank erosion impact rating. Bank erosion was rated as low impact in 10 and high impact in 6 of the 33 reaches evaluated.

Debris/Ice Jam Potential

Undersized culverts or bridges with spans less than the average channel width or bridges with piers in the middle of the channel were the primary factors identified as potential for ice and debris jams. These structures, which are likely to cause constrictions during high flow events may result in lateral erosion or channel avulsions or may even endanger infrastructure. Ten of the thirty-three reaches evaluated received an impact rating of low for debris/ice jam potential, three of the reaches resulted in an impact rating of high.

5.0 DATA ANALYSIS

5.1 Impact Scores

The Phase 1 evaluates parameters that may cause channel adjustment. These parameters are grouped into four major categories: land use, instream modifications, floodplain modifications, and bed and bank windshield survey. For each parameter, the maximum impact score for the entire watershed is 108 (54 reaches multiplied by the impact score of 2). As shown below in Figure 6, all impact scores were less than 70 out of the possible 108. All three parameters in the land use category received high impact ratings for the watershed. The parameters meander width ratio, wavelength ration, meander migration, berms and roads, bridges and culverts and bank erosion also resulted in high scores.

Figure 9 shows the watershed impact ratings for the channel adjustment parameters.

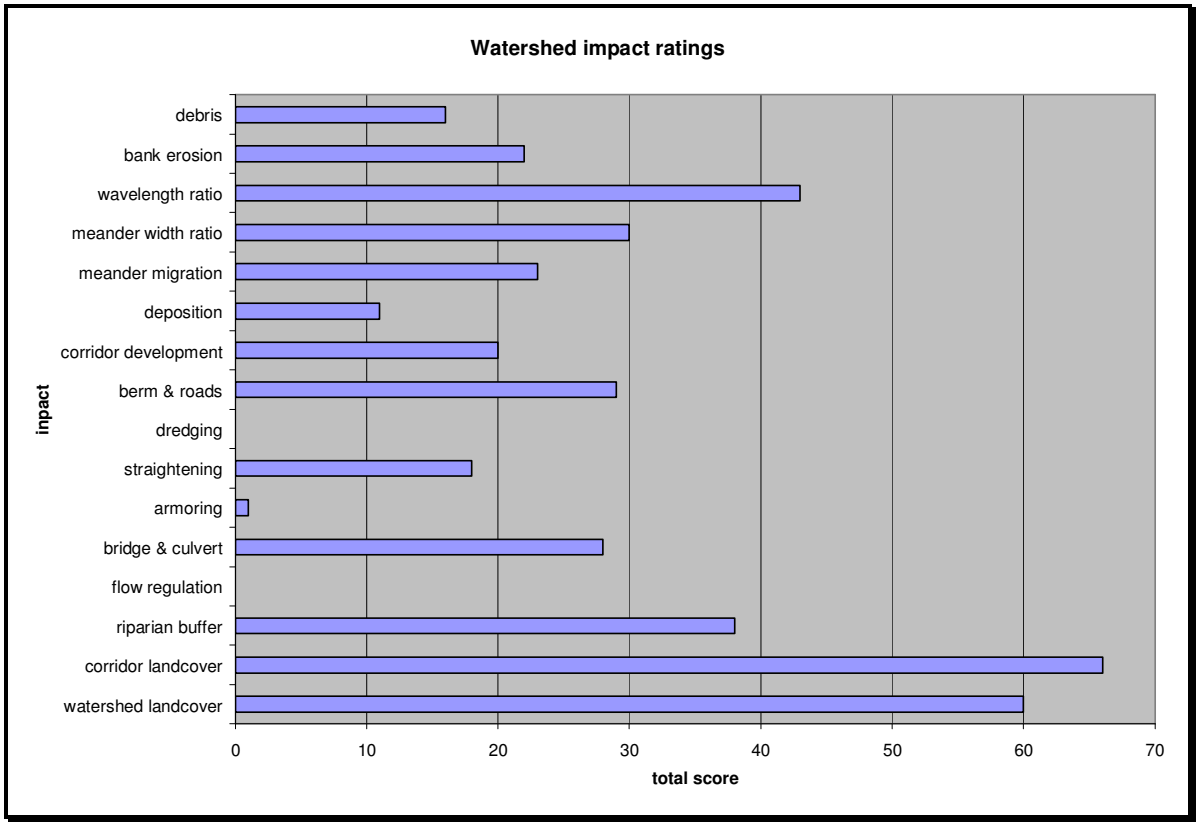

Figure 9: Watershed Impact Rating Scores

The total impact scores for the Phase I assessment are provided in Phase 1-Step 8. Stream and Watershed Impact Rating Report**,** on pages 35-37 of the Appendix and are mapped below in Figure 10.

Five reaches in poor condition (at the watershed, not statewide, level) include the main stem reach (M05), and portions of the tributary Hanlon Brook (T1.01, T1.02) and unnamed tributaries T1S1 and T2S1. Another 17 reaches were found to be in fair condition, mostly located in areas of more concentrated development.

The majority of the unconfined stream reaches were in the poor or fair category, while five confined stream reaches (M13, T3.06, T3.07, T3.09 and T4.07) resulted in a reach condition of fair. These reaches had undergone channel and floodplain modifications which may have resulted in a change in planform, profile, and dimension such that the stream is no longer in balance with the flow and sediment regime of its watershed.

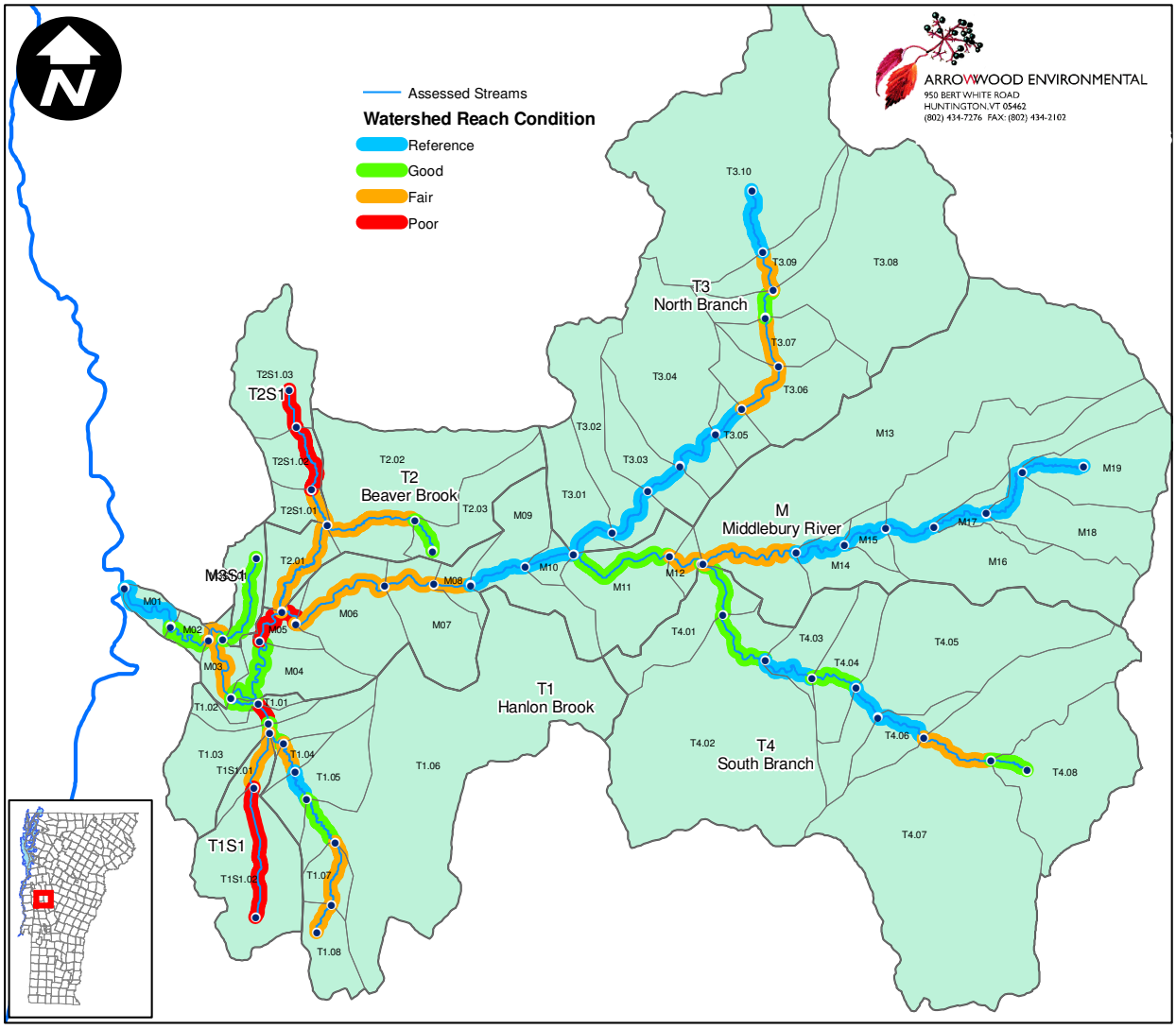

Figure 10. Reach Condition of Assessed Streams

Streams in poor condition are out of regime with reference conditions and could be deeply entrenched or aggrading, while those in fair condition are fully in adjustment and are experiencing major and rapid changes due to recent floodplain and channel modifications, land cover changes, and/or loss of riparian buffer. The majority of the unconfined stream reaches were in the poor or fair category. Thirteen of the reaches were placed in the good category. The streams in the good category had experienced some degree of human-induced change to their watershed, floodplain and/or channel and appeared to be undergoing only minor adjustments.

A reference reach has no significant channel or floodplain modifications and has a forested buffer, adjacent to the channel. These reaches are close to the natural condition. Streams

identified as reference are generally located in headwater areas of the main stem (M) and the North Branch (T3).

Figure 11 shows impact ratings from downstream on the main stem to the headwaters.

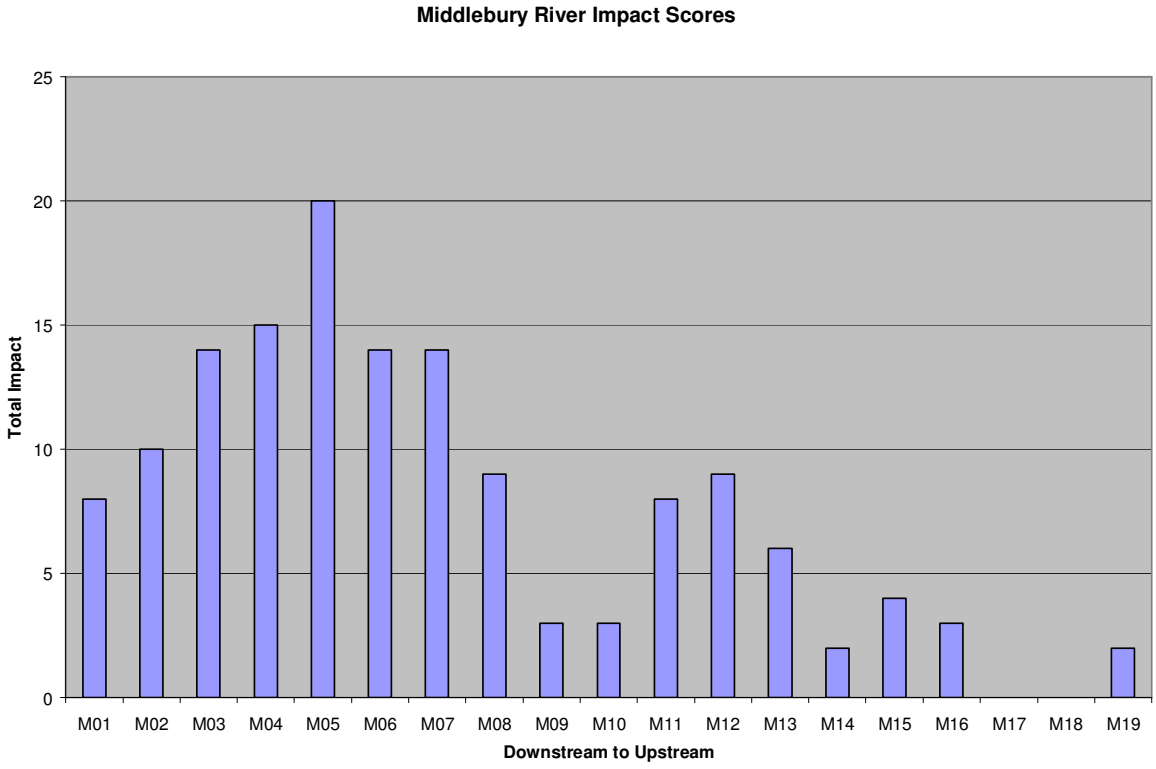

Figure 11. Impact Ratings from downstream to upstream on the main stem of the Middlebury River

5.2 Adjustment Processes

Phase 1-Step 9. Adjustment Process and Reach Condition Report**,** on pages 35-37 of the Appendix, provides a summary of the primary adjustment processes that were predicted based on the Phase 1 Stream Geomorphic Assessment. The Phase 1 data suggest that most of the assessed stream reaches are experiencing more than one type of channel adjustment process.

5.3 Reach Sensitivity

The online data management system assigns a reach sensitivity rating based on the reference stream type. Highly sensitive reaches are more likely to be in adjustment, and are very sensitive to land use changes within the watershed. The reach sensitivity is summarized in

Phase 1-Step 9. Adjustment Process and Reach Condition Report, on pages 35-37 of the Appendix. There were twelve unconfined stream reaches with a stream sensitivity rating of high. There was one unconfined stream reach with a stream sensitivity rating of moderate. There were nine confined reaches with a stream sensitivity rating of moderate.

