# Vermont Stream Geomorphic Assessment

# Appendix A

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

**Vermont Agency of Natural Resources**
**May, 2009**

# Vermont Stream Geomorphic Assessment

# Appendix A - Phase 1 Data Sheets

Phase 1 Data Sheets for Steps 1 - 9

Phase 1 Quality Assurance Sheet

**Data Sheet 1**

# Phase 1 - Step 1. Reach Locations

Stream Name: (DMS)_____ Watershed: (DMS)_____ Date:_____
USGS Map Name(s): _____ Organization /Agency: (DMS)_____
Observers: (DMS)_____

**Indicate the tools and materials used to collect data in the shaded box at the bottom of each data column.**

| **Reach No. (SGAT)** | **1.1 Reach Description** | **1.2 Town** | **1.3 Upstream End of Reach** Latitude/Longitude **(SGAT)** | | **Downstream End of Reach** Latitude/Longitude **(SGAT)** | |
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# Phase 1 - Step 2. Reference Stream Types

**Data Sheet 2**

| Reach No. (SGAT) | 2.1 Elevation (ENTER INTO STEP 10 OF SGAT) | | | 2.2 Valley Length (feet) (SGAT) | 2.3 Valley Slope (%) (DMS) | 2.4 Channel Length (feet) (SGAT) | 2.5 Channel Slope (%) (DMS) | 2.6 Sinuosity (DMS) | 2.7 Watershed Size (Sq. Mi.) (SGAT) | 2.8 Channel Width (feet) (DMS) | 2.9 Valley Width (feet) (SGAT) | 2.10 Confinement (Can be manually entered into | | 2.11 Stream Type | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Up | Down | Gentle Gradient | | | | | | | | | Ratio (DMS) | Type (DMS) | Letter | Bed Material |
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**Data Sheet 3**

# Phase 1 - Step 3. Basin Characteristics - Geology and Soils

| Reach No. (SGAT) | 3.1 Alluvial Fan (Y / N) | 3.2 Grade Controls (menu) | 3.3 Geologic Materials (SGAT) | | | 3.4 Valley Side Slopes | | 3.5 Soil Properties (menus) (SGAT) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dominant | % Dom | Sub-Dominant | Right | Left | Hydro Group | % Hydro | Flooding | % Flood | Water Table: Deep | % | Water Table: Shallow | % | Erod-ibility | % Erod |
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**Data Sheet 4**

# Phase 1 - Step 4. Land Cover - Reach Hydrology

| Reach No. (SGAT) | 4.1 Watershed Land Cover / Use (Menu) | | | | | | 4.2 Corridor Land Cover / Use (Menu) | | | | | | 4.3 Riparian Buffers (Menu) (DMS) | | | 4.4 Ground Water Inputs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Historic | Current (SGAT) Dom | % Dom | Sub-Dom | % Urban Crop | Impact H / L / NS (DMS) | Historic | Current (SGAT) Dom | % Dom | Sub-Dom | % Urban Crop | Impact H / L / NS (DMS) | RB | LB | Impact H / L / NS | High/Low/ None |
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**Data Sheet 5**

# Phase 1 - Step 5. Instream Channel Modifications

| Reach No. (SGAT) | 5.1 Flow Regulation (FIT) (Menu) | | 5.2 Bridges – Culverts (FIT) | | | 5.3 Bank Armoring (FIT) (Menu) | | | | 5.4 Channel Straightening (FIT) (Menu) | | | | 5.5 Dredging History (FIT) (Menu) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Type/Size/Use | Impact H / L / NS | Length (feet) (FIT) | % Impact (DMS) | Impact H / L / NS (DMS) | Type (FIT) | Length (FIT) | % Impact (DMS) | Impact H / L / NS (DMS) | Type (FIT) | Length (FIT) | % Impact (DMS) | Impact H / L / NS (DMS) | Type | Impact H / L / NS |
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# Phase 1 - Step 6. Floodplain Modifications and Planform Changes

