



Rapid Assessment of Stream Conditions Along Length (RASCAL) Protocol

Overview:

The RASCAL procedure; Rapid Assessment of Stream Conditions Along Length, has been modified from the NRCS Stream Visual Assessment Procedure (SVAP) to assess in-stream and near-stream environments of Iowa's streams and rivers. The RASCAL procedure and its results are intended to assist watershed groups in identifying priority areas for targeted conservation practices in and near streams and rivers.

The RASCAL data collection procedure has been developed to function as an easy to use application for use with ESRI's ArcPad software and most GPS units running Windows Mobile operating system. Custom scripts were written and attached to toolbar buttons that simplify many tasks in ArcPad. For example, by pressing the Point of Interest button a script will load the necessary data layer(s), activate the GPS, ensure the GPS is receiving an adequate signal, add a point feature to the data set, and launch a data entry form; all at the click of one button. The simple data entry forms ask surveyors to evaluate in and nearby stream environments and answer a few simple questions about the conditions in the stream or river. For example, surveyors are asked to note stream substrate, pool frequency, canopy cover, bank type, bank height, neighboring land cover, livestock access, and more. (See pages 3-5) Point features such as tile outlets, storm sewer outlets, stream crossings, severe bank erosion, and trash piles should also GPS'ed and evaluated. (See page 5)

Survey Procedure:

Before the field survey is conducted project staff should contact landowners and request permission for the survey to take place on their property. (See page 6-7 for sample letter and return postcard) Once landowner permission has been granted or denied a planning map should be developed that outlines which stream segments will be assessed. Generally, surveyors should be able to assess 3 miles of stream per day. If volunteers will be assisting with the assessment they should be contacted and informed which days they will be needed and what to expect. The following equipment should be necessary to conduct the survey:

-Digital camera

-Blaze orange vest

-Waders (If necessary)

-Cell phone

-Copy of letter sent to landowners

-Copy of this document












Stream or river assessments should be conducted on foot or if possible, in boat or canoe. Surveyors should assess surface water by walking downstream, usually starting at the highest point of perennial flow and ending at a confluence or watershed boundary. Collecting data points using the GPS and entering stream assessment information into data entry forms is the basis of the survey. Stream assessment data should be collected when any of the following observations occur:

1. Change in Livestock Access
 2. Change in Substrate
 3. Change in Bank Stability
- or every 750' (approximately 200 walking steps or every 2 minutes)

Table 1. Changes in stream conditions that warrant an assessment.

GPS Usage:

Tool Descriptions:

- | | |
|---|--|
|  Add Stream Assessment |  Add Layer to Map |
|  Add Point of Interest |  View Layers Currently in Map |
|  Add Photo Point |  Center Map to Current Location |
|  Activate/Deactivate GPS |  Zoom In |
|  Find GPS |  Zoom Out |
|  Exit ArcPad | |


Data Collection:

Step 1: Turn on GPS by pressing green power button. To conserve power the GPS is configured to enter Suspend Mode when it has been idle for 5 minutes, to start the GPS from Suspend Mode press the green power button.

Step 2: Touch “Start” then touch ArcPad 7.0. Arc Pad will open, with no data loaded. If you wish to have load background data for your watershed use the Add Layer button to do so.

Step 3: Data Collection

Stream Assessment: Start the assessment by walking downstream, when you notice a change in stream condition (*see page 1, table 1*) use the pen to tap the Add Stream Assessment button. The first time any of the assessment buttons are pressed the system will automatically load the necessary data and activate the GPS; this may take a minute or two. When the GPS is first activated you will see a screen saying the GPS is being activated, please wait until the GPS is active and then press the requested button again. It is very important to only collect data when the GPS is receiving an active signal, the location marker on the screen will signify the GPS status.

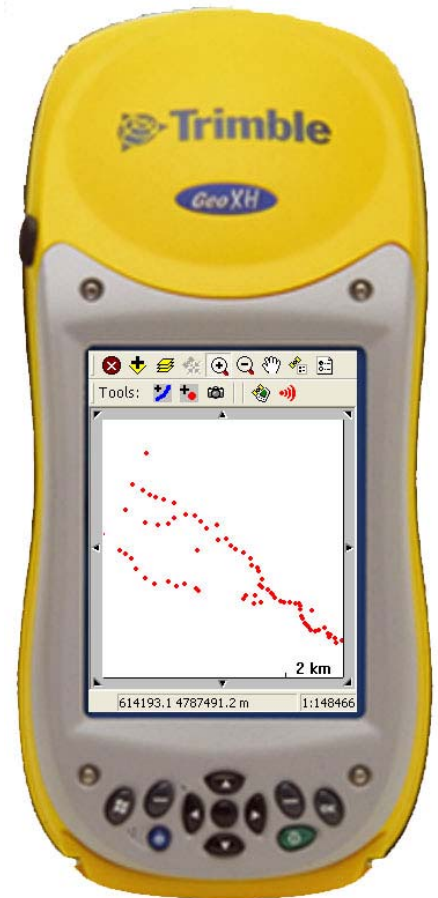
 **Receiving an active signal, okay to survey.** This arrow may point in any direction. If it is flickering **NO** but has the arrow most of the time it is okay to survey.