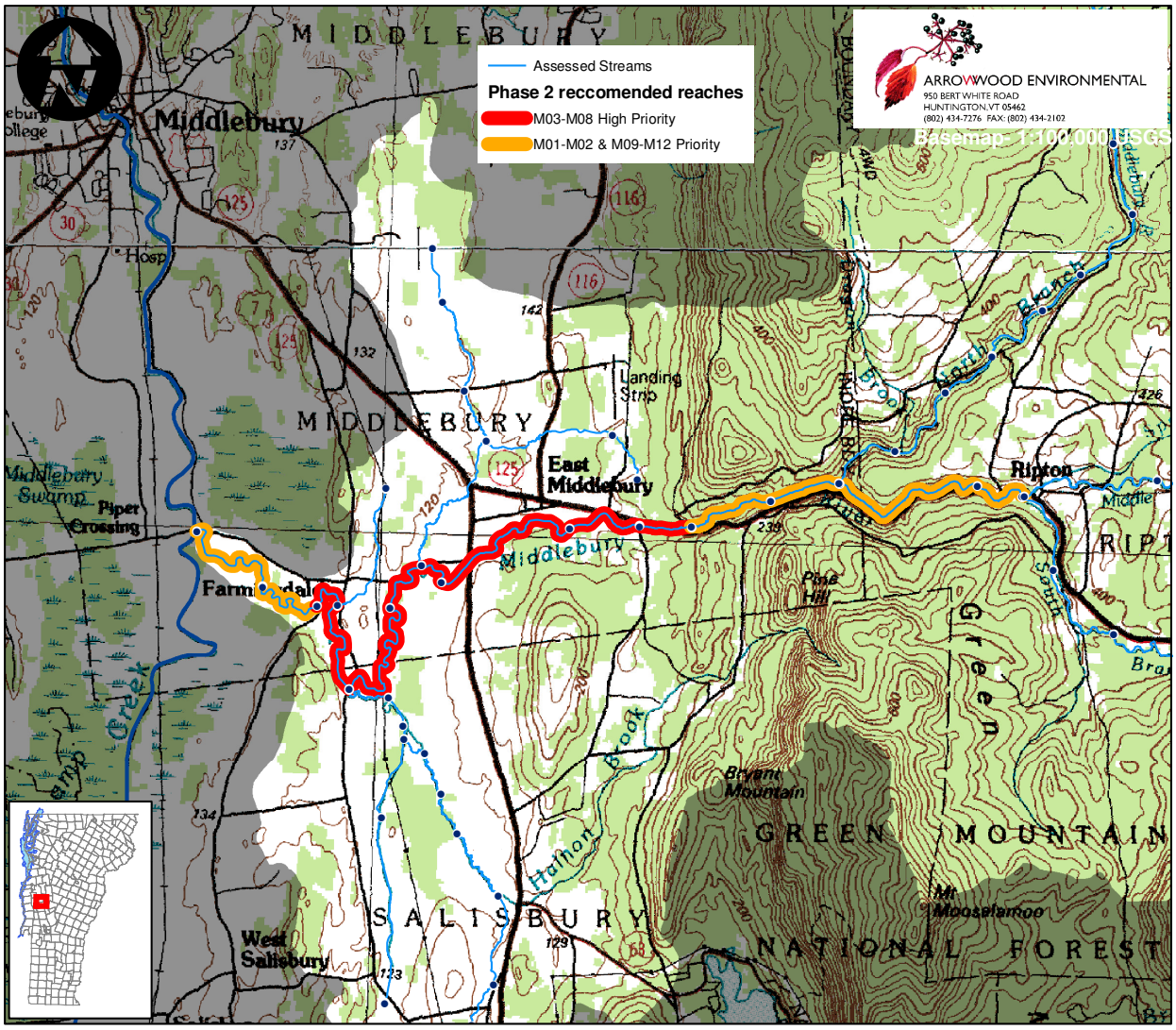

Figure 12. Phase 2 Recommendations

6.0 RECOMMENDATIONS FOR PHASE 2

The Phase I results are valuable for providing recommendations for reaches to select for the Phase 2 Assessment. Phase 2 work has already been completed on the main stem of the Middlebury River, and the tributaries T3 and T4.

Based only on Phase I results, the following recommendations would be made for Phase 2 assessment. Phase I reach condition and reach sensitivity ratings from the Phase I study for the proposed Phase 2 Assessment reaches are summarized in Table 4 and Figure 12.

Table 4- Reaches recommended for inclusion in Phase 2 Assessment

Reach ID	Stream miles	Con-finement	Ref. Strm	Bed material	Bedform	Watershed Condition	Statewide Condition	Reach Sen-sitivity
M01	0.95	VB	E	Sand	Dune-Ripple	Reference	Reference	High
M02	0.78	VB	E	Not Eval	Riffle-Pool	Good	Reference	
M03	1.14	VB	E	Sand	Dune-Ripple	Fair	Good	High
M04	1.42	VB	E	Sand	Dune-Ripple	Good	Reference	High
M05	0.78	VB	E	Gravel	Riffle-Pool	Poor	Fair	High
M06	1.31	VB	C	Gravel	Riffle-Pool	Fair	Good	High
M07	0.60	VB	C	Boulder	Plane Bed	Fair	Good	Very Low
M08	0.39	NW	B	Boulder	Step-Pool	Fair	Good	Very Low
M09	0.68		B	Boulder	Step-Pool	Reference	Reference	Very Low
M10	0.54		B	Not Eval	Step-Pool	Reference	Reference	
M11	1.27	NC	B	Boulder	Step-Pool	Good	Reference	Very Low
M12	0.46	SC	A	Boulder	Plane Bed	Fair	Good	Very Low

Recommendations for Phase 2 include main stem reaches from the mouth (M01) upstream to approximately the confluence with the South Branch in Ripton (M12). Of these, priority should be given to M03-M08, as Phase I suggests these reaches are in poorest condition having undergone greatest impact. Professional judgment and windshield survey observations concur with these findings.

T1 and T2 and their tributaries are generally small order streams which have been heavily influenced by agricultural practices and development in the Otter Creek basin. While these streams exhibit generally fair to poor conditions, it is thought that their small size reduces their priority for additional assessment. As resources allow, further evaluation to include these streams is suggested.

T3 and T4 are both headwater streams that merge with the main stem of the Middlebury River around the town of Ripton. These streams generally flow through forested watersheds, with portions of their length located in the federally protected Green Mountain National Forest.

Due to their high elevation, generally less impacted and good to reference condition, these receive the least urgent recommendation for further assessment.

Given the Phase 2 work complete to date on the main stem (M), and the North & South Branches (T3 & T4), the next priority for Phase 2 assessment in the Middlebury watershed should focus on the tributaries T1 & T2.

REFERENCES

United States Department of Agriculture. 1986. Urban Hydrology for Small Watersheds. Soil Conservation Service, Engineering Division, Technical Release 55. Washington, D.C.

Vermont Agency of Natural Resources. March 2006. Vermont Stream Geomorphic Assessment Phase 1 Handbook. Watershed Assessment Using Maps, Existing Data, and Windshield Surveys. Waterbury, Vermont

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Phase I Stream Geomorphic Assessment
Middlebury River Watershed,
Addison County, Vermont

Project Appendices:

Phase 1 Project Metadata

Parameter	Metadata
Confinement type	1:24K topos
Downstream and upstream elevations	1:24K topos
Stream type	1:24K topos
Towns that reaches are in	1:24K topos
Historic corridor land use - land cover	1:5K orthos (1970s)
Historic watershed land use - land cover	1:5K orthos (1970s)
Corridor soil data	NRCS soil survey maps
Corridor land use - land cover data	Land use - land cover (1990s statewide)
Watershed land use - land cover data	Land use - land cover (1990s statewide)
Channel length	SGAT automated
Latitude and Longitude	SGAT automated
Valley length	SGAT automated
Valley width	SGAT automated
Bank erosion - relative magnitude	Field obs. at access point along reach
Debris and ice jam potential	Field obs. at access point along reach
Alluvial fan	1:24K topos, field obs.
Valley side slopes	1:24K topos, field obs.
Grade controls	1:24K topos, field obs.
Valley walls	1:24K topos, surficial geology (SG) data
Watershed delineations	1:24K topos, 1:5K NHD
Meander centerline	1:24K topos, 1:5K NHD
Reach breaks	1:24K topos, 1:5K NHD
Groundwater and small tributary inputs	1:24K topos, 1:5K NHD, NWI maps
Bridges and culverts	1:24K topos, 1:5K NHD & orthos
Channel straightening	1:24K topos, 1:5K NHD & orthos
Flow regulations and water withdrawals	1:24K topos, 1:5K NHD & orthos
Bank armoring and revetments	1:24K topos, 1:5K orthos
Berms and roads	1:24K topos, 1:5K orthos, files
River corridor development	1:24K topos, 1:5K orthos, files
Depositional features	1:5K orthos, other aerial photos
Meander migration and channel avulsion	1:5K orthos (1990s & 1970s), other aerial photos
Riparian buffer width	1:5K orthos, recent coverages & photos, field obs.
Wavelength	1:5K NHD, 1:5K orthos
Belt width	1:5K NHD, 1:5K orthos
Dredging and gravel mining history	Interviews - DEC, NRCS, Towns, others
Dominant bed form and material	Preliminary estimate

Middlebury River Phase 1 QA Worksheet

QA Team Leader: Dori Barton
ANR Team Leader: Shannon Hill
Watershed orientation date: 4/5/2006

SGA Step	Sub step	Title	FIT/GIS data created	QA comments	Date completed	Confidence	Notes
1	1	Reach Description		Completed by ANR		high	
	2	Town		Completed by ANR		high	
	3	Lat/Long		Completed by ANR		high	
2	1-9	**SGAT** Processing	SGAT	Completed by ANR		high	
	10	Confinement			4/6/2006	high	
	11	Reference stream type		Completed by ANR	4/6/2006	high	
3	1	Alluvial Fan		Completed by ANR		high	
	2	Grade Control	FIT	partially completed by ANR		moderate-high	only field verified where visible from access points
	3	Geologic Material	SGAT	Completed by ANR		high	
	4	Valley Side Slopes	GIS	Completed by ANR		high	
	5	Soil Properties	SGAT	Completed by ANR		high	
4	1	Watershed Landcover-Historic		1970s orthos, UVM library	7/28/2006	moderate-high	
		Watershed Landcover-Current	SGAT	Completed by ANR		moderate	accuracy of landcover data used by SGAT is suspect
	2	Corridor LandCover-Historic		1970s orthos, UVM library	7/28/2006	moderate-high	
		Corridor LandCover-Current	SGAT	Completed by ANR		moderate	accuracy of landcover data used by SGAT is suspect
	3	Buffer Width	GIS		4/7/2006	high	
	4	Goundwater Inputs	GIS		4/7/2006	high	
5	1	Flow Regulation	FIT		8/8/2006	high	
	2	Bridge & Culvert	GIS		4/10/2006	high	
	3	Armoring/Revetments	FIT		8/7/2006	moderate-high	
	4	Straightening	FIT		5/9/2006	moderate-high	only field verified where visible from access points
	5	Dredging Mining	FIT		8/7/2006	moderate-low	insufficient information

6	1	Berms & Roads	FIT		5/8/2006	moderate-high	high for roads, slightly lower for berms
	2	Corridor Development	GIS	utiltized E-911 data & orthos	4/10/2006	high	
	3	Depositional Features	GIS		4/17/2006	moderate-high	only field verified where visible from access points
	4	Meander Migration	GIS		5/9/2006	high	
	5	Meander Width Ratio	GIS	GIS processing	4/24/2006	high	
	6	Wavelength Ratio	GIS	GIS processing	4/24/2006	high	
7	**(Windshield Survey)**						
	1	Bedform/Material			8/7/2006	high	where accessible
	2	Erosion	FIT		8/7/2006	moderate	only field verified where visible from access points
	3	Ice jam/Debris			8/7/2006	moderate	only field verified where visible from access points

Phase 1 - Step 1. Reach Locations

Reach ID	Excluded?	Stream Name	Towns	Description
M01		Middlebury River	Middlebury	Begins .6 miles east on 3 mile bridge rd from the intersection with creek rd. Ends at the confluence with the Otter Creek.
M02		Middlebury River	Middlebury	Begins .2 miles south on Shard Villa Rd from Farmingdale and ends .35 miles west of Farmingdale on Tree Mile Bridge Rd.
M03		Middlebury River	Middlebury	Begins where Middlebury river goes under Blake Roy Rd and ends .35 miles south of Farmingdale on Shard Villa Rd.
M04		Middlebury River	Middlebury, Salisbury	Begins .2 miles south on Shard Villa Rd from Farmingdale and ends .35 miles west of Farmingdale on Tree Mile Bridge Rd.
M05		Middlebury River	Middlebury	Located South of 3 mile bridge rd from .3 to .8 miles east of Farmingdale.
M06		Middlebury River	Middlebury	Reach crosses Rt 7
M07		Middlebury River	Middlebury	Begins at crossing with Lower Plains Rd and parallels Rt 125 to the West.
M08		Middlebury River	Middlebury	Located between North Branch Rd and Lower Plains Rd.
M09		Middlebury River	Middlebury	Located between Rt125 and the North Branch Rd.
M10		Middlebury River	Middlebury	Located between Rt125 and the North Branch Rd.
M11		Middlebury River	Middlebury	Begins .2 miles W of Ripton on Rt 125. Parallels Rt 125 to the West.
M12		Middlebury River	Ripton	Through Ripton parallel to Rt 125.
M13		Middlebury River	Ripton	Goes under Peddlar Bridge Rd.
M14		Middlebury River	Ripton	.4 to 1 mile up first right (class 4 road) off of Peddlar Bridge Rd.
M15		Middlebury River	Ripton	Parallels class 4 road in Green Mountain National Forest.
M16		Middlebury River	Ripton	Located in Green Mountain National Forest.
M17		Middlebury River	Ripton	Located in Green Mountain National Forest.
M18		Middlebury River	Ripton	Located in Green Mountain National Forest.
M19		Middlebury River	Ripton	Crosse Kirby Rd
M3S1.01		Unnamed trib to Middlebury River	Middlebury	Crosses 3 mile bridge rd .3 miles east of Farmingdale.
T1.01		Hanlon Brook	Salisbury	Begins at Power line crossing and ends at confluence with Middlebury River.
T1.02		Hanlon Brook	Salisbury	Ends just east of Power line crossing east of Blake Roy Rd.
T1.03		Hanlon Brook	Salisbury	Located .4 to .6 miles South on Rt 7 from Salisbury town line.