**Data Sheet 6**

| Reach No. (SGAT) | 6.1 Berms & Roads (RIT) | | | 6.2 River Corridor Development | | | 6.3 Depositional Features | | 6.4 Meander Migration | | 6.5 Meander Width Ratio (B/Wbkf) | | | 6.6 Wavelength Ratio (Lm/Wbkf) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | One Bank (FIT) | Both Banks (DMS) | % & Impact H / L / NS | One Bank (feet) (FIT) | Both Banks (feet) (FIT) | % & Impact H / L / NS (DMS) | Type | Impact H / L / NS | Type | Impact H / L / NS | Belt Width | MW Ratio | Impact H / L / NS (DMS) | Wave Length | WL Ratio | Impact H / L / NS (DMS) |
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**Data Sheet 7**

# Phase 1 - Step 7. Bed and Bank Windshield Survey

| Reach No. (SGAT) | 7.1 Bank Erosion / Bank Height | | | 7.2 Ice & Debris Jam Potential | | Comments |
|---|---|---|---|---|---|---|
| | Erosion (H /L /N) | Bank Height (H /M /L) | Impact H / L / NS | Type (Menu) | Impact H / L / NS | |
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**Data Sheet 8**

# Phase 1 - Step 8. Stream And Watershed Impact Rating

| | | | | | | | | 8.1 (DMS) | | | | | | | | | | 8.2 | 8.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Reach No.** | **Stream Type** | **4.1 Watershed Land Use / Cover** | **4.2 Corridor Land Use / Cover** | **4.3 Riparian Buffer Width** | **5.1 Flow Regulation / Withdrawals** | **5.2 Bridges and Culverts** | **5.3 Bank Armoring / Revetments** | **5.4 Channel Straightening** | **5.5 Dredging / Gravel Mining** | **6.1 Berms, Roads, Railroads, Paths** | **6.2 Floodplain Developments** | **6.3 Depositional Features** | **6.4 Meander Migration** | **6.5 Meander Width Ratio** | **6.6 Wavelength Ratio** | **7.1 Bank Erosion / Bank Height** | **7.2 Ice / Debris Jam Potential** | **Total Impact Score** | **Priority Ranking** |
| | | | | | | | | | | | | | | | | | | | |
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**Data Sheet 9**

# Phase 1 - Step 9. Geomorphic Condition Evaluation

| Reach No. | Stream Type | 9.1 Channel Adjustment Process | | 9.2 Reach Condition (DMS) | 9.3 Reach Sensitivity 9.4 (DMS) |
|---|---|---|---|---|---|
| | | **Adjustment** (DMS) | **Concurrent Adjustment** (DMS) | | |
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# Phase 1 – Quality Assurance Report

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. | **Phase 1** | |
| | **SGAT** | |
| | **QA** | |

| | |
|---|---|
| Windshield Orientation Survey completed | |
| Reach Breaks reviewed by trained team member for consistency | |
| ANR SGA Handbook Protocols and Database used exclusively | |
| Other protocols used: | |

| Phase 1 Step Number | Tool Used to Collect Data | Confidence Level | Date Completed | Date Updated | Date of Local QA Team Review | Date of State QA Team Review | Comments |
|---|---|---|---|---|---|---|---|
| **Step 1** | | Low to Moderate<br>Moderate<br>Moderate to High<br>High | | | | | |
| **Step 2** | | Low to Moderate<br>Moderate<br>Moderate to High<br>High | | | | | |
| **Step 3** | | Low to Moderate<br>Moderate<br>Moderate to High<br>High | | | | | |
| **Step 4** | | Low to Moderate<br>Moderate<br>Moderate to High<br>High | | | | | |
| **Step 5** | | Low to Moderate<br>Moderate<br>Moderate to High<br>High | | | | | |
| **Step 6** | | Low to Moderate<br>Moderate<br>Moderate to High<br>High | | | | | |
| **Step 7** | | Low to Moderate<br>Moderate<br>Moderate to High<br>High | | | | | |
| **Step 8 / 9** | | Low to Moderate<br>Moderate<br>Moderate to High<br>High | | | | | |