NO Not receiving an up-to-date signal, not okay to survey. In you are not receiving an active signal press the Activate/Deactivate GPS button twice to update GPS signal.

Points of Interest: To collect Points of Interest locations make sure the GPS is receiving an active signal then press the Add Point of Interest button.

Photo Locations: Surveyors are urged to take digital photos of stream conditions and points of interest. Make sure the GPS is receiving an active signal then use the Add Photo Point button to add a data point for the location of the picture. The associated data entry form will ask for a photo ID, refer to your digital camera for the photo number.

Step 4: When finished surveying for the day or during a long break, exit ArcPad and press the green power button to turn off the GPS unit. Place the GPS on the charger overnight to ensure that it is fully charged for the next days work.



Stream Assessment Variables:

Flow: The volume of water carried by a stream, relative to average, at the time of assessment.

Low Flow	Normal Flow	High Flow	No Flow
Water levels are below normal, dry or drought conditions are occurring in the watershed.	Water levels appear to be at normal levels, no recent rains have significantly impacted water levels.	Water levels are above normal, recent rain or melt-water has raised water levels.	Stream bed is dry, could be a result of extreme drought or karst geology causing streams to disappear or flow underground.

Stream Habitat Type:

Riffle	Run	Pool/Glide	Pond	Dry Channel
Shallow, broken water, fast moving, usually with coarse substrate.	Shallow or deep moving water, surface is not broken, higher velocity than Pool/Glide.	Deeper water area, surface is not broken, velocity is slow, often times an area of deposition.	Section of stream that is impounded by natural or unnatural causes.	Dry segment of stream with no flow of water.

Dominant Substrate: The dominant material that forms the bed of the stream segment.

Bedrock	Boulder	Cobble	Gravel	Sand	Clay/Hard Pan	Silt/Mud
Bedrock substrate occurs when streams flow directly on bedrock; often large flat limestone slabs indicate bedrock is present.	Boulder substrate is characterized by the presence of rocks larger than cobbles but do not form bedrock.	Cobble substrate is characterized by rock ranging in size from 1" in diameter to 10." Cobble can be picked up with one hand.	Gravel substrate characterized by rock smaller than 2' in diameter and larger than sand particles.	Sand substrate is fine rocky material than does not include silt or soil particles.	Hardened soil layer, typically found where streambed erosion has exposed a compacted soil layer, often times clay.	Fine particles of soil.

Channel Condition:

Natural Channel	Past Channel Alteration	Altered Channel
No dikes or artificial structures are present limiting flow of floodwaters also stream has not been straightened.	Channel exhibits signs of dikes or structures but significant stream recovery has taken places to allow for some natural stream migration and flooding.	Stream shows evident signs of alteration, for example, straitening, dikes, levees, etc.

Pool Frequency: Pools are defined as areas of slow moving water with depths greater than three feet.

None	< 1 Pool Every 250'	> 1 Pool Every 250'	Frequent Pools
No pools deeper than 3' are present.	Infrequent pools. Less than one pool deeper than 3' can be found per 250' of stream.	Some pools. More than one pool deeper than 3' can be found per 250' of stream.	Frequent pools deeper than 3' are evident.

Canopy Cover: Percent of stream channel area shaded or covered by vegetation during full leaf-on conditions.

0-10%	10-25%	25-50%	50-75%	75-100%
0-10% of stream segment is shaded or covered by overhead vegetation growth.	10-25% of stream segment is shaded or covered by overhead vegetation growth.	25-50% of stream segment is shaded or covered by overhead vegetation growth.	50-75% of stream segment is shaded or covered by overhead vegetation growth.	75-100% of stream segment is shaded or covered by overhead vegetation growth.

Embeddedness: Degree to which large particles (boulders, cobble, gravel) are surrounded or covered by silt or fine sediment.

Completely Exposed	Partially Exposed	Mostly Embedded	Completely Embedded	NA
Rocky substrate is free of silt or fine sediment.	Some silt or fine sediment is starting fill spaces between rocky substrate.	Spaces between rocky sediment are mostly filled with silt or fine sediment.	Rocky substrate is completely surrounded by or covered with silt or fine sediment.	Stream substrate is composed of sand, silt or mud therefore embeddedness is not an issue.

In-Stream Habitat: Examples of in-stream habitat include logs, fallen trees, backwater pools, deep pools, overhanging vegetation, riffles, floating leaf matter, aquatic vegetation, root mats, undercut banks, etc.

Excellent	Average	Poor
Many examples of in-stream habitat exist; aquatic species (insects and fish) are present. This type of segment appears significantly better than other segments surveyed.	Some examples of in-stream habitat are present.	Very few to no examples of in-stream habitat exist in stream segment. Few fish or aquatic insects are present. This type of segment appears worse than other segments surveyed.

Losing Flow: Primarily a function of karst geology, losing flow is characterized by stream segments losing flow to cracks in bedrock or stream sinks.