Reach ID	Excluded?	Stream Name	Towns	Description
T1.04		Hanlon Brook	Salisbury	Located west of Rt 7 in Salisbury in wetland area.
T1.05		Hanlon Brook	Salisbury	Located west of Rt 7 near intersection with Salisbury Plains Rd.
T1.06		Hanlon Brook	Salisbury	Begins just west of Rt 7 and Rt 53 intersection and ends West of Rt 7 from intersection with Salisbury Plains Rd.
T1.07		Hanlon Brook	Salisbury	Begins at intersection of Kelly Cross Rd and Rt 7. Ends west of Rt 7 from intersection with Rt 53.
T1.08		Hanlon Brook	Salisbury	Crosses Kelly Cross Rd.
T1S1.01		Unnamed trib to Hanlon Brook	Salisbury	Located East of intersection of Middle Rd and Columbus Smith rd.
T1S1.02		Unnamed trib to Hanlon Brook	Salisbury	Parallels Middle Rd to the East.
T2.01		Beaver Brook	Middlebury	Begins at tributary confluence from the North and crosses Three Mile Bridge Rd. Crosses under Rt 125.
T2.02		Beaver Brook	Middlebury	Crosses Rt 116 .5 miles North of East Middlebury.
T2.03		Beaver Brook	Middlebury	Crosses unnamed road that intersects Airport Rd and Rt 125 east of Rt 116.
T2S1.01		Unnamed trib to Beaver Brook	Middlebury	Begins just South of intersection with Cady Rd. Ends at confluence with Beaver Brook.
T2S1.02		Unnamed trib to Beaver Brook	Middlebury	Located North of intersecting Cody Rd and parallels east of Foote Rd.
T2S1.03		Unnamed trib to Beaver Brook	Middlebury	Located .6 miles East of Foote Street cemetery.
T3.01		North Branch Middlebury River	Ripton	Located from 1.3 to 2.1 miles up North Branch Rd from the intersection with Rt 125.
T3.02		North Branch Middlebury River	Ripton	Begins SE of intersection of North Branch Rd and Dugway Rd. Ends south of North Branch Rd .5 mi west of intersection with Dugway Rd.
T3.03		North Branch Middlebury River	Ripton	Begins where crossing Dugway Rd. Ends SE of intersection of North Branch Rd and Dugway Rd.
T3.04		North Branch Middlebury River	Ripton	Begins west of Lincoln Rd .6 miles North of Lincoln Rd and Robbins Cross Rd intersection. Ends at crossing Dugway Rd.
T3.05		North Branch Middlebury River	Ripton	Parallels Lincoln Rd to the west. Located from .6 to 1 mile North of Lincoln Rd and Robbin Cross Rd intersection.

Reach ID	Excluded?	Stream Name	Towns	Description
T3.06		North Branch Middlebury River	Ripton	Parallels and crosses Lincoln Rd. Located from 1 to 1.6 miles North on Lincoln Rd from the intersection with Robins Cross rd.
T3.07		North Branch Middlebury River	Ripton	Located East of Lincoln Rd. Located from .75 to 1.3 miles South on Lincoln Rd from the intersection with North Branch Rd.
T3.08		North Branch Middlebury River	Ripton	Parallels Lincoln rd to the East. Begins at confluence with Alder Brook.
T3.09		North Branch Middlebury River	Ripton	Begins at intersection of North Branch Rd and Lincoln Rd. Ends at confluence with Alder Brook.
T3.10		North Branch Middlebury River	Ripton	Parallels Lincoln Brook Rd North of intersection with North Branch Rd.
T4.01		South Branch Middlebury River	Ripton	Parallels Rt 125 to the west. Begins .6 miles south on Rt 125 of Ripton.
T4.02		South Branch Middlebury River	Ripton	Parallels Rt 125 to the south and west. Reach is on the opposite side of Rt 125 from intersection with Maiden Lane.
T4.03		South Branch Middlebury River	Ripton	Reach parallels Rt 125 to the south. Located from .4 to .9 miles east on Rt 125 from intersection with Maiden Lane.
T4.04		South Branch Middlebury River	Ripton	Reach is south of Rt 125 and passes the Calving cemetery.
T4.05		South Branch Middlebury River	Ripton	Located south of the intersection of Rt 125 and Kirby Rd.
T4.06		South Branch Middlebury River	Ripton	Located south of Rt 125 from .2 to .7 miles west on Rt 125 of intersection with Sucker Bk Tr Road.
T4.07		South Branch Middlebury River	Ripton	Crosses Sucker Bk Tr Road.
T4.08		South Branch Middlebury River	Ripton	Parallels Rt 125 to the south from .5 to 1 mile east of intersection of Rt 125 and Sucker BK TR Road.

Phase 1 - Step 2. Preliminary Reference Stream Type

Step	2.1 Elevation		2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10		2.11	
Reach ID	Up (ft.)	Down (ft.)	Valley Length (ft.)	Valley Slope (%)	Channel Length (ft.)	Channel Slope (%)	Sinuosity	Watershed Area (sq. mi.)	Channel Width (ft.)	Valley Width (ft.)	Confinement Ratio	Type	Reference Stream Type	Bedform
M01	347	345	3334	0.06	5034	0.04	1.51	62.82	81.0	1426	17.6	VB	E	Dune-Ripple
M02	349	347	2166	0.09	4119	0.05	1.90	62.65	80.9	1553	19.2	VB	E	Riffle-Pool
M03	354	349	3608	0.14	6032	0.08	1.67	62.51	80.8	1183	14.6	VB	E	Dune-Ripple
M04	359	354	3844	0.13	7507	0.07	1.95	52.00	74.5	1716	23.0	VB	E	Dune-Ripple
M05	365	359	2484	0.24	4126	0.15	1.66	51.38	74.1	1742	23.5	VB	E	Riffle-Pool
M06	405	365	5828	0.69	6899	0.58	1.18	46.43	70.9	1699	24.0	VB	C	Riffle-Pool
M07	463	405	3075	1.89	3176	1.83	1.03	45.42	70.2	1485	21.1	VB	C	Plane Bed
M08	510	463	2017	2.33	2043	2.30	1.01	44.56	69.6			NW	B	Step-Pool
M09	700	510			3596	5.28		44.31	69.5				B	Step-Pool
M10	790	700			2842	3.17		43.31	68.8				B	Step-Pool
M11	978	790	6651	2.83	6722	2.80	1.01	29.12	57.7			NC	B	Step-Pool
M12	1060	978	2198	3.73	2419	3.39	1.10	28.01	56.8			SC	A	Plane Bed
M13	1253	1060	5711	3.38	6961	2.77	1.22	11.62	38.5			SC	B	Step-Pool
M14	1370	1253	3141	3.72	3912	2.99	1.25	5.99	28.8			NW	B	Step-Pool
M15	1461	1370	2491	3.65	2902	3.14	1.16	5.55	27.8			NW	B	Step-Pool
M16	1568	1461	3020	3.54	3259	3.28	1.08	5.33	27.3			NW	B	Step-Pool
M17	1710	1568	3088	4.60	3609	3.93	1.17	2.66	20.2			NW	A	Step-Pool
M18	1895	1710	1710	10.82	4382	4.22	2.56	2.42	19.3			NW	B	Step-Pool
M19	2103	1895	3688	5.64	4091	5.08	1.11	1.04	13.3			SC	B	Step-Pool
M3S1.01	438	351			5923	1.47		0.38	8.6				C	Plane Bed
T1.01	355	354	2109	0.05	2367	0.04	1.12	9.83	35.8	565	15.8	VB	C	Dune-Ripple
T1.02	356	355	1011	0.10	1278	0.08	1.26	9.71	35.6	1475	41.4	VB	C	Dune-Ripple
T1.03	357	356	1693	0.06	2047	0.05	1.21	9.47	35.2	902	25.6	VB	C	Dune-Ripple
T1.04	359	357	1637	0.12	2164	0.09	1.32	6.78	30.4	1267	41.7	VB	B	Dune-Ripple
T1.05	360	359	1812	0.06	2105	0.05	1.16	6.61	30.1	2158	71.7	VB	C	Dune-Ripple

Step	2.1 Elevation		2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10		2.11	
Reach ID	Up (ft.)	Down (ft.)	Valley Length (ft.)	Valley Slope (%)	Channel Length (ft.)	Channel Slope (%)	Sinuosity	Watershed Area (sq. mi.)	Channel Width (ft.)	Valley Width (ft.)	Confinement Ratio	Type	Reference Stream Type	Bedform
T1.06	378	360	3194	0.56	4050	0.44	1.27	5.91	28.6	929	32.5	VB	C	Dune-Ripple
T1.07	420	378	3249	1.29	3889	1.08	1.20	0.73	11.4	820	72.1	VB	C	Dune-Ripple
T1.08	460	420	1624	2.46	1970	2.03	1.21	0.45	9.2	582	63.2	VB	C	Dune-Ripple
T1S1.01	357	356	2568	0.04	3431	0.03	1.34	1.61	16.2	1497	92.6	VB	C	Dune-Ripple
T1S1.02	374	357	7351	0.23	7460	0.23	1.01	1.40	15.2	1404	92.5	VB	C	Dune-Ripple
T2.01	384	362	3197	0.69	7454	0.30	2.33	4.72	25.9	1797	69.3	VB	E	Dune-Ripple
T2.02	459	384	4963	1.51	5868	1.28	1.18	2.71	20.3	634	31.2	VB	C	Plane Bed
T2.03	519	459	1948	3.08	2196	2.73	1.13	0.66	10.9	292	26.8	VB	C	Riffle-Pool
T2S1.01	399	384	2114	0.71	2546	0.59	1.20	1.53	15.8	664	42.0	VB	C	Dune-Ripple
T2S1.02	419	399	3590	0.56	4403	0.45	1.23	1.30	14.7	687	46.7	VB	C	Dune-Ripple
T2S1.03	425	419	2101	0.29	2241	0.27	1.07	0.96	12.8	779	60.6	VB	C	Dune-Ripple
T3.01	912	788	2981	4.16	3028	4.10	1.02	14.04	41.9			NC	A	Step-Pool
T3.02	1009	912	3652	2.66	3736	2.60	1.02	13.37	41.0			NC	B	Riffle-Pool
T3.03	1070	1009	2394	2.55	2402	2.54	1.00	12.34	39.6			NC	B	Step-Pool
T3.04	1165	1070	3330	2.85	3678	2.58	1.10	11.69	38.6			NC	B	Step-Pool
T3.05	1212	1165	2085	2.25	2096	2.24	1.01	9.77	35.7			NC	B	Step-Pool
T3.06	1279	1212	3459	1.94	3646	1.84	1.05	9.50	35.3			NW	B	Riffle-Pool
T3.07	1309	1279	2913	1.03	2951	1.02	1.01	8.41	33.4			BD	B	Plane Bed
T3.08	1334	1309	1599	1.56	1837	1.36	1.15	7.92	32.6	362	11.1	VB	B	Plane Bed
T3.09	1405	1334	2379	2.98	2460	2.89	1.03	4.81	26.1			SC	B	Step-Pool
T3.10	1475	1405	3585	1.95	3976	1.76	1.11	4.24	24.7			NW	C	Plane Bed
T4.01	1143	1065	3432	2.27	3643	2.14	1.06	16.24	44.7			NC	B	Step-Pool
T4.02	1240	1143	4022	2.41	4623	2.10	1.15	15.51	43.8			SC	C	Step-Pool
T4.03	1275	1240	2888	1.21	4134	0.85	1.43	11.49	38.4			NW	C	Riffle-Pool
T4.04	1306	1275	2569	1.21	3141	0.99	1.22	10.98	37.6	469	12.5	VB	C	Plane Bed
T4.05	1336	1306	2101	1.43	2165	1.39	1.03	10.32	36.6			NW	C	Riffle-Pool
T4.06	1393	1336	2920	1.95	3331	1.71	1.14	7.86	32.4			NC	B	Riffle-Pool
T4.07	1513	1393	4016	2.99	4515	2.66	1.12	7.43	31.7			NW	B	Plane Bed
T4.08	1669	1513	2136	7.30	2268	6.88	1.06	1.61	16.2			SC	B	Step-Pool

Phase 1 - Step 3. Basin Characteristics: Geology

Step	3.1	3.2	3.3 Geologic Materials			3.4 Valley Side Slope	
Reach ID	Alluvial Fan	Grade Control	Dominant	%	Sub-Dominant	Left	Right
M01	None	None	Alluvial	100.0	---	Flat	Flat
M02	None	None	Alluvial	68.3	Glacial Lake	Flat	Flat
M03	None		Alluvial	69.0	Glacial Lake	Hilly	Hilly
M04	None	None	Alluvial	61.5	Glacial Lake	Hilly	Hilly
M05	None	None	Alluvial	82.1	Glacial Lake	Hilly	Hilly
M06	None	None	Other	34.6	Alluvial	Hilly	Hilly
M07	None	None	Ice-Contact	81.6	Other	Hilly	Hilly
M08	None	Ledge	Ice-Contact	94.8	Till	Flat	Hilly
M09			Other	71.2	Ice-Contact		
M10			Ice-Contact	100.0	---		
M11	None	Multiple	Ice-Contact	93.3	Till	Extremely Steep	Steep
M12	None	Multiple	Ice-Contact	79.1	Till	Hilly	Hilly
M13	None	Ledge	Till	52.3	Ice-Contact	Steep	Steep
M14	None	Multiple	Till	100.0	---	Hilly	Hilly
M15			Till	67.4	Ice-Contact		
M16	None	None	Ice-Contact	95.9	Till	Flat	Flat
M17	None	None	Ice-Contact	93.3	Till	Flat	Flat
M18	None	None	Ice-Contact	95.6	Till	Hilly	Hilly
M19	None		Till	56.4	Ice-Contact	Hilly	Hilly
M3S1.01			Glacial Lake	99.9	Alluvial		
T1.01			Alluvial	97.5	Ice-Contact		
T1.02			Alluvial	84.2	Ice-Contact		
T1.03			Alluvial	100.0	---		
T1.04			Alluvial	98.6	Glacial Lake		
T1.05			Glacial Lake	66.0	Alluvial		
T1.06			Glacial Lake	100.0	---		

