Vermont Stream Geomorphic Assessment

Appendix A

Map, Sketch, and Photo Documentation
&
Data Sheets and Field Forms

Vermont Agency of Natural Resources
April, 2004

Sketch Form for Sites – Segments – Reaches

Stream Name:_____ Segment or Site ID: _____
Location: _____ Date:_____
_____ Town:_____
Observers:_____ Elevation: _____ Ft.
Organization /Agency: _____

Site Sketch - see reverse side for sketch codes and tally columns for left and right bank erosion, revetments, and corridor developments and calculating the total length of the segment affected by beaver flowages.

Scale:_____

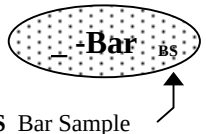
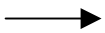
Height of bankfull features above water surface (Ft.)

_____ _____ _____ _____ _____ _____

_____ _____ _____ _____ _____ _____

Selected BKF Height

LWD tally _____
Debris Jams _____
Stormwater _____
Constrictions _____
(culverts, bridges, old footings, bedrock

Parameters	Map Codes and Sketch Examples
Alluvial Fan	**AF**
Bank Revetments	**rprp** XXXXXXXX Rip Rap **trvt** XXXXXXXX Tree-revetment
Bars and other Depositional Features	**Pbr** Point Bar **Mbr** Mid-channel Bar **Dbr** Diagonal Bar **Dtbr** Delta Bar **Sbr** Side Bar **BS** Bar Sample 
Bed Features	**Rf** Riffle **Stp** Step **P** Pool  
Bedrock	**BR** 
Benchmark Locations	**BM**
Berms	**B**
Buffers	**Bfr**
Chutes, Cut-offs and Avulsions	**FC** Flood Chutes **NC** Neck Cut-off **CA** Channel Avulsion
Cross Section Locations and Number	**CS#__**
Culverts and Bridges	**Cul** Culvert **Brg** Bridge
Debris Jam Locations	**DJ** Debris Jam
Developments	**D-R** Residential **D-C** Commercial / Industrial D-R
Eroding Banks	**BF** Bank Failure **MF** Mass Failure
Floodplains and Terraces	**Fp** Floodplain **Tr** Terrace
Flow Direction	
Flow Regulation or Withdrawal Structures	**Dam** **Weir** **Snow** Snowmaking **Irrig** Irrigation
Grade Controls	**GC** (also note type of control)
Head-cuts and Steep Riffles	**HC** Head Cut **ST** Steep Riffle
Longitudinal Profile	**LP-start** and **LP-end**
North Arrow	**N**
Pebble Count (mark start and end points)	**PC-start** and **PC-end**
Photo Points	**P#** (# to correspond w/ photo log #)
Reach and Segment start/end points (also include reach number from Phase 1 data)	**R-start** and **S-start** **R-end** and **S-end**
Roads, Railroads, Improved Paths	**RD** Roads **RR** Railroads **IP** Improved Path
Seep / Spring	**S**
Stormwater Features	**SI** Stormwater Input **G** Gulley
Stream Fords or Animal Crossings	**SF** Stream Ford **AC** Animal Crossing
Tributary	**Trib**

Bank Erosion	
Left Bank	Right Bank
Total:	Total:
Bank Revetments	
Left Bank	Right Bank
Total:	Total:
Floodplain Developments	
Left Bank	Right Bank
Total:	Total:
Beaver Dam affected lengths	
	Total:

Database - Photo Log

Photo ID: ___________________
Photo Date: _________________
Photographer:________________________

Site ID (If location is in Sites table): ______________
Stream Name: ______________________________
Town:________________________________
Waterbody ID: __________________
Valley Type: ___________________
XS #: ___________

Photo Type: aerial photo / digital photo / referenced aerial
Site Type: degraded / gage / reference / restoration
Instability Type: dimension / hydrology / lateral / pattern profile / sediment regime
Management Activities: floodplain / in channel / riparian / watershed

- ☐ Graphic Enhanced
- ☐ Clear Bankfull Indicators
- ☐ People
- ☐ Structure
- ☐ Monitoring Photo point

Database - Photo Log

Photo ID: ___________________
Photo Date: _________________
Photographer:________________________

Site ID (If location is in Sites table): ______________
Stream Name: ______________________________
Town:________________________________
Waterbody ID: __________________
Valley Type: ___________________
XS #: ___________

Photo Type: aerial photo / digital photo / referenced aerial
Site Type: degraded / gage / reference / restoration
Instability Type: dimension / hydrology / lateral / pattern profile / sediment regime
Management Activities: floodplain / in channel / riparian / watershed

- ☐ Graphic Enhanced
- ☐ Clear Bankfull Indicators
- ☐ People
- ☐ Structure
- ☐ Monitoring Photo point