# Phase 1 – Meta Data Documentation

Stream Name: (DMS)_____ Watershed: (DMS)_____ Date:_____

| Step | Parameter Name | Meta Data Options (Circle One) |
|---|---|---|
| 0.1 | Reach breaks | 1:24K topos |
| | | 1:24K topos, 1:5K NHD |
| 0.2 | Watershed delineations | 1:24K DEM |
| | | 1:24K topos, 1:5K NHD |
| | | 1:5K DEM |
| 0.3 | Valley walls | 1:24K topos |
| | | 1:24K topos, SG data |
| | | 1:24K topos, SG data, field obs. |
| | | 1:24K topos, SG data, field - GPS |
| 0.4 | Meander centerline | 1:24K topos, 1:5K NHD |
| 1.2 | Towns that reaches are in | 1:24K topos |
| | | SGAT automated |
| 1.3 | Latitude and Longitude | SGAT automated |
| 2.01 | Downstream and upstream elevations | 1:24K topos |
| 2.02 | Valley length | SGAT automated |
| | | 1:24K topos |
| | | 1:24K topos & 1:5K orthos |
| 2.04 | Channel length | SGAT automated |
| | | Field - tape measure |
| | | Field - GPS |
| | | Field - survey |
| 2.08 | Channel width | HGC - SGAT Automated |
| | | Field - range finder |
| | | Field - tape measure |
| | | Field - survey |

| Step | Parameter Name | Meta Data Options (Circle One) |
|---|---|---|
| 2.09 | Valley width | SGAT automated |
| | | 1:24K topos |
| | | Field - range finder |
| | | Field - tape measure |
| 2.10 | Confinement type | 1:24K topos |
| | | 1:24K topos, SG data |
| | | Field observation |
| | | Field - tape measure |
| 2.11 | Stream type | 1:24K topos |
| | | Field observation |
| | | Cross-sections, pebble counts |
| | | Profile, cross-sections, pebble counts |
| 3.1 | Alluvial fan | 1:24K topos |
| | | 1:24K topos, SG data |
| | | 1:24K topos, SG data, geologic studies |
| | | 1:24K topos, field obs. |
| 3.2 | Grade controls | 1:24K topos |
| | | 1:24K topos, bedrock map |
| | | 1:24K topos, bedrock map, dam inventories |
| | | 1:24K topos, field obs. |
| 3.4 | Valley side slopes | 1:24K topos |
| | | 1:24K topos, soils slope data |
| | | 1:24K topos, field obs. |
| 3.5 | Corridor soil data | NRCS soil survey maps |
| 4.1 | Historic watershed land use - land cover | 1:5K orthos (1970s) |
| | | 1:5K orthos (1970s), old aerial photos, topos |
| | | Land use - land cover (1990s statewide) |
| 4.2 | Historic corridor land use - land cover | 1:5K orthos (1970s) |
| | | 1:5K orthos (1970s), old aerial photos, topos |
| | | Land use - land cover (1990s statewide) |
| | | Digitial corridor land use - land cover |

| Step | Parameter Name | Meta Data Options (Circle One) |
|---|---|---|
| 4.3 | Riparian buffer width | 1:5K orthos |
| | | Digitial corridor land use - land cover |
| | | 1:5K orthos, recent coverages & photos, field obs. |
| 4.4 | Groundwater and small tributary inputs | 1:24K topos, 1:5K NHD |
| | | 1:24K topos, 1:5K NHD, NWI maps |
| | | 1:5K NHD, NWI maps, field obs. |
| 5.1 | Flow regulations and water withdrawals | 1;24K topos, 1:5K NHD & orthos |
| | | 1;24K topos, 1:5K NHD & orthos, files |
| | | 1;24K topos, 1:5K NHD & orthos, files, field obs. |
| 5.2 | Bridges and culverts | 1;24K topos, 1:5K NHD & orthos |
| | | 1;24K topos, 1:5K NHD & orthos, files |
| | | 1;24K topos, 1:5K NHD & orthos, files, field obs. |
| 5.3 | Bank armoring and revetments | 1;24K topos & orthos |
| | | 1;24K topos, orthos, files |
| | | 1;24K topos, orthos, files, field obs. |
| 5.4 | Channel straightening | 1;24K topos, 1:5K NHD & orthos |
| | | 1;24K topos, 1:5K NHD & orthos, files |
| | | 1;24K topos, 1:5K NHD & orthos, files, field obs. |
| 5.5 | Dredging and gravel mining history | Interviews - DEC, NRCS |
| | | Interviews - DEC, NRCS, Towns, others |
| 6.1 | Berms and roads | 1:24K topos, 1:5K orthos |
| | | 1:24K topos, 1:5K orthos, files |
| | | 1:24K topos, 1:5K orthos, files, field obs |
| 6.2 | River corridor development | 1:24K topos, 1:5K orthos |
| | | 1:24K topos, 1:5K orthos, files |
| | | 1:24K topos, 1:5K orthos, files, field obs |
| 6.3 | Depositional features | 1:5K orthos |
| | | 1:5K orthos, other aerial photos |
| | | 1:5K orthos, field obs. |
| 6.4 | Meander migration and channel avulsion | 1:5K orthos (1990s & 1970s) |
| | | 1:5K orthos (1990s & 1970s), other aerial photos |
| | | 1:5K orthos (1990s & 1970s), field obs. |