Step	3.1	3.2	3.3 Geologic Materials			3.4 Valley Side Slope	
Reach ID	Alluvial Fan	Grade Control	Dominant	%	Sub-Dominant	Left	Right
T1.07			Glacial Lake	100.0	---		
T1.08			Glacial Lake	53.7	Till		
T1S1.01			Alluvial	94.0	Glacial Lake		
T1S1.02			Glacial Lake	96.3	Alluvial		
T2.01			Alluvial	95.5	Glacial Lake		
T2.02			Ice-Contact	50.3	Alluvial		
T2.03			Ice-Contact	100.0	---		
T2S1.01			Glacial Lake	97.0	Alluvial		
T2S1.02			Glacial Lake	100.0	---		
T2S1.03			Glacial Lake	100.0	---		
T3.01	None	Ledge	Ice-Contact	100.0	---	Extremely Steep	Steep
T3.02	None	None	Ice-Contact	100.0	---	Hilly	Hilly
T3.03	None	Multiple	Ice-Contact	100.0	---	Hilly	Hilly
T3.04	None	Multiple	Ice-Contact	93.6	Till	Hilly	Hilly
T3.05	None	Multiple	Ice-Contact	77.4	Till	Hilly	Hilly
T3.06	None	None	Till	100.0	---	Hilly	Hilly
T3.07	None	None	Till	67.9	Alluvial	Hilly	Hilly
T3.08	None	None	Alluvial	54.3	Till	Flat	Flat
T3.09	None	None	Till	100.0	---	Steep	Hilly
T3.10	None	None	Till	100.0	---	Flat	Flat
T4.01	None	Ledge	Till	58.4	Ice-Contact	Hilly	Flat
T4.02	None	Ledge	Ice-Contact	51.8	Till	Hilly	Flat
T4.03	None	None	Till	72.0	Ice-Contact	Hilly	Flat
T4.04	None	None	Ice-Contact	85.6	Till	Flat	Flat
T4.05	None	None	Till	69.3	Ice-Contact	Hilly	Hilly
T4.06	None	None	Till	52.4	Alluvial	Steep	Steep
T4.07	None	None	Till	85.5	Alluvial	Flat	Flat
T4.08	None	None	Till	92.4	Ice-Contact	Steep	Steep

Phase 1 - Step 3. Basin Characteristics: Soils

	3.5 Soil Properties									
	Hydrologic				Water Table					
Reach ID	Group	%	Flooding	%	Deep	%	Shallow	%	Erodibility	%
M01	C	61.3	Frequent	80.4	1.5	61.3	0.0	61.3		
M02	B	61.1	Occasional	44.0	3.0	52.2	1.5	68.1	Moderate	31.6
M03	B	68.0	Occasional	49.3	3.0	69.4	1.5	49.3	Moderate	27.1
M04	B	54.2	Frequent	38.6	6.0	46.7	4.0	31.3	Slight	15.5
M05	B	82.1	Occasional	82.1	3.0	93.6	1.5	82.1	Slight	11.9
M06	Not Rated	34.6	Frequent	34.6	3.0	49.1	1.5	32.5	Slight	20.7
M07	A	60.4	None/Rare	81.6	6.0	60.4	6.0	60.4		
M08	A	94.8	None/Rare	100.0	6.0	100.0	6.0	94.8	Moderate	31.1
M09	Not Rated	71.2	None/Rare	100.0	6.0	28.8	6.0	28.4	Moderate	25.7
M10	A	100.0	None/Rare	100.0	6.0	100.0	6.0	100.0	Very Severe	100.0
M11	A	93.3	None/Rare	100.0	6.0	100.0	6.0	93.3	Very Severe	99.9
M12	A	79.1	None/Rare	100.0	6.0	100.0	6.0	79.1	Severe	52.1
M13	A	44.9	None/Rare	100.0	6.0	52.8	6.0	44.9	Severe	60.3
M14	B	88.0	None/Rare	100.0	6.0	88.0	2.0	88.0	Very Severe	100.0
M15	C	86.3	None/Rare	100.0	2.5	53.7	1.5	53.7	Severe	67.4
M16	C	98.8	None/Rare	100.0	1.0	95.9	0.0	95.9	Slight	4.1
M17	A	68.7	None/Rare	100.0	6.0	71.4	6.0	68.7	Severe	67.7
M18	A	95.6	None/Rare	100.0	6.0	95.6	6.0	95.6	Very Severe	90.0
M19	B	56.4	None/Rare	100.0	6.0	100.0	2.0	56.4	Very Severe	100.0
M3S1.01	D	99.9	None/Rare	81.1	3.0	77.3	1.0	77.2	Very Severe	77.2
T1.01	C	82.4	Frequent	97.5	1.5	82.4	0.0	82.4	Slight	0.3
T1.02	C	84.2	Frequent	84.2	1.5	84.2	0.0	84.2		
T1.03	C	100.0	Frequent	100.0	1.5	100.0	0.0	100.0		
T1.04	C	98.6	Frequent	98.6	1.5	98.6	0.0	98.6		
T1.05	D	66.0	None/Rare	66.0	1.0	47.6	0.5	47.6	Slight	18.4
T1.06	D	100.0	None/Rare	100.0	1.0	88.3	0.5	92.8	Slight	7.2

3.5 Soil Properties										
	Hydrologic				Water Table					
Reach ID	Group	%	Flooding	%	Deep	%	Shallow	%	Erodibility	%
T1.07	D	66.6	None/Rare	100.0	3.0	55.4	1.0	55.4	Severe	57.6
T1.08	D	53.7	None/Rare	100.0	3.0	60.7	1.5	35.8	Severe	71.2
T1S1.01	C	94.0	Frequent	94.0	1.5	97.8	0.0	97.8		
T1S1.02	D	96.3	None/Rare	97.1	1.0	81.1	0.0	84.0	Slight	3.4
T2.01	C	88.1	Frequent	92.2	1.5	88.1	0.0	88.1	Slight	4.5
T2.02	A	50.3	None/Rare	70.6	6.0	67.4	6.0	67.4	Severe	58.0
T2.03	A	100.0	None/Rare	100.0	6.0	100.0	6.0	100.0	Very Severe	81.7
T2S1.01	D	97.0	None/Rare	97.0	1.0	74.1	0.5	74.1	Slight	22.9
T2S1.02	D	100.0	None/Rare	100.0	3.0	96.7	1.0	96.7	Very Severe	96.7
T2S1.03	D	100.0	None/Rare	100.0	1.0	77.1	0.0	77.1	Slight	22.9
T3.01	A	100.0	None/Rare	100.0	6.0	100.0	6.0	100.0	Very Severe	100.0
T3.02	A	100.0	None/Rare	100.0	6.0	100.0	6.0	100.0	Very Severe	100.0
T3.03	A	100.0	None/Rare	100.0	6.0	100.0	6.0	100.0	Very Severe	100.0
T3.04	A	93.6	None/Rare	100.0	6.0	100.0	6.0	93.6	Very Severe	99.6
T3.05	A	77.4	None/Rare	100.0	6.0	77.4	6.0	77.4	Very Severe	100.0
T3.06	D	66.7	None/Rare	100.0	2.0	66.7	0.0	66.7	Very Severe	100.0
T3.07	B	67.9	None/Rare	76.4	6.0	67.9	2.0	67.9	Severe	67.9
T3.08	C	54.3	Frequent	54.3	1.5	54.3	0.0	58.9	Moderate	42.9
T3.09	B	89.1	None/Rare	100.0	6.0	89.1	2.0	89.1	Very Severe	100.0
T3.10	D	81.1	None/Rare	100.0	2.0	81.1	0.0	81.1	Very Severe	100.0
T4.01	A	41.6	None/Rare	100.0	6.0	75.1	6.0	41.6	Severe	58.4
T4.02	B	48.0	None/Rare	100.0	6.0	52.4	1.5	33.2	Severe	63.2
T4.03	B	95.0	None/Rare	100.0	6.0	69.0	2.0	69.0	Very Severe	78.8
T4.04	C	61.3	None/Rare	100.0	1.0	61.3	0.0	61.3	Slight	14.8
T4.05	B	74.3	None/Rare	100.0	6.0	69.3	2.0	69.3	Severe	69.3
T4.06	B	52.4	None/Rare	52.4	6.0	52.4	2.0	52.4	Severe	52.4
T4.07	D	51.4	None/Rare	92.2	2.0	51.4	0.0	59.5	Very Severe	88.8
T4.08	B	92.4	None/Rare	100.0	6.0	100.0	2.0	92.4	Very Severe	100.0

Phase 1 - Step 4. Land Cover - Reach Hydrology

Step	4.1 Watershed Land Cover - Land Use							4.2 Corridor Land Cover - Land Use							4.3 Riparian Buffer			4.4
		Current							Current						Width (ft.)			Grndwater
Reach ID	Historic	Dom.	%	Sub-D.	Urban	Crop	Impact	Historic	Dom.	%	Sub-D.	Urban	Crop	Impact	L Bank	R Bank	Impact	Inputs
M01	Field	Forest	80.6	Field	3.5	3.6	Low	Forest	Forest	44.9	Crop	2.0	18.9	High	>100	0-25	Low	Abundant
M02	Field	Forest	80.8	Field	3.4	3.6	Low	Field	Field	35.5	Forest	2.3	4.7	Low	0-25	0-25	High	None
M03	Field	Forest	80.9	Field	3.4	3.5	Low	Shrub	Forest	26.7	Crop	10.5	24.3	High	>100	0-25	Low	Minimal
M04	Field	Forest	84.9	Field	3.2	2.8	Low	Field	Forest	25.0	Crop	1.3	23.4	High	0-25	0-25	Low	Abundant
M05	Field	Forest	85.5	Field	3.2	2.4	Low	Shrub	Forest	35.2	Urban	12.9	12.7	High	>100	>100	Low	Minimal
M06	Forest	Forest	89.9	Urban	2.9	0.8	Low	Forest	Forest	39.0	Crop	4.0	12.9	High	>100	>100	N.S.	Abundant
M07	Forest	Forest	90.5	Urban	2.9	0.6	Low	Residential	Forest	36.7	Field	13.8	9.9	High	>100	>100	Low	Minimal
M08	Forest	Forest	90.8	Urban	2.8	0.5	Low	Forest	Urban	36.7	Forest	36.7	5.2	High	>100	0-25	Low	Minimal
M09	Forest	Forest	90.8	Urban	2.7	0.5	Low	Forest	Forest	62.7	Crop	0.8	7.0	Low	>100	>100	N.S.	Minimal
M10	Forest	Forest	90.8	Urban	2.7	0.5	Low	Forest	Forest	54.5	Crop	0.4	16.2	High	>100	>100	N.S.	None
M11	Forest	Forest	91.4	Urban	2.5	0.5	Low	Commercial	Forest	53.2	Urban	23.9	1.1	High	0-25	>100	Low	Abundant
M12	Forest	Forest	91.4	Urban	2.4	0.5	Low	Residential	Forest	40.2	Urban	26.4	4.0	High	>100	>100	Low	None
M13	Forest	Forest	91.5	Urban	2.4	0.3	Low	Forest	Forest	49.1	Urban	13.0	0.9	High	>100	>100	N.S.	Abundant
M14	Forest	Forest	93.2	Urban	1.1	0.1	N.S.	Forest	Forest	70.5	---			N.D.	>100	>100	N.S.	None
M15	Forest	Forest	93.2	Urban	0.9	0.0	N.S.	Forest	Forest	77.2	---			N.D.	>100	>100	N.S.	Minimal
M16	Forest	Forest	93.2	Urban	0.9	0.0	N.S.	Forest	Forest	70.6	---			N.D.	>100	>100	N.S.	Abundant
M17	Forest	Forest	94.5	Urban	0.8		N.S.	Forest	Forest	56.1	---			N.D.	>100	>100	N.S.	None
M18	Forest	Forest	94.6	Urban	0.8		N.S.	Forest	Forest	48.6	---			N.D.	>100	>100	N.S.	Minimal
M19	Forest	Forest	96.2	Urban	0.3		N.S.	Forest	Forest	56.6	Urban	2.0		Low	>100	>100	N.S.	Minimal
M3S1.01		Field	64.8	Forest	3.2	6.4	Low		Field	38.5	Crop	2.6	11.8	High	51-100	>100	N.S.	Abundant
T1.01		Forest	63.2	Field	4.6	6.8	High		Wetland	53.4	Forest	3.4	3.1	Low	>100	>100	N.S.	Abundant
T1.02		Forest	63.7	Field	4.6	6.5	High		Forest	45.4	Wetland	3.9	3.0	Low	0-25	0-25	High	Abundant
T1.03		Forest	64.4	Field	4.7	6.3	High		Wetland	61.0	Forest			N.D.	0-25	0-25	High	Abundant
T1.04		Forest	71.7	Field	4.7	4.6	Low		Wetland	59.5	Forest		12.5	High	0-25	0-25	High	Abundant
T1.05		Forest	72.7	Field	4.8	4.4	Low		Forest	64.5	Wetland			N.D.	>100	>100	Low	Abundant
T1.06		Forest	75.2	Field	5.0	4.0	Low		Wetland	28.6	Field		7.8	Low	0-25	0-25	High	Abundant
T1.07		Forest	45.4	Field	9.2	12.4	High		Field	18.1	Crop	1.0	13.8	High	0-25	0-25	Low	Minimal
T1.08		Forest	59.7	Field	12.0	7.6	High		Forest	33.9	Field	7.5	1.9	Low	>100	0-25	Low	Minimal
T1S1.01		Forest	51.4	Field	5.2	11.2	High		Forest	73.7	Wetland		0.4	N.S.	>100	>100	N.S.	Abundant
T1S1.02		Forest	50.1	Field	5.6	11.2	High		Wetland	40.3	Field	1.6	5.7	Low	0-25	0-25	High	Abundant
T2.01		Forest	45.5	Field	5.4	17.2	High		Forest	51.1	Urban	11.4	3.7	High	>100	0-25	Low	Abundant