Database - Photo Log

Photo ID: ___________________
Photo Date: _________________
Photographer:________________________

Site ID (If location is in Sites table): ______________
Stream Name: ______________________________
Town:________________________________
Waterbody ID: __________________
Valley Type: ___________________
XS #: ___________

Photo Type: aerial photo / digital photo / referenced aerial
Site Type: degraded / gage / reference / restoration
Instability Type: dimension / hydrology / lateral / pattern profile / sediment regime
Management Activities: floodplain / in channel / riparian / watershed

- ☐ Graphic Enhanced
- ☐ Clear Bankfull Indicators
- ☐ People
- ☐ Structure
- ☐ Monitoring Photo point

Database - Photo Log

Photo ID: ___________________
Photo Date: _________________
Photographer:________________________

Site ID (If location is in Sites table): ______________
Stream Name: ______________________________
Town:________________________________
Waterbody ID: __________________
Valley Type: ___________________
XS #: ___________

Photo Type: aerial photo / digital photo / referenced aerial
Site Type: degraded / gage / reference / restoration
Instability Type: dimension / hydrology / lateral / pattern profile / sediment regime
Management Activities: floodplain / in channel / riparian / watershed

- ☐ Graphic Enhanced
- ☐ Clear Bankfull Indicators
- ☐ People
- ☐ Structure
- ☐ Monitoring Photo point

Standard Photo Log

Reach or Segment Number	Roll & Photo Number	Photo View* or Feature	Photo Description

* Photo views would include upstream, downstream, right bank, left bank, cross-section, etc.

Vermont Stream Geomorphic Assessment

Appendix A - Phase 3 Field Forms

Site Location and Description
Longitudinal Profile
Cross-Section
Pebble Count
Planform Geometry
Point/Side Bar-Bulk Materials Sample
Stream Bank and Boundary Conditions
Phase 3 Quality Assurance Sheet

Site Location and Description

Stream Name:_____ Date:_____
Location: _____ Town:_____
_____ Elevation: _____ Ft.
Assessor Assigned Site ID:_____ Drainage Area:_____Sq.Mi.
Observers:_____ Site Length: _____ Ft.
Organization /Agency: _____ Benchmark Elevation:_____
USGS Map Name(s):_____ Heavy Rain in
Latitude (N/S): _____ Last 7 Days:_____
Longitude (E/W): _____ ¶ Flood history noted

1.1 Location Map

1.2 Assessment Type	DEG	RGA	GAG	NCD	REF

1.3 Valley Type	
Phase 3 - Preliminary Stream Type	
Stream Type	
Bed Type	

1.4 Surficial Geology: _____

1.5 Nearest Gauging Station & Location:

gauge # _____
on tributary ____
on assessment stream ____
on receiving above confluence ____
on receiving below confluence ____
other, within basin ____
adjacent basin ____

1.6 Upstream Corridor	
Paved roads, buildings	H / M / L / N
Dirt Roads	H / M / L / N
Bank Erosion	H / M / L / N
Agricultural runoff	H / M / L / N
Channelized, rip-rapped	H / M / L / N
Forested, vegetated buffer	H / M / L / N
Armored Banks	H / M / L / NA
Channelized	H / M / L / NA

1.7 Notes:

1.8 Survey Equipment Used:

2.1 Longitudinal Profile

Stream Name: _____ Site ID: _____
Location: _____ Date: _____
Organization/Agency: _____ Town: _____
Observers: _____

#	Feature		Distance	Azimuth	Elevations					XS	Notes
					Thalweg	Water	LBank	RBank	BKFull		
1			0	---							
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											

Feature Codes

Head of Riffle = RiH	Head of Pool = PH	Head of Glide = GlH	Head of Meander = MH
Mid-Riffle = RiM	Mid-Pool = PM	Mid-Glide = GlM	Meander Apex = MA
Tail of Riffle = RiT	Max-Pool = PMax	Tail of Glide = GlT	Tail of Meander = MT
Head of Run = RuH	Tail of Pool = PT	Head of Step = SpH	Crossover = CO
Mid-Run = RuM	Plane Bed = PB	Mid-Step = SpM	Cross-Section = XS
Tail of Run = RuT	Other: Head = OH, Tail = OT	Tail of Step = SpT	Thalweg = TW

Tips for Successful Longitudinal Profile Survey

- Walk the reach before starting the survey; making a preliminary assessment of bed features.
- Start the survey with the same bed feature (i.e., RiffH) that you plan to end with.
- Assign a bed feature (RiffT, RunM, etc) to *every* surveyed point along the thalweg.
- Survey and record the elevation of boulders or other stable objects near each cross section location.
- Flag and survey the location of each anticipated cross section location.