Yes	No
Stream segment loses some or all of its flow to cracks in bedrock or stream sinks. Normally occurs only in karst regions.	Stream segment does not lose flow.

Riparian Zone Width: The width of the transition zone between the water and the upland zone, typically the width of natural vegetation (trees or grass).

<10 Feet	10-30 Feet	30-60 Feet	>60 Feet
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Riparian Zone Cover: Land cover in the transition zone between the water and the upland zone.

Grass	Mixed Grass/Trees	Trees
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Adjacent Land Use: Land cover in the upland areas outside the riparian zone.

Row Crop	Trees	Grass	Pasture	CRP	Residential	Commercial	Farmstead	Cliff	Other
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Livestock Access: Specifies livestock accessibility to stream segment.

Yes	No
Livestock have unrestricted access to the stream segment being assessed.	Livestock do not have access to the stream segment.

Percent Bare Bank: This characterizes the percent of stream bank area that is void of vegetation or other material that acts to stabilize soil.

0-20%	20-40%	40-60%	60-80%	80-100%
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Stream Bank Height: The distance in feet from the bottom of the stream channel to the top of the stream bank (not necessarily the high water mark).

Stream Bank Stability: This characterizes the stability of the banks and reflects the degree to which the bank is laterally eroding.

Stable	Moderately Stable	Moderately Unstable	Unstable	Artificially Stable
Banks are protected by natural vegetation and are not showing signs of lateral erosion.	Banks are mostly protected by natural vegetation; the bank is showing some signs of minor erosion.	Natural vegetation is not protecting major portions of the stream, outside banks are showing signs of erosion, some signs of trees and/or vegetation falling into stream segment.	Some straight reaches and inside bends are actively eroding as well as outside bends, trees and vegetation has fallen into stream, little to no natural vegetation is protecting the bank.	Bank has been stabilized by the placement of rip-rap or other stabilizing material.

Stream Bank Material: This defines the dominant material that makes up both stream banks.

Rock/Rip Rap	Cobble/Gravel	Sand	Soil/Silt
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Points of Interest:

Points of Interest mark the location of potential point source pollution impacts to the waterbody as well as general points the surveyor wishes to inventory. The following list should be used as guidance; if a point of interest type is not in the list please use the “Other” category and the comments field to describe the location.

Bank Erosion	Manure
Beaver Dam	Metal/Cars
Boating Access	Nick Point
Bridge	Seep
Concrete/Rock Waste	Sinkhole
Confluence	Spring
Construction Activity	Storm Sewer
Culvert	Stream Sink
Dam/Barrier	Stream Xing (Animal)
Dead Animal	Stream Xing (Mach.)
Dead Fish	Suspicious Activity
Drainage Ditch	Tile Outlet
Drums/Barrels	Trash- Other
Fence Across Stream	Unknown
Gully Minor	Wastewater
Gully Severe	Other

(Print on District Letterhead)

(name)
(address)

You are receiving this letter because our records indicate you own land adjacent to (name of water body).

As part of our continued commitment to conservation, the (county) Soil & Water Conservation District is trying to secure additional cost share dollars to assist producers apply additional conservation practices in the (name of water body) watershed (please refer to the enclosed map). However, before any additional funds can be secured, the local sponsors need to complete a detailed assessment of the watershed in order to further our understanding of the on-going processes impacting soil erosion and water quality.

As part of this assessment, we would like your permission to complete a walking inventory of the stream corridor in order to gain first hand knowledge of the existing conditions along the stream. A partial list of the data we plan to collect is the degree of existing vegetative cover in an area 200 feet on either side of the stream, the relative stability of the streambanks, and is the stream bottom comprised of silt or gravel, to name a few. Collecting such data is critical in furthering our basic understanding of the overall water quality health of the (name of water body) watershed.

Please read and select your preference to this request on the enclosed postcard and return it to us by (deadline date). If we hear nothing back by that date, we will attempt to call you. With your permission, we expect to complete the inventory sometime between (indicate timeframe).

Please remember, your approval is voluntary. If you prefer NOT to participate or grant us access, please indicate as such on the enclosed pre-paid postcard and mail it back to at your earliest convenience. It is important to note, the (County) Soil & Water Conservation District requires all staff or anyone working on our behalf to respect private property.

Please contact the (County) Soil & Water Conservation District office at (SWCD Office number) if you have any questions or concerns regarding the assessment.

Sincerely,

(County) Soil & Water Conservation District Chairperson

Postcard Information

Side 1:

Include the address of the SWCD office. If at all possible, the return address should be that of the landowner, so we can tell who responded.

Side 2:

Use something like the following:

In regards to the (County) Soil & Water Conservation District's request to access my property as part of the (water body) watershed assessment, I choose the following option:

_____ You have my permission to access my property during the timeframe indicated.

_____ You have my permission, but would prefer you call to set up an appointment so I can be present.

_____ You have my permission, but I will be unable to attend. Please call to set up an appointment to complete the assessment with my designate, who is: _____

_____ You do NOT have my permission to access my property at this time.