Step	4.1 Watershed Land Cover - Land Use							4.2 Corridor Land Cover - Land Use							4.3 Riparian Buffer			4.4
		Current							Current						Width (ft.)			Grndwater
Reach ID	Historic	Dom.	%	Sub-D.	Urban	Crop	Impact	Historic	Dom.	%	Sub-D.	Urban	Crop	Impact	L Bank	R Bank	Impact	Inputs
T2.02		Forest	61.4	Field	5.4	10.0	High		Forest	52.7	Field	3.4	6.6	Low	>100	>100	Low	Abundant
T2.03		Forest	80.9	Field	3.2	3.4	Low		Field	28.2	Forest	13.3	1.2	High	>100	>100	N.S.	Abundant
T2S1.01		Field	36.2	Crop	5.1	32.5	High		Urban	17.1	Field	17.1	11.1	High	0-25	0-25	High	Abundant
T2S1.02		Crop	34.0	Field	3.8	34.0	High		Field	24.0	Urban	16.1	14.1	High	0-25	0-25	High	Minimal
T2S1.03		Crop	35.0	Forest	3.5	35.0	High		Field	33.2	Urban	24.1	4.3	High	0-25	0-25	High	Minimal
T3.01	Forest	Forest	89.8	Urban	3.0	0.5	Low	Forest	Forest	50.9	Crop		3.3	Low	>100	>100	N.S.	Minimal
T3.02	Forest	Forest	89.8	Urban	2.9	0.5	Low	Forest	Forest	53.1	Crop		0.9	N.S.	>100	>100	N.S.	Minimal
T3.03	Forest	Forest	89.8	Urban	3.0	0.4	Low	Forest	Forest	34.0	Urban	22.7	0.8	High	>100	>100	N.S.	None
T3.04	Forest	Forest	89.9	Urban	2.8	0.4	Low	Forest	Forest	30.7	Field	8.6		Low	>100	>100	N.S.	Abundant
T3.05	Forest	Forest	90.7	Urban	2.4	0.3	Low	Forest	Forest	47.1	Urban	0.3	0.1	N.S.	>100	>100	N.S.	None
T3.06	Forest	Forest	90.7	Urban	2.3	0.3	Low	Residential	Urban	39.1	Forest	39.1		High	>100	0-25	Low	Minimal
T3.07	Forest	Forest	90.4	Urban	2.3	0.3	Low	Forest	Forest	40.8	Urban	31.0		High	>100	0-25	Low	None
T3.08	Forest	Forest	90.1	Urban	2.3	0.3	Low	Forest	Forest	48.8	Urban	18.3		High	>100	>100	Low	Minimal
T3.09	Forest	Forest	89.3	Urban	2.5	0.4	Low	Forest	Forest	42.8	Urban	31.4		High	>100	>100	Low	Minimal
T3.10	Forest	Forest	90.0	Urban	1.7	0.4	Low	Forest	Forest	47.9	Urban	1.7		N.S.	>100	>100	N.S.	Abundant
T4.01	Forest	Forest	91.5	Urban	2.3	0.5	Low	Residential	Urban	38.0	Forest	38.0	0.8	High	>100	0-25	Low	Minimal
T4.02	Forest	Forest	91.8	Urban	2.2	0.6	Low	Forest	Forest	50.7	Urban	14.6	1.1	High	>100	>100	N.S.	Abundant
T4.03	Forest	Forest	91.9	Urban	2.0	0.7	Low	Wetland	Forest	58.6	Urban	1.6		N.S.	>100	>100	N.S.	Abundant
T4.04	Forest	Forest	91.9	Urban	2.0	0.7	Low	Shrub	Forest	68.4	Wetland		0.9	N.S.	0-25	0-25	Low	Minimal
T4.05	Forest	Forest	91.8	Urban	1.9	0.7	Low	Forest	Forest	55.0	---			N.D.	>100	>100	N.S.	Minimal
T4.06	Forest	Forest	92.4	Urban	1.6	0.6	Low	Forest	Forest	48.2	Crop		0.5	N.S.	>100	>100	N.S.	Minimal
T4.07	Forest	Forest	92.6	Urban	1.6	0.6	Low	Shrub	Forest	44.2	Urban	9.4	0.1	Low	>100	>100	Low	Abundant
T4.08	Forest	Forest	90.6	Urban	2.1	2.0	Low	Forest	Urban	44.9	Forest	44.9	1.4	High	>100	26-50	N.S.	Abundant

Phase 1 - Step 4. Riparian Condition Summary

	Riparian Corridor				Riparian Buffer										
	Dominant			Corridor	Left Bank					Right Bank					Buffer
	Corridor	Urban	Crop	Land Cover	Buffer	Percent of each Buffer Width				Buffer	Percent of each Buffer Width				Width
Reach ID	Land Cover	%	%	Impact	Width	0-25	26-50	51-100	>100	Width	0-25	26-50	51-100	>100	Impact
M01	Forest	2.0	18.9	High	>100	49	0	0	51	0-25	32	32	5	31	Low
M02	Field	2.3	4.7	Low	0-25	95	0	0	5	0-25	100	0	0	0	High
M03	Forest	10.5	24.3	High	>100	36	12	6	46	0-25	68	6	0	26	Low
M04	Forest	1.3	23.4	High	0-25	70	0	0	30	0-25	68	0	10	22	Low
M05	Forest	12.9	12.7	High	>100	40	0	0	60	>100	29	0	11	60	Low
M06	Forest	4.0	12.9	High	>100	8	0	0	92	>100	14	0	0	85	N.S.
M07	Forest	13.8	9.9	High	>100	32	0	7	61	>100	26	5	0	68	Low
M08	Urban	36.7	5.2	High	>100	15	0	0	85	0-25	74	0	0	26	Low
M09	Forest	0.8	7.0	Low	>100	0	0	0	100	>100	0	0	7	93	N.S.
M10	Forest	0.4	16.2	High	>100	0	0	0	100	>100	0	0	0	100	N.S.
M11	Forest	23.9	1.1	High	0-25	71	0	0	29	>100	0	0	0	100	Low
M12	Forest	26.4	4.0	High	>100	28	0	0	72	>100	42	9	0	49	Low
M13	Forest	13.0	0.9	High	>100	13	5	12	70	>100	8	5	12	75	N.S.
M14	Forest			N.D.	>100	5	4	3	88	>100	0	0	0	100	N.S.
M15	Forest			N.D.	>100	0	0	0	100	>100	0	0	0	100	N.S.
M16	Forest			N.D.	>100	0	0	0	100	>100	0	0	0	100	N.S.
M17	Forest			N.D.	>100	0	0	0	100	>100	0	0	0	100	N.S.
M18	Forest			N.D.	>100	0	0	0	100	>100	0	0	0	100	N.S.
M19	Forest	2.0		Low	>100	0	0	0	100	>100	0	0	0	100	N.S.
M3S1.01	Field	2.6	11.8	High	51-100	0	3	83	15	>100	0	8	8	84	N.S.
T1.01	Wetland	3.4	3.1	Low	>100	2	0	0	98	>100	0	0	0	100	N.S.
T1.02	Forest	3.9	3.0	Low	0-25	84	0	0	16	0-25	77	0	11	11	High
T1.03	Wetland			N.D.	0-25	100	0	0	0	0-25	100	0	0	0	High
T1.04	Wetland		12.5	High	0-25	100	0	0	0	0-25	82	0	0	18	High
T1.05	Forest			N.D.	>100	0	0	0	100	>100	34	0	0	66	Low
T1.06	Wetland		7.8	Low	0-25	92	0	0	8	0-25	100	0	0	0	High

	Riparian Corridor				Riparian Buffer										
	Dominant			Corridor	Left Bank					Right Bank					Buffer
	Corridor	Urban	Crop	Land Cover	Buffer	Percent of each Buffer Width				Buffer	Percent of each Buffer Width				Width
Reach ID	Land Cover	%	%	Impact	Width	0-25	26-50	51-100	>100	Width	0-25	26-50	51-100	>100	Impact
T1.07	Field	1.0	13.8	High	0-25	56	33	6	4	0-25	51	12	15	22	Low
T1.08	Forest	7.5	1.9	Low	>100	20	30	0	50	0-25	59	0	0	41	Low
T1S1.01	Forest		0.4	N.S.	>100	0	0	0	100	>100	0	0	0	100	N.S.
T1S1.02	Wetland	1.6	5.7	Low	0-25	100	0	0	0	0-25	100	0	0	0	High
T2.01	Forest	11.4	3.7	High	>100	4	0	28	68	0-25	72	0	0	28	Low
T2.02	Forest	3.4	6.6	Low	>100	22	8	4	66	>100	34	10	20	36	Low
T2.03	Field	13.3	1.2	High	>100	11	6	9	74	>100	16	0	9	75	N.S.
T2S1.01	Urban	17.1	11.1	High	0-25	100	0	0	0	0-25	100	0	0	0	High
T2S1.02	Field	16.1	14.1	High	0-25	69	0	0	31	0-25	92	0	4	4	High
T2S1.03	Field	24.1	4.3	High	0-25	100	0	0	0	0-25	100	0	0	0	High
T3.01	Forest		3.3	Low	>100	0	0	0	100	>100	0	0	0	100	N.S.
T3.02	Forest		0.9	N.S.	>100	0	0	0	100	>100	0	0	0	100	N.S.
T3.03	Forest	22.7	0.8	High	>100	0	0	0	100	>100	0	0	0	100	N.S.
T3.04	Forest	8.6		Low	>100	3	10	0	87	>100	8	7	14	71	N.S.
T3.05	Forest	0.3	0.1	N.S.	>100	0	0	41	59	>100	0	0	0	100	N.S.
T3.06	Urban	39.1		High	>100	25	8	0	67	0-25	46	22	0	33	Low
T3.07	Forest	31.0		High	>100	0	0	0	100	0-25	47	0	28	26	Low
T3.08	Forest	18.3		High	>100	0	0	0	100	>100	33	0	18	49	Low
T3.09	Forest	31.4		High	>100	0	0	0	100	>100	39	5	16	40	Low
T3.10	Forest	1.7		N.S.	>100	6	0	4	90	>100	0	0	0	100	N.S.
T4.01	Urban	38.0	0.8	High	>100	0	7	8	85	0-25	54	34	0	11	Low
T4.02	Forest	14.6	1.1	High	>100	22	6	4	68	>100	24	0	0	76	N.S.
T4.03	Forest	1.6		N.S.	>100	0	0	0	100	>100	0	0	6	94	N.S.
T4.04	Forest		0.9	N.S.	0-25	58	0	0	42	0-25	58	0	0	42	Low
T4.05	Forest			N.D.	>100	0	0	0	100	>100	0	5	11	85	N.S.
T4.06	Forest		0.5	N.S.	>100	0	0	0	100	>100	0	0	0	100	N.S.
T4.07	Forest	9.4	0.1	Low	>100	19	0	0	81	>100	42	0	0	58	Low
T4.08	Urban	44.9	1.4	High	>100	0	0	0	100	26-50	24	51	0	25	N.S.

Phase 1 - Step 5. Instream Channel Modification

Step	5.1 Flow Regulation		5.2 Bridges - Culverts				5.3 Bank Armoring			5.4 Channel Straightening			5.5 Dredging History	
Reach ID	Type	Impact	Number	Length	Percent	Impact	Length	Percent	Impact	Length	Percent	Impact	Type	Impact
M01	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
M02	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
M03	None	N.S.	2	300	5.0	Low	48	0.4	N.S.	2015	33.4	High		Unk.
M04	None	N.S.	1	120	1.6	Low			Unk.	668	8.9	Low		Unk.
M05	None	N.S.	1	830	20.1	High	483	5.9	N.S.	1972	47.8	High		Unk.
M06	None	N.S.	1	300	4.3	Low	140	1.0	N.S.	1662	24.1	High		Unk.
M07	None	N.S.	2	140	4.4	Low	890	14.0	Low			Unk.		Unk.
M08	None	N.S.	2	240	11.7	Low			Unk.			Unk.		Unk.
M09	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
M10	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
M11	None	N.S.	0	0	0.0	N.S.	377	2.8	N.S.			Unk.		Unk.
M12	None	N.S.	1	90	3.7	Low			Unk.			Unk.		Unk.
M13	None	N.S.	4	470	6.8	Low	53	0.4	N.S.			Unk.		Unk.
M14	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
M15	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
M16	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
M17	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
M18	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
M19	None	N.S.	1	140	3.4	Low			Unk.			Unk.		Unk.
M3S1.01	None	N.S.	2	270	4.6	Low			Unk.			Unk.		Unk.
T1.01	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
T1.02	None	N.S.	0	0	0.0	N.S.			Unk.	1212	94.9	High		Unk.
T1.03	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
T1.04	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
T1.05	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
T1.06	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.

Step	5.1 Flow Regulation		5.2 Bridges - Culverts				5.3 Bank Armoring			5.4 Channel Straightening			5.5 Dredging History	
Reach ID	Type	Impact	Number	Length	Percent	Impact	Length	Percent	Impact	Length	Percent	Impact	Type	Impact
T1.07	None	N.S.	1	120	3.1	Low			Unk.			Unk.		Unk.
T1.08	None	N.S.	1	180	9.1	Low			Unk.			Unk.		Unk.
T1S1.01	None	N.S.	0	0	0.0	N.S.			Unk.	2438	71.1	High		Unk.
T1S1.02	None	N.S.	1	150	2.0	Low			Unk.	7058	94.6	High		Unk.
T2.01	None	N.S.	2	560	7.5	Low			Unk.			Unk.		Unk.
T2.02	None	N.S.	2	260	4.4	Low			Unk.			Unk.		Unk.
T2.03	None	N.S.	3	380	17.3	Low			Unk.			Unk.		Unk.
T2S1.01	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
T2S1.02	None	N.S.	2	300	6.8	Low			Unk.	272	6.2	Low		Unk.
T2S1.03	None	N.S.	1	100	4.5	Low			Unk.	2217	98.9	High		Unk.
T3.01	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
T3.02	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
T3.03	None	N.S.	1	60	2.5	Low			Unk.			Unk.		Unk.
T3.04	None	N.S.	1	180	4.9	Low			Unk.			Unk.		Unk.
T3.05	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
T3.06	None	N.S.	1	220	6.0	Low			Unk.			Unk.		Unk.
T3.07	None	N.S.	1	90	3.0	Low			Unk.			Unk.		Unk.
T3.08	None	N.S.	1	150	8.2	Low			Unk.			Unk.		Unk.
T3.09	None	N.S.	1	130	5.3	Low			Unk.			Unk.		Unk.
T3.10	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
T4.01	None	N.S.	1	140	3.8	Low			Unk.			Unk.		Unk.
T4.02	None	N.S.	1	80	1.7	Low			Unk.			Unk.		Unk.
T4.03	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
T4.04	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
T4.05	None	N.S.	0	0	0.0	N.S.			Unk.	740	34.2	High		Unk.
T4.06	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.
T4.07	None	N.S.	2	200	4.4	Low			Unk.			Unk.		Unk.
T4.08	None	N.S.	0	0	0.0	N.S.			Unk.			Unk.		Unk.