#	Feature		Distance	Azimuth	Elevations					XS	Notes
					Thalweg	Water	LBank	RBank	BKFull		
20			0	-----							
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											
45											
46											
47											
48											
49											
50											
51											
52											
53											

Cross-Section

Stream Name:_____ Site ID: _____
Location: _____ Date:_____
_____ Town:_____
Observers:_____ Drainage Area:_____Sq.Mi.
Organization /Agency: _____ Benchmark Elevation:_____ Ft.
USGS Map Name(s):_____ Heavy Rain Last 7 Days:_____
Latitude (N/S): _____
Longitude (E/W): _____ Cross Section No.:_____

Bed Feature: riffle / run / pool / glide **Location Within Bed Feature:** head / mid / max / tail
L/R Mon Heading _____ **Reference?** Yes / No

2.2 Cross-Section

Note	Distance	Elevation	Note	Distance	Elevation	Note	Distance	Elevation

Calculation of Flood Prone Elevation

BF: _____
TW: _____
Dmax: _____
2xDmax: _____ + TW _____ = FPE _____

2.3 Flood Prone Width _____

LTER = Left Terrace RTER = Right Terrace
LFPA = Left Floodplain RFPA = Right Floodplain
LPIN = Left Pin RPIN = Right Pin
LTOB = Left Top of Bank RTOB = Right Top of Bank
LBF = Left Bankfull Stage RBF = Right Bankfull Stage
LEW = Left Edge of Water REW = Right Edge of Water

TW = Thalweg

Lmon. = Left Monument Rmon. = Right Monument
LFPA = Left Flood Prone Area RFPA = Right Flood Prone Area

2.4 Vegetation: Composition/Density

	Overstory	Understory	Floor	% Bare Soil
LBank	___/___	___/___	___/___	_____
RBank	___/___	___/___	___/___	_____

Overstory / Understory: MH= Mixed Hardwood MHS=Mixed Hardwood/Softwood Con.=Coniferous WA=Willow/Alder
Forest Floor: SGF=Sedges/Grasses/Ferns PG=Pasture Grasses Herb.=Shade Tolerant Herbaceous W=Willow

2.5 Valley Cross-Section Drawing

Pebble Count

Stream Name: _____ Site ID: _____
Location: _____ Date: _____
Organization/Agency: _____ Observers: _____ Town: _____

2.6 XSEC / BED or 2.7 BAR **Note Bed Feature Next To Each Line Number** (riffle / run / pool / glide / plane bed / other)

Inches	PARTICLE	Millimeters		1:	2:	3:	4:	5:	6:	7:	TOT #	ITEM %	% CUM
	Silt / Clay	<.062	S/C										
	Very Fine	.062 - .125	SAND										
	Fine	.125 - .25											
	Medium	.25 - .50											
	Coarse	.50 - 1.0											
.04-.08	Very Coarse	1.0 - 2											
.08-.16	Very Fine	2 - 4	GRAVEL										
.16-.22	Fine	4 - 5.7											
.22-.31	Fine	5.7 - 8											
.31-.44	Medium	8 - 11.3											
.44-.63	Medium	11.3 - 16											
.63-.89	Coarse	16 - 22.6											
.89-1.26	Coarse	22.6 - 32											
1.26-1.77	Very Coarse	32 - 45											
1.77-2.5	Very Course	45 - 64											
	Small	64 - 90	COBBLE										
3.5-5.0	Small	90 - 128											
5.0-7.1	Large	128 - 180											
7.1-10.1	Large	180 - 256											
10.1-14.3	Small	256 - 362	BOULDER										
14.3-20	Small	362 - 512											
2040	Medium	512 - 1024											
40-80	Lg-Very Lg	1024 - 2048											
	Bedrock		BDRK										

Largest Particles on riffle: **bar:** **TOTALS -**

2.7 Point/Side Bar-Bulk Materials Sample: Size Distribution Analysis

Stream Name: ______________________________ Site ID: ______________
Location: ______________________________ Date: ______________
Organization/Agency: ______________ Observers: ______________ Town: ______________

Corresponding Riffle XS										
Sieve Size										**Grand Total Sample Weight**
Total Weight										
Tare Weight										
Tare Weight										
Net Weight Total										
% Grand Total										
Cum. % =<										

Corresponding Riffle XS										
Sieve Size										**Grand Total Sample Weight**
Total Weight										
Tare Weight										
Tare Weight										
Net Weight Total										
% Grand Total										
Cum. % =<										

Corresponding Riffle XS										
Sieve Size										**Grand Total Sample Weight**
Total Weight										
Tare Weight										
Tare Weight										
Net Weight Total										
% Grand Total										
Cum. % =<										

Surface Materials Data (Two Largest Particles Per Bar)			
Corresponding Riffle XS #	**No.**	**Dia. (mm)**	**WT.**
XS-			
XS-			
XS-			

Add weight of the two largest particles to their respective size classes when entering data in the office. If for some reason this is done in the field be sure this is indicated to assure that double counting is prevented.