| Step | Parameter Name | Meta Data Options (Circle One) |
|---|---|---|
| 6.5 | Belt Width | 1:5K NHM, 1:5K orthos |
| | | Field - survey |
| 6.6 | Wavelength | 1:5K NHM, 1:5K orthos |
| | | Field - survey |
| 7.1 | Dominant bed form and material | Preliminary estimate |
| | | Field obs. at access point along reach |
| | | Field obs. along entire reach |
| | | Field obs. and detailed notes along entire reach |
| 7.2 | Bank erosion - relative magnitude | Field obs. at access point along reach |
| | | Field obs. along entire reach |
| | | Field obs. and detailed notes along entire reach |
| 7.3 | Debris and ice jam potential | Field obs. at access point along reach |
| | | Field obs. along entire reach |
| | | Field obs. and detailed notes along entire reach |

## Phase 1 Task Register 2005

Watershed: _____ Date:_____
Organization /Agency: _____

| Participant Contact Information | | | |
|---|---|---|---|
| **Name (and Agency /Group)** | **Telephone** | **E-Mail** | **Mailing Address** |
| | | | |
| | | | |
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| Task to get started **(complete on a paper map first)** | | | | |
|---|---|---|---|---|
| **Task** | **Person completing task** | **Schedule** | **Comments** | **Approx time** |
| Reach Break identification | | | | |
| Watershed delineation (reach sub-watershed delineation) | | | | |
| Reach Numbering | | | | |

| **Generate Arcview Themes needed to use SGAT:** See attached Phase 1 task document for details | | | | |
|---|---|---|---|---|
| **Task** | **Person completing task** | **Schedule** | **Comments** | **Approx time** |
| 1) Watersheds, | | | | |
| 2) Meander Centerline, | | | | |
| 3) Valley Walls | | | | |
| ***Upload Themes into DMS for QA review*** | | | | |

| SGAT and Database Creation | | | | |
|---|---|---|---|---|
| **Phase 1 steps completed in full or part by SGAT:** 1.3; 2.1, 2.2; 2.3; 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 3.3, 3.5, 4.1, 4.2 (see attached document for details) | | | | |
| **Task** | **Person completing task** | **Schedule** | **Comments** | **Approx time** |
| Run SGAT steps 1-10 | | | | |
| Review reach data in step 10; enter elevations; missing valley lengths and widths; towns, orthos; topos, notes | | | | |
| Export Step 10 table | | | | |
| Run SGAT steps 11-14 for soils and lulc **(see note below)** | | | | |
| Parameters clipped in SGAT steps 11-14 for soils and lulc; with Appendix E corridor created in SGAT and/or Watersheds created by user | | | | |
| **Task / Phase 1 step #** | **Person completing task** | **Schedule** | **Comments** | **Approx time** |
| 3.3 – Geologic Material | | | | |
| 3.5 – Soils Characteristics | | | | |
| 4.1 Watershed LuLc | | | | |
| 4.2 – Corridor LuLc (this may be more accurate to do with orthophotographs) | | | | |
| • ***Import tables from SGAT into DMS*** ***Run QA check for each table*** | | | | |
| To assist in steps outside of SGAT it can be useful to print out the reports, for each step and/or the "Data Entry Worksheet", from the database. This will give the user tables with reach numbers in place for completion of the step. If using the "Data Entry Worksheet" simply fill in the step & parameters being collected at the head of each column. | | | | |