Phase 1 - Step 6. Floodplain Modification and Planform Changes

Step	6.1 Berms & Roads			6.2 Corridor Development			6.3 Depositional Features		6.4 Meander Migration		6.5 Meander Width Ratio			6.6 Wavelength Ratio		
Reach ID	Length	Percent	Impact	Length	Percent	Impact	Type	Impact	Type	Impact	Width	Ratio	Impact	Length	Ratio	Impact
M01	194	3.9	N.S.	0.0	0.0	N.S.	Point	N.S.	Migration	High	448	5.5	N.S.	779	9.6	N.S.
M02	431	10.5	Low	0.0	0.0	N.S.	Multiple	Low	Multiple	High	326	4.0	Low	514	6.3	Low
M03	898	14.9	Low	444.0	7.4	Low	Point	N.S.	Multiple	High	287	3.6	Low	852	10.5	N.S.
M04	384	5.1	Low	0.0	0.0	N.S.	Multiple	High	Multiple	High	582	7.8	N.S.	419	5.6	High
M05	993	24.1	High	235.0	5.7	Low	Multiple	High	Multiple	High	299	4.0	Low	590	8.0	Low
M06			Unk.	782.0	11.3	Low	Point	High	Multiple	High	371	5.2	N.S.	1214	17.1	High
M07	218	6.9	Low	979.5	30.8	High	None	N.S.	Avulsion	Low	230	3.3	Low	1185	16.9	High
M08	795	38.9	High	694.8	34.0	High	None	N.S.	None	N.S.	Not Applicable		Unk.			Unk.
M09	466	13.0	Low	0.0	0.0	N.S.	None	N.S.	None	N.S.	Not Applicable		Unk.			Unk.
M10			Unk.	0.0	0.0	N.S.	None	N.S.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
M11	4938	73.5	High	0.0	0.0	N.S.	None	N.S.	None	N.S.	318	5.5	N.S.	1143	19.8	High
M12	994	41.1	High	1824.0	75.4	High	None	N.S.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
M13	215	3.1	N.S.	1634.0	23.5	High	No Data	N.D.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
M14			Unk.	0.0	0.0	N.S.	No Data	N.D.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
M15			Unk.	0.0	0.0	N.S.	No Data	N.D.	None	N.S.	229	8.2	Low	642	23.1	High
M16			Unk.	289.0	8.9	Low	No Data	N.D.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
M17			Unk.	0.0	0.0	N.S.	No Data	N.D.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
M18			Unk.	0.0	0.0	N.S.	No Data	N.D.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
M19			Unk.	72.0	1.8	N.S.	No Data	N.D.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
M3S1.01			Unk.	128.0	2.2	N.S.	None	N.S.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
T1.01			Unk.	0.0	0.0	N.S.	None	N.S.	Multiple	Low	125	3.5	Low	183	5.1	High

Step	6.1 Berms & Roads			6.2 Corridor Development			6.3 Depositional Features		6.4 Meander Migration		6.5 Meander Width Ratio			6.6 Wavelength Ratio		
Reach ID	Length	Percent	Impact	Length	Percent	Impact	Type	Impact	Type	Impact	Width	Ratio	Impact	Length	Ratio	Impact
T1.02			Unk.	0.0	0.0	N.S.	None	N.S.	Avulsion	High	36	1.0	High	36	1.0	High
T1.03			Unk.	0.0	0.0	N.S.	None	N.S.	None	N.S.	88	2.5	High	236	6.7	Low
T1.04			Unk.	0.0	0.0	N.S.	None	N.S.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
T1.05			Unk.	0.0	0.0	N.S.	None	N.S.	None	N.S.	109	3.6	Low	297	9.9	N.S.
T1.06			Unk.	0.0	0.0	N.S.	None	N.S.	None	N.S.	124	4.3	Low	166	5.8	High
T1.07	207	5.3	Low	0.0	0.0	N.S.	None	High	Migration	High	109	9.6	Low	352	30.9	High
T1.08	48	2.4	N.S.	112.0	5.7	Low	None	N.S.	Migration	Low	90	9.8	Low	304	33.0	High
T1S1.01			Unk.	97.0	2.8	N.S.	Mid-channel	Low	None	N.S.	16	1.0	High	16	1.0	High
T1S1.02			Unk.	0.0	0.0	N.S.	None	N.S.	None	N.S.	15	1.0	High	15	1.0	High
T2.01	693	9.3	Low	348.0	4.7	N.S.	None	N.S.	None	N.S.	89	3.4	Low	137	5.3	High
T2.02			Unk.	153.0	2.6	N.S.	No Data	N.D.	None	N.S.	127	6.3	N.S.	322	15.8	Low
T2.03			Unk.	262.0	11.9	Low	No Data	N.D.	None	N.S.	90	8.3	Low	387	35.5	High
T2S1.01			Unk.	0.0	0.0	N.S.	None	N.S.	None	N.S.	75	4.7	Low	186	11.8	N.S.
T2S1.02			Unk.	102.0	2.3	N.S.	None	N.S.	None	N.S.	53	3.6	Low	143	9.7	N.S.
T2S1.03			Unk.	76.0	3.4	N.S.	None	N.S.	None	N.S.	13	1.0	High	13	1.0	High
T3.01			Unk.	0.0	0.0	N.S.	No Data	N.D.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
T3.02			Unk.	0.0	0.0	N.S.	No Data	N.D.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
T3.03			Unk.	59.0	2.5	N.S.	No Data	N.D.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
T3.04	218	5.9	Low	50.0	1.4	N.S.	No Data	N.D.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
T3.05			Unk.	217.0	10.4	Low	No Data	N.D.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
T3.06	2828	77.6	High	81.0	2.2	N.S.	No Data	N.D.	None	N.S.	140	4.0	Low	1218	34.5	High
T3.07	1423	48.2	High	64.0	2.2	N.S.	No Data	N.D.	None	N.S.	71	2.1	High	30	0.9	High
T3.08	257	14.0	Low	116.0	6.3	Low	No Data	N.D.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
T3.09	735	29.9	High	278.2	11.3	Low	No Data	N.D.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
T3.10			Unk.	367.1	9.2	Low	No Data	N.D.	None	N.S.	76	3.1	Low	401	16.2	High
T4.01	3083	84.6	High	400.0	11.0	Low	No Data	N.D.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.

Step	6.1 Berms & Roads			6.2 Corridor Development			6.3 Depositional Features		6.4 Meander Migration		6.5 Meander Width Ratio			6.6 Wavelength Ratio		
Reach ID	Length	Percent	Impact	Length	Percent	Impact	Type	Impact	Type	Impact	Width	Ratio	Impact	Length	Ratio	Impact
T4.02	602	13.0	Low	243.0	5.3	Low	No Data	N.D.	None	N.S.	237	5.4	N.S.	423	9.7	N.S.
T4.03			Unk.	0.0	0.0	N.S.	Multiple	Low	Avulsion	Low	299	7.8	N.S.	547	14.3	Low
T4.04			Unk.	0.0	0.0	N.S.	None	N.S.	Avulsion	Low	254	6.8	N.S.	382	10.2	N.S.
T4.05			Unk.	0.0	0.0	N.S.	No Data	N.D.	None	N.S.	186	5.1	N.S.	33	0.9	High
T4.06			Unk.	0.0	0.0	N.S.	No Data	N.D.	None	N.S.	Not Applicable		Unk.	Not Applicable		Unk.
T4.07	263	5.8	Low	129.0	2.9	N.S.	No Data	N.D.	Migration	High	Not Applicable		Unk.	Not Applicable		Unk.
T4.08	2244	98.9	High	0.0	0.0	N.S.	No Data	N.D.	None	N.S.	43	2.7	High	207	12.8	N.S.

Phase 1 - Step 7. Bed and Bank Windshield Survey

Step	7.1 Stream Type					7.2 Bank Erosion - Bank Height			7.3 Ice & Debris Jam Potential	
	Reference	Mod. Ref.	Dominant	Subclass	Dominant	Bank	Bank			
Reach ID	Stream Type	Stream Type	Bedform	Slope	Bed Material	Erosion	Height	Impact	Type	Impact
M01	E	No	Dune-Ripple		Sand	Low	Low	Low	Multiple	Low
M02	E	No	Riffle-Pool		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
M03	E	No	Dune-Ripple		Sand	Low	Medium	Low	Bend	Low
M04	E	No	Dune-Ripple		Sand	Low	Low	Low	Bend	Low
M05	E	No	Riffle-Pool		Gravel	Low	Low	High	Multiple	Low
M06	C	No	Riffle-Pool		Gravel	Low	Low	Low	None	N.S.
M07	C	No	Plane Bed		Boulder	Low	Medium	Low	No Data	N.S.
M08	B	No	Step-Pool		Boulder	None	High	N.S.	None	N.S.
M09	B	Yes	Step-Pool	a	Boulder	None	High	N.S.	No Data	N.S.
M10	B	No	Step-Pool		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
M11	B	Yes	Step-Pool	c	Boulder	None	High	N.S.	None	N.S.
M12	A	Yes	Plane Bed	b	Boulder	None	High	N.S.	None	N.S.
M13	B	No	Step-Pool		Cobble	None	Low	N.S.	None	N.S.
M14	B	No	Step-Pool		Cobble	None	High	N.S.	Multiple	High
M15	B	Yes	Step-Pool	c	Cobble	Low	Low	N.S.	Debris	Low
M16	B	No	Step-Pool		Cobble	None	Low	N.S.	Debris	High
M17	A	No	Step-Pool		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
M18	B	No	Step-Pool		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.

Step	7.1 Stream Type					7.2 Bank Erosion - Bank Height			7.3 Ice & Debris Jam Potential	
	Reference	Mod. Ref.	Dominant	Subclass	Dominant	Bank	Bank			
Reach ID	Stream Type	Stream Type	Bedform	Slope	Bed Material	Erosion	Height	Impact	Type	Impact
M19	B	No	Step-Pool		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
M3S1.01	C	No	Plane Bed		Sand	Low	High	Low	Culvert	Low
T1.01	C	No	Dune-Ripple		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
T1.02	C	No	Dune-Ripple		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
T1.03	C	No	Dune-Ripple		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
T1.04	B	No	Dune-Ripple		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
T1.05	C	No	Dune-Ripple		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
T1.06	C	No	Dune-Ripple		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
T1.07	C	No	Dune-Ripple		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
T1.08	C	No	Dune-Ripple		Sand	None	Low	N.S.	None	N.S.
T1S1.01	C	No	Dune-Ripple		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
T1S1.02	C	No	Dune-Ripple		Sand	None	Low	N.S.	Culvert	Low
T2.01	E	No	Dune-Ripple		Sand	None	Low	N.S.	Bend	N.S.
T2.02	C	No	Plane Bed		Sand	Low	High	High	None	N.S.
T2.03	C	No	Riffle-Pool		Sand	Low	High	N.S.	Culvert	High
T2S1.01	C	No	Dune-Ripple		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.

Step	7.1 Stream Type					7.2 Bank Erosion - Bank Height			7.3 Ice & Debris Jam Potential	
	Reference	Mod. Ref.	Dominant	Subclass	Dominant	Bank	Bank			
Reach ID	Stream Type	Stream Type	Bedform	Slope	Bed Material	Erosion	Height	Impact	Type	Impact
T2S1.02	C	No	Dune-Ripple		Sand	High	High	High	None	N.S.
T2S1.03	C	No	Dune-Ripple		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
T3.01	A	No	Step-Pool		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
T3.02	B	No	Riffle-Pool		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
T3.03	B	No	Step-Pool		Boulder	None	Low	N.S.	Debris	Low
T3.04	B	No	Step-Pool		Boulder	None	Low	N.S.	None	N.S.
T3.05	B	No	Step-Pool		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
T3.06	B	Yes	Riffle-Pool	c	Cobble	None	Low	N.S.	None	N.S.
T3.07	B	Yes	Plane Bed	c	Boulder	None	Medium	N.S.	Bend	N.S.
T3.08	B	No	Plane Bed		Cobble	Low	Medium	Low	Bend	N.S.
T3.09	B	No	Step-Pool		Boulder	Low	Medium	Low	None	N.S.
T3.10	C	No	Plane Bed		Cobble	Low	High	Low	None	N.S.
T4.01	B	No	Step-Pool		Boulder	Low	Low	Low	Debris	Low
T4.02	C	No	Step-Pool		Boulder	Low	Low	High	None	N.S.
T4.03	C	No	Riffle-Pool		Cobble	No Data	No Data	N.D.	No Data	N.D.
T4.04	C	No	Plane Bed		Cobble	Low	Low	High	Debris	Low
T4.05	C	No	Riffle-Pool		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
T4.06	B	No	Riffle-Pool		Not Evaluated	Not Evaluated	Not Evaluated	N.D.	Not Evaluated	N.D.
T4.07	B	No	Plane Bed		Cobble	Low	Low	High	None	N.S.
T4.08	B	Yes	Step-Pool	c	Boulder	None	High	N.S.	None	N.S.