2.8 Meander Geometry

Stream Name:_____ Site ID: _____
Location: _____ Date:_____
_____ Town:_____
Organization /Agency: _____ Observers:_____

Planform Sketch

Circle values used # Field Ortho-Photos

Meander or Bendway	1	2	3	4	5	Mean
Meander Wavelength (L_m)						
Belt Width (W_{blt})						
Channel Bend Length (L_b)						
Radius of Curvature (R_c)						

Stream Bank and Boundary Conditions

Stream Name: _____
Location: _____
Observers: _____
Organization/Agency: _____
USGS Map Name: _____
Latitude (N/S, NAD 83): _____
Longitude (E/W, NAD 83):_____

Segment ID/Site ID: _____
Date:_____
Town:_____
Weather: _____
Rain storm within past 7 days? Y / N

3.1 Bank Conditions

Length of Bank _____ft
Bankfull height (Bkf Ht) _____ft
Bedrock present at site? Yes / No
If no, where is nearest bedrock? _____
Bank revetments:
None / Rip-rap / Gabion / Concrete / Other
Surface protection _____%
Bank vegetation _____
Land use above bank_____
Concentration of storm water onto bank? (Y/N)
If yes, describe _____

3.2 Bank Failure

Type Bank Failure:
None / Soil creep / Landslide (Active/Inactive)
Type of Landslide:
Fall / Topple / Simple rotational slump /
Complex rotational slump-flow /
Block slide / Flow / Other
Length of bank failure _____ft
Height of bank failure _____ft
Condition of toe:
Intact / Partly eroded / Totally eroded
Has damage resulted from landslide? Yes / No

3.3 Sketch: Include scale and show orientation. Show units, internal structure, rooting, sample locations, landslide features, etc. A schematic cross-section of the bank is usually most effective.

Segment ID/Site ID_____ Date_____

3.4 Stratigraphic description. Measurements in feet. Elevation at top of section _____ (feet, meters)

Depth	Thick-ness (Tu)	USCS Classifi-cation	Soil Horiz.	Root quantity and size	Color	Moist	Plasti-city	Cohe-sive	Clasts	Structure	Lower contact	Interpretation	Angle	Consis-tency	Cu	Cu x Tu
ΣT =			Σ Root density =									ΣA =		Σ (Cu x Tu) =		

3.5 Total and Bankfull Bank Consistency Rating

Total bank height / Bankfull Height (ΣT / Bkf Ht) _____
Overall thickness of exposure above bankfull _____ ft
Root Depth / Total Bank Height _____
Weighted Root Density (ΣR / ΣT) _____%
Overall weighted bank angle (ΣA / ΣT) _____º
Bank angle up to bankfull height _____º

Weighted Consistency Rating (WCR = Σ(Cu x Tu)/ΣT) _____
Modified Weighted Consistency Rating (MCR) _____

3.6 Documentation

Samples: Number, unit, date on each container
Photographs: Roll _____ Frames _____

3.7 Discussion

Interpretation and age of adjacent landforms_____

_____

_____

Cause of slope failure_____

_____

_____

Comments _____

Phase 3 – Quality Assurance Data Sheet

Stream Name:_____ Watershed: _____ Date:_____
QA Team Leader: _____ Organization /Agency: _____
ANR Team Leader: _____

Check one or more boxes to indicate the types of ANR sponsored training received by one or more members of your assessment team		
	Field Survey	
	Data Analysis	
	QA	

Phase 1 data used to conduct geomorphic assessment of Phase 3 site	
Phase 2 Rapid Assessment completed on the Phase 3 Survey site	
ANR SGA Handbook Protocols, Spreadsheet, and Database used exclusively	
Other protocols used:	

Phase 3 Step Number	Tool Used to Collect Data	Equipment Calibration Date	Confidence Level	Date Completed	Date Updated	Date of QA Officer Review	Date of State QA Review	Comments
Step 1			Low to Moderate Moderate Moderate to High High					
Step 2			Low to Moderate Moderate Moderate to High High					
Step 3			Low to Moderate Moderate Moderate to High High					
Step 4			Low to Moderate Moderate Moderate to High High					
Step 5			Low to Moderate Moderate Moderate to High High					
Step 6			Low to Moderate Moderate Moderate to High High					
Step 7			Low to Moderate Moderate Moderate to High High					