| Steps done without SGAT or SGAT corridor delineation (use Appendix A worksheets to record the data) | | | | |
|---|---|---|---|---|
| **Task / Phase 1 step #** | **Person completing task** | **Schedule** | **Comments** | **Approx time** |
| 1.1– Reach Description | | | | |
| 1.2 – Town | | | | |
| 2.11 – Stream Type (steps 2.3 and 2.10 must be completed first) | | | | |
| ***DMS – QA step to be completed*** | | | | |
| 3.1 – Alluvial Fan | | | | |
| 3.2 – Grade Controls | | | | |
| 3.4 – Valley Side Slope | | | | |
| 4.3 – Riparian Buffer Width | | | | |
| 4.4 – Groundwater and Small Tributary Input | | | | |
| For several parameters in Steps 5-7 it will be necessary to create, and/or modify current, GIS shapefiles. Steps 5.1, 5.3, 5.4, 6.1, 6.2, 6.5, 6.6, 7.2. The type of GIS layer suggested will be noted below, in the step. The Feature Indexing Tool (FIT) is required for steps 5.3, 5.4 and 6.1 (see attached document for details) | | | | |
| 5.1 – Flow Regulations (FIT – point theme) | | | | |
| 5.2 – Bridges (FIT –line theme) | | | | |
| 5.3 – Bank Revetments (FIT – line theme) | | | | |
| 5.4 – Channel Modifications (FIT- line theme) | | | | |
| 5.5 – Dredging and Gravel Mining | | | | |
| Steps 6.1 & 6.2 are done with Appendix E corridor ( created by SGAT) and orthophotographs (use Appendix A worksheets to record the data) | | | | |
| 6.1 – Berms, Roads, Railroads, and Improved Paths (FIT – line theme) | | | | |
| 6.2 – River Corridor Development (FIT – line theme) | | | | |

| Con't - Steps done without SGAT or SGAT corridor delineation (use Appendix A worksheets to record the data) | | | | |
|---|---|---|---|---|
| **Task / Phase 1 step #** | **Person completing task** | **Schedule** | **Comments** | **Approx time** |
| 6.3 – Channel Bars | | | | |
| 6.4 – Meander Migration | | | | |
| 6.5 – Meander Width Ratio (GIS – line theme) | | | | |
| 6.6 – Wavelength Ratio (GIS – line theme) | | | | |
| 7.1 – Dominant Bed Material | | | | |
| 7.2 – Bank Erosion (FIT – line theme) | | | | |
| 7.3 – Debris and Ice Jam Potential | | | | |
| ***DMS – QA step to be completed*** | | | | |
| 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 | | | | |

# Phase 1 Tasks 2005

**It is very valuable, and recommended, to take the time to mark all reach breaks, draw all watersheds (reach sub-watersheds, as well as the overall watershed), and to label/number all reaches on a paper map before starting on the computer. This will provide a working map and will help those members of the team who may be completing steps not done on the computer.**

*** See protocols for details on collecting the data for all steps.**

## Task to get started

1) Reach Break identification
2) Watershed delineation (reach sub-watershed delineation)
3) Reach Numbering

## Step done totally or in part by SGAT:

*** Use the SGAT user manual for working through the program. Use the Phase 1 assessment handbook protocols for understanding and evaluating the information for each step listed below.**

**The user must generate 3 ArcView themes;**

1) **Watersheds,**
2) **Meander Centerline, and**
3) **Valley Walls**

*** The user will also need the 1:5000 stream layer, digital NRCS soils maps, and the digital State-wide Land-use/Land-cover for their area/watershed (data can be obtained from VCGI's web site or by contacting them for a CD).**

***1.3*** *– Latitude/Longitude*

- Completed for all reaches by SGAT

***2.1*** *– Elevation*

- User enters elevation, off the topographic map, for each reach point in Step 10 of SGAT)
- **Note:** If the user is unable to distinguish an elevation for the reach break, due to a long reach in a very low slope valley where there are no contour lines crossing the valley, the user may find it difficult to interpolate an elevation. For those reaches where no elevation change is distinguishable on the topographic map, the user can check (on the data sheet and in the database, not in SGAT) the "Gentle Gradient" descriptor for valley and channel slope.