Phase 1 - Step 7. Channelization Report

Step	2.5	2.11 (also 7.1) Stream Type				5.4 Channel Straightening			6.5 Meander Width Ratio			6.6 Wavelength Ratio		
	Channel	Reference	Dominant	Subclass	Dominant									
	Slope	Stream Type	Bedform	Slope	Bed Material	Length	Percent	Impact	Width	Ratio	Impact	Length	Ratio	Impact
M01	0.04	E	Dune-Ripple		Sand			Unk.	448	5.5	N.S.	779	9.6	N.S.
M02	0.05	E	Riffle-Pool		Not Evaluated			Unk.	326	4.0	Low	514	6.3	Low
M03	0.08	E	Dune-Ripple		Sand	2015	33.4	High	287	3.6	Low	852	10.5	N.S.
M04	0.07	E	Dune-Ripple		Sand	668	8.9	Low	582	7.8	N.S.	419	5.6	High
M05	0.15	E	Riffle-Pool		Gravel	1972	47.8	High	299	4.0	Low	590	8.0	Low
M06	0.58	C	Riffle-Pool		Gravel	1662	24.1	High	371	5.2	N.S.	1214	17.1	High
M07	1.83	C	Plane Bed		Boulder			Unk.	230	3.3	Low	1185	16.9	High
M08	2.30	B	Step-Pool		Boulder			Unk.			Unk.			Unk.
M09	5.28	B	Step-Pool	a	Boulder			Unk.			Unk.			Unk.
M10	3.17	B	Step-Pool		Not Evaluated			Unk.			Unk.			Unk.
M11	2.80	B	Step-Pool	c	Boulder			Unk.	318	5.5	N.S.	1143	19.8	High
M12	3.39	A	Plane Bed	b	Boulder			Unk.			Unk.			Unk.
M13	2.77	B	Step-Pool		Cobble			Unk.			Unk.			Unk.
M14	2.99	B	Step-Pool		Cobble			Unk.			Unk.			Unk.
M15	3.14	B	Step-Pool	c	Cobble			Unk.	229	8.2	Low	642	23.1	High
M16	3.28	B	Step-Pool		Cobble			Unk.			Unk.			Unk.
M17	3.93	A	Step-Pool		Not Evaluated			Unk.			Unk.			Unk.
M18	4.22	B	Step-Pool		Not Evaluated			Unk.			Unk.			Unk.
M19	5.08	B	Step-Pool		Not Evaluated			Unk.			Unk.			Unk.
M3S1.01	1.47	C	Plane Bed		Sand			Unk.			Unk.			Unk.
T1.01	0.04	C	Dune-Ripple		Not Evaluated			Unk.	125	3.5	Low	183	5.1	High

Step	2.5	2.11 (also 7.1) Stream Type				5.4 Channel Straightening			6.5 Meander Width Ratio			6.6 Wavelength Ratio		
	Channel	Reference	Dominant	Subclass	Dominant									
	Slope	Stream Type	Bedform	Slope	Bed Material	Length	Percent	Impact	Width	Ratio	Impact	Length	Ratio	Impact
T1.02	0.08	C	Dune-Ripple		Not Evaluated	1212	94.9	High	36	1.0	High	36	1.0	High
T1.03	0.05	C	Dune-Ripple		Not Evaluated			Unk.	88	2.5	High	236	6.7	Low
T1.04	0.09	B	Dune-Ripple		Not Evaluated			Unk.			Unk.			Unk.
T1.05	0.05	C	Dune-Ripple		Not Evaluated			Unk.	109	3.6	Low	297	9.9	N.S.
T1.06	0.44	C	Dune-Ripple		Not Evaluated			Unk.	124	4.3	Low	166	5.8	High
T1.07	1.08	C	Dune-Ripple		Not Evaluated			Unk.	109	9.6	Low	352	30.9	High
T1.08	2.03	C	Dune-Ripple		Sand			Unk.	90	9.8	Low	304	33.0	High
T1S1.01	0.03	C	Dune-Ripple		Not Evaluated	2438	71.1	High	16	1.0	High	16	1.0	High
T1S1.02	0.23	C	Dune-Ripple		Sand	7058	94.6	High	15	1.0	High	15	1.0	High
T2.01	0.30	E	Dune-Ripple		Sand			Unk.	89	3.4	Low	137	5.3	High
T2.02	1.28	C	Plane Bed		Sand			Unk.	127	6.3	N.S.	322	15.8	Low
T2.03	2.73	C	Riffle-Pool		Sand			Unk.	90	8.3	Low	387	35.5	High
T2S1.01	0.59	C	Dune-Ripple		Not Evaluated			Unk.	75	4.7	Low	186	11.8	N.S.
T2S1.02	0.45	C	Dune-Ripple		Sand	272	6.2	Low	53	3.6	Low	143	9.7	N.S.
T2S1.03	0.27	C	Dune-Ripple		Not Evaluated	2217	98.9	High	13	1.0	High	13	1.0	High
T3.01	4.10	A	Step-Pool		Not Evaluated			Unk.			Unk.			Unk.

Step	2.5	2.11 (also 7.1) Stream Type				5.4 Channel Straightening			6.5 Meander Width Ratio			6.6 Wavelength Ratio		
	Channel	Reference	Dominant	Subclass	Dominant									
	Slope	Stream Type	Bedform	Slope	Bed Material	Length	Percent	Impact	Width	Ratio	Impact	Length	Ratio	Impact
T3.02	2.60	B	Riffle-Pool		Not Evaluated			Unk.			Unk.			Unk.
T3.03	2.54	B	Step-Pool		Boulder			Unk.			Unk.			Unk.
T3.04	2.58	B	Step-Pool		Boulder			Unk.			Unk.			Unk.
T3.05	2.24	B	Step-Pool		Not Evaluated			Unk.			Unk.			Unk.
T3.06	1.84	B	Riffle-Pool	c	Cobble			Unk.	140	4.0	Low	1218	34.5	High
T3.07	1.02	B	Plane Bed	c	Boulder			Unk.	71	2.1	High	30	0.9	High
T3.08	1.36	B	Plane Bed		Cobble			Unk.			Unk.			Unk.
T3.09	2.89	B	Step-Pool		Boulder			Unk.			Unk.			Unk.
T3.10	1.76	C	Plane Bed		Cobble			Unk.	76	3.1	Low	401	16.2	High
T4.01	2.14	B	Step-Pool		Boulder			Unk.			Unk.			Unk.
T4.02	2.10	C	Step-Pool		Boulder			Unk.	237	5.4	N.S.	423	9.7	N.S.
T4.03	0.85	C	Riffle-Pool		Cobble			Unk.	299	7.8	N.S.	547	14.3	Low
T4.04	0.99	C	Plane Bed		Cobble			Unk.	254	6.8	N.S.	382	10.2	N.S.
T4.05	1.39	C	Riffle-Pool		Not Evaluated	740	34.2	High	186	5.1	N.S.	33	0.9	High
T4.06	1.71	B	Riffle-Pool		Not Evaluated			Unk.			Unk.			Unk.
T4.07	2.66	B	Plane Bed		Cobble			Unk.			Unk.			Unk.
T4.08	6.88	B	Step-Pool	c	Boulder			Unk.	43	2.7	High	207	12.8	N.S.

Phase 1 - Step 8. Stream and Watershed Impact Rating

High ranking->7

Reach ID	Type	Material	Slope	Bed Feature	Type	Area	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	Score	Ranking
M01	E	Sand		Dune-Ripple	VB	62.8	1	2	1	0	0	0	0	0	0	0	0	2	0	0	1	1	8	HIGH
M02	E	Not Evaluated		Riffle-Pool	VB	62.6	1	1	2	0	0	0	0	0	1	0	1	2	1	1	0	0	10	HIGH
M03	E	Sand		Dune-Ripple	VB	62.5	1	2	1	0	1	0	2	0	1	1	0	2	1	0	1	1	14	HIGH
M04	E	Sand		Dune-Ripple	VB	52	1	2	1	0	1	0	1	0	1	0	2	2	0	2	1	1	15	HIGH
M05	E	Gravel		Riffle-Pool	VB	51.4	1	2	1	0	2	0	2	0	2	1	2	2	1	1	2	1	20	HIGH
M06	C	Gravel		Riffle-Pool	VB	46.4	1	2	0	0	1	0	2	0	0	1	2	2	0	2	1	0	14	HIGH
M07	C	Boulder		Plane Bed	VB	45.4	1	2	1	0	1	1	0	0	1	2	0	1	1	2	1	0	14	HIGH
M08	B	Boulder		Step-Pool	NW	44.6	1	2	1	0	1	0	0	0	2	2	0	0	0	0	0	0	9	HIGH
M09	B	Boulder	a	Step-Pool		44.3	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	LOW
M10	B	Not Evaluated		Step-Pool		43.3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	LOW
M11	B	Boulder	c	Step-Pool	NC	29.1	1	2	1	0	0	0	0	0	2	0	0	0	0	2	0	0	8	HIGH
M12	A	Boulder	b	Plane Bed	SC	28	1	2	1	0	1	0	0	0	2	2	0	0	0	0	0	0	9	HIGH
M13	B	Cobble		Step-Pool	SC	11.6	1	2	0	0	1	0	0	0	0	2	0	0	0	0	0	0	6	LOW
M14	B	Cobble		Step-Pool	NW	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	LOW
M15	B	Cobble	c	Step-Pool	NW	5.5	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	4	LOW
M16	B	Cobble		Step-Pool	NW	5.3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	3	LOW
M17	A	Not Evaluated		Step-Pool	NW	2.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	LOW
M18	B	Not Evaluated		Step-Pool	NW	2.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	LOW
M19	B	Not Evaluated		Step-Pool	SC	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	LOW
M3S1.01	C	Sand		Plane Bed		0.4	1	2	0	0	1	0	0	0	0	0	0	0	0	0	1	1	6	LOW

Reach ID	Type	Material	Slope	Bed Feature	Type	Area	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	Score	Ranking
T1.01	C	Not Evaluated		Dune-Ripple	VB	9.8	2	1	0	0	0	0	0	0	0	0	0	1	1	2	0	0	7	LOW
T1.02	C	Not Evaluated		Dune-Ripple	VB	9.7	2	1	2	0	0	0	2	0	0	0	0	2	2	2	0	0	13	HIGH
T1.03	C	Not Evaluated		Dune-Ripple	VB	9.5	2	0	2	0	0	0	0	0	0	0	0	0	2	1	0	0	7	LOW
T1.04	B	Not Evaluated		Dune-Ripple	VB	6.8	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5	LOW
T1.05	C	Not Evaluated		Dune-Ripple	VB	6.6	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	3	LOW
T1.06	C	Not Evaluated		Dune-Ripple	VB	5.9	1	1	2	0	0	0	0	0	0	0	0	0	1	2	0	0	7	LOW
T1.07	C	Not Evaluated		Dune-Ripple	VB	0.7	2	2	1	0	1	0	0	0	1	0	2	2	1	2	0	0	14	HIGH
T1.08	C	Sand		Dune-Ripple	VB	0.4	2	1	1	0	1	0	0	0	0	1	0	1	1	2	0	0	10	HIGH
T1S1.01	C	Not Evaluated		Dune-Ripple	VB	1.6	2	0	0	0	0	0	2	0	0	0	1	0	2	2	0	0	9	HIGH
T1S1.02	C	Sand		Dune-Ripple	VB	1.4	2	1	2	0	1	0	2	0	0	0	0	0	2	2	0	1	13	HIGH
T2.01	E	Sand		Dune-Ripple	VB	4.7	2	2	1	0	1	0	0	0	1	0	0	0	1	2	0	0	10	HIGH
T2.02	C	Sand		Plane Bed	VB	2.7	2	1	1	0	1	0	0	0	0	0	0	0	0	1	2	0	8	HIGH
T2.03	C	Sand		Riffle-Pool	VB	0.7	1	2	0	0	1	0	0	0	0	1	0	0	1	2	0	2	10	HIGH
T2S1.01	C	Not Evaluated		Dune-Ripple	VB	1.5	2	2	2	0	0	0	0	0	0	0	0	0	1	0	0	0	7	LOW
T2S1.02	C	Sand		Dune-Ripple	VB	1.3	2	2	2	0	1	0	1	0	0	0	0	0	1	0	2	0	11	HIGH
T2S1.03	C	Not Evaluated		Dune-Ripple	VB	1	2	2	2	0	1	0	2	0	0	0	0	0	2	2	0	0	13	HIGH
T3.01	A	Not Evaluated		Step-Pool	NC	14	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	LOW
T3.02	B	Not Evaluated		Riffle-Pool	NC	13.4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	LOW
T3.03	B	Boulder		Step-Pool	NC	12.3	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	1	5	LOW

Reach ID	Type	Material	Slope	Bed Feature	Type	Area	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	Score	Ranking
T3.04	B	Boulder		Step-Pool	NC	11.7	1	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	4	LOW
T3.05	B	Not Evaluated		Step-Pool	NC	9.8	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	LOW
T3.06	B	Cobble	c	Riffle-Pool	NW	9.5	1	2	1	0	1	0	0	0	2	0	0	0	1	2	0	0	10	HIGH
T3.07	B	Boulder	c	Plane Bed	BD	8.4	1	2	1	0	1	0	0	0	2	0	0	0	2	2	0	0	11	HIGH
T3.08	B	Cobble		Plane Bed	VB	7.9	1	2	1	0	1	0	0	0	1	1	0	0	0	0	1	0	8	HIGH
T3.09	B	Boulder		Step-Pool	SC	4.8	1	2	1	0	1	0	0	0	2	1	0	0	0	0	1	0	9	HIGH
T3.10	C	Cobble		Plane Bed	NW	4.2	1	0	0	0	0	0	0	0	0	1	0	0	1	2	1	0	6	LOW
T4.01	B	Boulder		Step-Pool	NC	16.2	1	2	1	0	1	0	0	0	2	1	0	0	0	0	1	1	10	HIGH
T4.02	C	Boulder		Step-Pool	SC	15.5	1	2	0	0	1	0	0	0	1	1	0	0	0	0	2	0	8	HIGH
T4.03	C	Cobble		Riffle-Pool	NW	11.5	1	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	4	LOW
T4.04	C	Cobble		Plane Bed	VB	11	1	0	1	0	0	0	0	0	0	0	0	1	0	0	2	1	6	LOW
T4.05	C	Not Evaluated		Riffle-Pool	NW	10.3	1	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	5	LOW
T4.06	B	Not Evaluated		Riffle-Pool	NC	7.9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	LOW
T4.07	B	Cobble		Plane Bed	NW	7.4	1	1	1	0	1	0	0	0	1	0	0	2	0	0	2	0	9	HIGH
T4.08	B	Boulder	c	Step-Pool	SC	1.6	1	2	0	0	0	0	0	0	2	0	0	0	2	0	0	0	7	LOW