***2.2*** *– Valley Length*

- Completed by SGAT for reaches where valley wall polygon has been drawn {those reaches that are in Narrow, Broad, or Very Broad valleys}; for reaches in Semi-confined and Narrow-confined valleys, the user must measure the valley length and enter the data in Step 10 of SGAT)

***2.3*** *– Valley Slope*

- Calculated by SGAT for reaches where valley length and reach elevations have either been generated by SGAT or entered by the user in Step 10 of SGAT.

***2.4****-Channel Length*

- Completed for all reaches by SGAT

***2.5*** *– Channel Slope*

- Calculated for all reaches by SGAT once elevations have been entered in SGAT Step 10

***2.6** – Sinuosity*

- Calculated for reaches where valley length is provided by either SGAT or entered by the user in SGAT Step 10.

***2.7** – Watershed Size*

- Calculated for all reaches by SGAT

***2.8** – Channel Width*

- Calculated, by SGAT, for all reaches

***2.9** – Valley Width*

- Calculated, by SGAT, for only those reaches where a valley wall polygon has been drawn {typically, those reaches that are in Narrow, Broad, or Very Broad valleys}; the user may choose not to measure confined valley widths due to the inability to discern valley toes on the topographic map, so this parameter may be left blank for confined valleys. If the user measures a confined valley width ,the data can be entered in SGAT Step 10.

***2.10** – Confinement*

- The confinement ratio will be calculated for those reaches where a valley wall polygon has been drawn {those reaches that are in Narrow, Broad, or Very Broad valleys}; if the user entered a valley width for a confined valley in SGAT Step10 then a ratio will be calculated by SGAT. The user will then choose a confinement type in the Phase 1-2 database. For those confined valleys, where no valley wall lines were drawn, use confinement type "1-SC" (semi-confined) as a default choice unless you are aware that the valley is "V" shaped and the stream is narrowly confined, then choose 1-NC.

* SGAT will generate the Appendix E corridor (see Phase 1 handbook for details on the corridor used to determine the information for the following steps)

***3.3** – Geologic Materials*

- Complete steps 11, 12, and 14 in SGAT

***3.5** – Soils Characteristics*

- Complete steps 11, 12, and 14 in SGAT

***4.1** – Watershed Land Cover / Land Use*

- Complete steps 11, 12, **13** and 14 in SGAT

***4.2** – Corridor Land Cover / Land Use*

- Complete steps 11, 12, and 14 in SGAT
-
- **Note: The State-wide LuLc layer is not very accurate at the corridor level. If you have a more detailed LuLc layer (that has the same categories as the State-wide, but has been done for your area more recently) you can clip that layer for your corridor information. Otherwise it is recommended that you get this information from the current orhtophotographs and the windshield orientation survey. (Overlay the corridor generated in SGAT on the orhtophotograph and look for the LuLc that is within the corriodor.)**

Steps 3.3, 3.5, 4.1 and 4.2: **SGAT will clip and sum the information from the NRCS soils data and/or the state-wide Land-use/Land-cover layer. Importing the tables into the DMS will calculate the corrected percents and impact scores for these steps.**

## Steps that will be completed once the Appendix E corridor has been created (by SGAT or by hand if not using SGAT)

3.3 –Geologic Material (see SGAT above)
3.5 – Soils Characteristics (see SGAT above)
4.2 – Corridor Land-use/Land-cover (see SGAT above)

6.1 – Berms, Roads, Railroads, and Improved Paths
6.2 – River Corridor Development

## Steps that can be done without assistance from SGAT or SGAT corridor delineations:

- Review of orthophotos and topographic maps can be done on the computer, but the paper copies will also be okay for completing these steps, so members of your team who are not computer savvy can work on these tasks while other people do the computer work.
- For all reaches, Complete the Appendix A worksheets for each step. Have a QAQC meeting to review the data before entering it into the database.

| Step 1 | Step 2 | Step 3 | Step 4 | Step 5 | Step 6 | Step 7 | Step 8 | Step 9 | Step 10 |
|---|---|---|---|---|---|---|---|---|---|
| **1.1**- Reach Description<br><br>**1.2** – Town | *** 2.11** – Stream Type | **3.1** – Alluvial Fan<br><br>**3.4** – Valley Side Slope | *** 4.3** – Riparian Buffer Width<br><br>**4.4** – Groundwater and Small Tributary Input | **5.1** – Flow Regulations<br><br>**5.2** – Bridges<br><br>**5.3** – Bank Revetments<br><br>**5.4** – Channel Modifications<br><br>**5.5** – Dredging and Gravel Mining | **6.3** – Channel Bars<br><br>**6.4** – Meander Migration<br><br>**6.5** – Meander Width Ratio<br><br>**6.6** – Wavelength Ratio | **7.1** – Dominant Bed Material<br><br>**7.2** – Bank Erosion<br><br>**7.3** – Debris and Ice Jam Potential | **8.1** – Impact Rating<br><br>**8.2** – Priority Rating | **9.1**- Channel Adjustment Process<br><br>**9.2**- Reach Condition<br><br>**9.3**- Reach Sensitivity | **10** - Like Reach Evaluation |

* 2.11 – Stream Type

(To complete the stream type for each reach, data from steps 2.3 and 2.10 must be completed first; additional information from steps 7.1 may also be used for a more detailed stream type; but is not necessary for the initial stream type classification, if step 7.1 has not been completed).

* 4.3 – Riparian Buffer Width

**(If this is done on the computer, it can be useful to have the various buffer widths displayed, such aa 100 ft "buffer"; polygon created for the stream layer, then overlay it on the orthophoto to help with quickly determining the buffer widths within each category.) When using the centerline, it is more accurate to create the buffer widths based on the equation (channel width / 2) + X ; where channel width comes from SGAT step 8 and X is the widths (25, 50, and 100)**

## Create the following GIS layers that correspond to Steps 5-7.

- **Step 5.1 Flow Modifications**- identify water withdrawal sites, dams and other features that modify flow (point theme).
- **Step 5.3 Bank Armoring**- locate areas of bank protection (line theme). (**RIT)**
- **Step 5.4 Channel Modification**- document sections of channel that have been modified (line theme). (**RIT)**
- **Step 6.1 Berms and Roads**- identify roads, berms and railroads within stream corridor (line theme). (**RIT)**
- **Ste6 6.2- River Corridor Development**- utilizing 911 site data, locate structures within the river corridor (point theme).
- **Step 6.5 and Step 6.6 Meander Width and Length**- record how and which meanders were measured (line theme).
- **Step 7.2 Bank Erosion**- identify areas of stream bank erosion (line theme).

**These GIS layers will be used in the QAQC process, documenting the length and location of the parameter, and identifying where parameters were assessed. These layers are also very valuable for mapping and display purposes.**

## QAQC Review :

- Review of data collected by QAQC team
- Complete QA steps as required in DMS (shapefiles, SGAT tables, after Step 2, and after step 7)
- Document any questions, concerns, missing data, etc.
- Complete QAQC form for watershed

## Database:

* Entering data for all steps

**Note:** The reach number and VTID, as well as notes and other information from SGAT step 0.0; and from SGAT for steps : 1.3, 2.1, 2.2, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10; can be imported into the database automatically. Also information from SGAT for Steps: 3.3, 3.5, 4.1, and 4.2 is automatically imported into the DMS.

Information from RIT for steps 5.3, 5.4, 6.1 is automatically uploaded.

## Bridge and Culvert Survey:

- Contact town highway department, RPC, and utilize VCGIs' bridge/culvert layer to determine structure numbers (where available)
- Complete Phase ANR Bridge/Culvert Survey
- Enter data into DMS