Phase 1 - Step 8. Summary of Categorical Impacts

		Stream Type					Step 4	Step 5	Step 6	Step 7
							Land	Instream	Floodplain	Bed & Bank
		Stream	Bed	Subclass		Total	Use	Modification	Modification	Survey
Reach ID	Stream or Tributary	Type	Material	Slope	Bedform	(out of 32)	(out of 6)	(out of 10)	(out of 12)	(out of 4)
M01	Middlebury River	E	Sand		Dune-Ripple	8	4	0	2	2
M02	Middlebury River	E	Not Evaluated		Riffle-Pool	10	4	0	6	0
M03	Middlebury River	E	Sand		Dune-Ripple	14	4	3	5	2
M04	Middlebury River	E	Sand		Dune-Ripple	15	4	2	7	2
M05	Middlebury River	E	Gravel		Riffle-Pool	20	4	4	9	3
M06	Middlebury River	C	Gravel		Riffle-Pool	14	3	3	7	1
M07	Middlebury River	C	Boulder		Plane Bed	14	4	2	7	1
M08	Middlebury River	B	Boulder		Step-Pool	9	4	1	4	0
M09	Middlebury River	B	Boulder	a	Step-Pool	3	2	0	1	0
M10	Middlebury River	B	Not Evaluated		Step-Pool	3	3	0	0	0
M11	Middlebury River	B	Boulder	c	Step-Pool	8	4	0	4	0
M12	Middlebury River	A	Boulder	b	Plane Bed	9	4	1	4	0
M13	Middlebury River	B	Cobble		Step-Pool	6	3	1	2	0
M14	Middlebury River	B	Cobble		Step-Pool	2	0	0	0	2
M15	Middlebury River	B	Cobble	c	Step-Pool	4	0	0	3	1
M16	Middlebury River	B	Cobble		Step-Pool	3	0	0	1	2
M17	Middlebury River	A	Not Evaluated		Step-Pool	0	0	0	0	0

		Stream Type					Step 4	Step 5	Step 6	Step 7
							Land	Instream	Floodplain	Bed & Bank
		Stream	Bed	Subclass		Total	Use	Modification	Modification	Survey
Reach ID	Stream or Tributary	Type	Material	Slope	Bedform	(out of 32)	(out of 6)	(out of 10)	(out of 12)	(out of 4)
M18	Middlebury River	B	Not Evaluated		Step-Pool	0	0	0	0	0
M19	Middlebury River	B	Not Evaluated		Step-Pool	2	1	1	0	0
M3S1.01	Unnamed trib to Middlebury River	C	Sand		Plane Bed	6	3	1	0	2
T1.01	Hanlon Brook	C	Not Evaluated		Dune-Ripple	7	3	0	4	0
T1.02	Hanlon Brook	C	Not Evaluated		Dune-Ripple	13	5	2	6	0
T1.03	Hanlon Brook	C	Not Evaluated		Dune-Ripple	7	4	0	3	0
T1.04	Hanlon Brook	B	Not Evaluated		Dune-Ripple	5	5	0	0	0
T1.05	Hanlon Brook	C	Not Evaluated		Dune-Ripple	3	2	0	1	0
T1.06	Hanlon Brook	C	Not Evaluated		Dune-Ripple	7	4	0	3	0
T1.07	Hanlon Brook	C	Not Evaluated		Dune-Ripple	14	5	1	8	0
T1.08	Hanlon Brook	C	Sand		Dune-Ripple	10	4	1	5	0
T1S1.01	Unnamed trib to Hanlon Brook	C	Not Evaluated		Dune-Ripple	9	2	2	5	0
T1S1.02	Unnamed trib to Hanlon Brook	C	Sand		Dune-Ripple	13	5	3	4	1
T2.01	Beaver Brook	E	Sand		Dune-	10	5	1	4	0

		Stream Type					Step 4	Step 5	Step 6	Step 7
							Land	Instream	Floodplain	Bed & Bank
		Stream	Bed	Subclass		Total	Use	Modification	Modification	Survey
Reach ID	Stream or Tributary	Type	Material	Slope	Bedform	(out of 32)	(out of 6)	(out of 10)	(out of 12)	(out of 4)
T2.02	Beaver Brook	C	Sand		Ripple Plane Bed	8	4	1	1	2
T2.03	Beaver Brook	C	Sand		Riffle-Pool	10	3	1	4	2
T2S1.01	Unnamed trib to Beaver Brook	C	Not Evaluated		Dune-Ripple	7	6	0	1	0
T2S1.02	Unnamed trib to Beaver Brook	C	Sand		Dune-Ripple	11	6	2	1	2
T2S1.03	Unnamed trib to Beaver Brook	C	Not Evaluated		Dune-Ripple	13	6	3	4	0
T3.01	North Branch Middlebury River	A	Not Evaluated		Step-Pool	2	2	0	0	0
T3.02	North Branch Middlebury River	B	Not Evaluated		Riffle-Pool	1	1	0	0	0
T3.03	North Branch Middlebury River	B	Boulder		Step-Pool	5	3	1	0	1
T3.04	North Branch Middlebury River	B	Boulder		Step-Pool	4	2	1	1	0
T3.05	North Branch Middlebury River	B	Not Evaluated		Step-Pool	2	1	0	1	0
T3.06	North Branch Middlebury River	B	Cobble	c	Riffle-Pool	10	4	1	5	0
T3.07	North Branch Middlebury River	B	Boulder	c	Plane Bed	11	4	1	6	0
T3.08	North Branch Middlebury River	B	Cobble		Plane Bed	8	4	1	2	1
T3.09	North Branch Middlebury River	B	Boulder		Step-Pool	9	4	1	3	1

		Stream Type					Step 4	Step 5	Step 6	Step 7
							Land	Instream	Floodplain	Bed & Bank
		Stream	Bed	Subclass		Total	Use	Modification	Modification	Survey
Reach ID	Stream or Tributary	Type	Material	Slope	Bedform	(out of 32)	(out of 6)	(out of 10)	(out of 12)	(out of 4)
T3.10	North Branch Middlebury River	C	Cobble		Plane Bed	6	1	0	4	1
T4.01	South Branch Middlebury River	B	Boulder		Step-Pool	10	4	1	3	2
T4.02	South Branch Middlebury River	C	Boulder		Step-Pool	8	3	1	2	2
T4.03	South Branch Middlebury River	C	Cobble		Riffle-Pool	4	1	0	3	0
T4.04	South Branch Middlebury River	C	Cobble		Plane Bed	6	2	0	1	3
T4.05	South Branch Middlebury River	C	Not Evaluated		Riffle-Pool	5	1	2	2	0
T4.06	South Branch Middlebury River	B	Not Evaluated		Riffle-Pool	1	1	0	0	0
T4.07	South Branch Middlebury River	B	Cobble		Plane Bed	9	3	1	3	2
T4.08	South Branch Middlebury River	B	Boulder	c	Step-Pool	7	3	0	4	0
	Total Scores					405	164	47	156	38
	Percent of Each Impact Category						40.5 %	11.6 %	38.5 %	9.4 %

Phase 1 - Step 9. Adjustment Process and Reach Condition

Reach ID	Confinement Type	Stream Type				Watershed Area	Total Impact	9.1 Predicted Adjustment Scores				9.2 Reach Condition		9.3 Reach Sensitivity
		Stream	Bed	Subclass										
		Type	Material	Slope	Bedform			Degrad.	Aggrad.	Widen.	Planf.	Project	Statewide	
M01	VB	E	Sand		Dune-Ripple	62.82	8	0	4	0	2	Reference	Reference	High
M02	VB	E	Not Evaluated		Riffle-Pool	62.65	10	0	4	2	4	Good	Reference	
M03	VB	E	Sand		Dune-Ripple	62.51	14	5	6	3	8	Fair	Good	High
M04	VB	E	Sand		Dune-Ripple	52.00	15	2	4	2	4	Good	Reference	High
M05	VB	E	Gravel		Riffle-Pool	51.38	20	8	10	7	10	Poor	Fair	High
M06	VB	C	Gravel		Riffle-Pool	46.43	14	5	5	5	9	Fair	Good	High
M07	VB	C	Boulder		Plane Bed	45.42	14	7	6	3	6	Fair	Good	Very Low
M08	NW	B	Boulder		Step-Pool	44.56	9	7	6	3	6	Fair	Good	Very Low
M09		B	Boulder	a	Step-Pool	44.31	3	2	2	0	0	Reference	Reference	Very Low
M10		B	Not Evaluated		Step-Pool	43.31	3	2	3	0	0	Reference	Reference	
M11	NC	B	Boulder	c	Step-Pool	29.12	8	4	4	0	0	Good	Reference	Very Low
M12	SC	A	Boulder	b	Plane Bed	28.01	9	7	6	3	3	Fair	Good	Very Low
M13	SC	B	Cobble		Step-Pool	11.62	6	5	5	3	3	Fair	Good	Moderate
M14	NW	B	Cobble		Step-Pool	5.99	2	2	2	0	0	Reference	Reference	Moderate
M15	NW	B	Cobble	c	Step-Pool	5.55	4	2	0	0	0	Reference	Reference	Moderate
M16	NW	B	Cobble		Step-Pool	5.33	3	2	2	0	0	Reference	Reference	Moderate
M17	NW	A	Not Evaluated		Step-Pool	2.66	0	2	0	0	0	Reference	Reference	
M18	NW	B	Not Evaluated		Step-Pool	2.42	0	2	0	0	0	Reference	Reference	
M19	SC	B	Not		Step-Pool	1.04	2	3	1	0	0	Reference	Reference	

Reach ID	Confinement Type	Stream Type				Watershed Area	Total Impact	9.1 Predicted Adjustment Scores				9.2 Reach Condition		9.3 Reach Sensitivity
		Stream	Bed	Subclass										
		Type	Material	Slope	Bedform			Degrad.	Aggrad.	Widen.	Planf.	Project	Statewide	
M3S1.01		C	Evaluated Sand		Plane Bed	0.38	6	3	3	0	1	Good	Reference	High
T1.01	VB	C	Not Evaluated		Dune-Ripple	9.83	7	4	3	2	0	Good	Reference	
T1.02	VB	C	Not Evaluated		Dune-Ripple	9.71	13	8	9	7	10	Poor	Fair	
T1.03	VB	C	Not Evaluated		Dune-Ripple	9.47	7	4	4	4	2	Good	Good	
T1.04	VB	B	Not Evaluated		Dune-Ripple	6.78	5	2	5	4	4	Fair	Good	
T1.05	VB	C	Not Evaluated		Dune-Ripple	6.61	3	2	2	0	0	Reference	Reference	
T1.06	VB	C	Not Evaluated		Dune-Ripple	5.91	7	0	4	2	2	Good	Reference	
T1.07	VB	C	Not Evaluated		Dune-Ripple	0.73	14	5	7	7	7	Fair	Good	
T1.08	VB	C	Sand		Dune-Ripple	0.45	10	5	6	5	5	Fair	Good	High
T1S1.01	VB	C	Not Evaluated		Dune-Ripple	1.61	9	6	4	4	4	Fair	Good	
T1S1.02	VB	C	Sand		Dune-Ripple	1.40	13	7	7	7	9	Poor	Fair	High
T2.01	VB	E	Sand		Dune-Ripple	4.72	10	5	7	5	5	Fair	Good	High
T2.02	VB	C	Sand		Plane Bed	2.71	8	6	8	7	5	Fair	Good	High
T2.03	VB	C	Sand		Riffle-Pool	0.66	10	3	5	2	3	Good	Good	High
T2S1.01	VB	C	Not Evaluated		Dune-Ripple	1.53	7	2	6	6	4	Fair	Good	
T2S1.02	VB	C	Sand		Dune-Ripple	1.30	11	8	10	9	8	Poor	Fair	High

Reach ID	Confinement Type	Stream Type				Watershed Area	Total Impact	9.1 Predicted Adjustment Scores				9.2 Reach Condition		9.3 Reach Sensitivity
		Stream	Bed	Subclass										
		Type	Material	Slope	Bedform			Degrad.	Aggrad.	Widen.	Planf.	Project	Statewide	
T2S1.03	VB	C	Not Evaluated		Dune-Ripple	0.96	13	7	8	7	9	Poor	Fair	
T3.01	NC	A	Not Evaluated		Step-Pool	14.04	2	2	2	0	0	Reference	Reference	
T3.02	NC	B	Not Evaluated		Riffle-Pool	13.37	1	2	1	0	0	Reference	Reference	
T3.03	NC	B	Boulder		Step-Pool	12.34	5	3	3	0	0	Reference	Reference	Very Low
T3.04	NC	B	Boulder		Step-Pool	11.69	4	3	2	0	0	Reference	Reference	Very Low
T3.05	NC	B	Not Evaluated		Step-Pool	9.77	2	2	1	0	0	Reference	Reference	
T3.06	NW	B	Cobble	c	Riffle-Pool	9.50	10	7	6	3	4	Fair	Good	Moderate
T3.07	BD	B	Boulder	c	Plane Bed	8.41	11	5	6	3	4	Fair	Good	Very Low
T3.08	VB	B	Cobble		Plane Bed	7.92	8	3	4	0	1	Good	Reference	Moderate
T3.09	SC	B	Boulder		Step-Pool	4.81	9	5	6	3	1	Fair	Good	Very Low
T3.10	NW	C	Cobble		Plane Bed	4.24	6	4	1	0	0	Reference	Reference	Moderate
T4.01	NC	B	Boulder		Step-Pool	16.24	10	5	6	3	0	Good	Good	Very Low
T4.02	SC	C	Boulder		Step-Pool	15.51	8	3	5	4	0	Good	Reference	Very Low
T4.03	NW	C	Cobble		Riffle-Pool	11.49	4	1	1	0	0	Reference	Reference	Moderate
T4.04	VB	C	Cobble		Plane Bed	10.98	6	2	4	2	0	Good	Reference	Moderate
T4.05	NW	C	Not Evaluated		Riffle-Pool	10.32	5	2	1	0	2	Reference	Reference	
T4.06	NC	B	Not Evaluated		Riffle-Pool	7.86	1	2	1	0	0	Reference	Reference	
T4.07	NW	B	Cobble		Plane Bed	7.43	9	5	7	5	7	Fair	Good	Moderate
T4.08	SC	B	Boulder	c	Step-Pool	1.61	7	4	3	0	0	Good	Reference	Very Low