

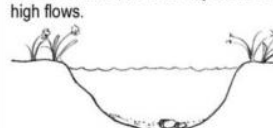


# #1 EPIFAUNAL SUBSTRATE: What types of submerged materials are on the channel bottom?

Habitat Parameter	Excellent -----Poor			
<b>1. Epifaunal Substrate</b>	<p><b>Abundant stable</b> habitat cover for colonization by macroinvertebrates and fish: submerged roots, woody and vegetative debris, cobbles, leaf packs and undercut banks.</p> 	<p><b>Adequate stable</b> habitat cover for colonization by macroinvertebrates and fish: submerged roots, woody and vegetative debris, cobbles, leaf packs and undercut banks.</p> 	<p><b>Little or no stable</b> habitat cover available for colonization by macroinvertebrates and fish: submerged roots, woody and vegetative debris, cobbles, leaf packs and undercut banks; habitat may move during high flows.</p> 	What did you see?
<b>What types of submerged materials are on the channel bottom?</b>	10 9 8 7	6 5 4 3	2 1 0	Score <input type="text"/>



**What to Look for:** This parameter looks at the amount of habitat or cover available for critters such as macroinvertebrates and fish living in the water. It looks at the quantity and variety of natural materials in the channel including submerged roots, woody and vegetative debris, cobbles, leaf packs and undercut banks.



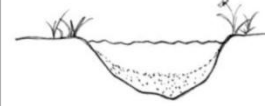
**Why is it Important?** These types of available cover provide refuges as well as breeding and feeding grounds for aquatic life. An abundance and variety of habitat can support a diversity of organisms and also provide for more stability following a disturbance such as flooding.

**How to Score this Parameter:** Rated on a scale from 0-10, choose a value that reflects the variety and abundance of habitat materials present ranging from 'little to abundant' such as submerged roots, woody and vegetative debris, cobbles, leaf packs and undercut banks.

## Definition of Terms

- EPIFAUNAL SUBSTRATE:** The organic and inorganic material that is available within the stream for organisms to live in or on. Otherwise known as 'available cover.'

## #2 EMBEDDEDNESS: Are fine sediments being deposited in the riffle/run area? (Score for ROCKY BOTTOM streams only)

Habitat Parameter	Excellent -----Poor			
<b>2. Embeddedness</b>	Gravel and cobble are <b>slightly</b> embedded in riffle area.	Gravel and cobble are <b>partially</b> embedded in riffle area.	Gravel and cobble are <b>completely</b> embedded in riffle area.	What did you see?
* For ROCKY BOTTOM streams only				
Are fine sediments being deposited in riffle/run area?	10 9 8 7	6 5 4 3	2 1 0	Score <input type="text"/>



**What to Look for:** This is a measure of how much the bottom substrate materials (cobbles, boulders and other rock) are surrounded and covered by fine sediment (silt and sand). The more the bottom is covered in silt and sand, the more embedded it is. This parameter is only to be scored if evaluating rocky bottom streams and in an area where riffles are a natural feature.

**Why is it Important?** Embeddedness tells us if there is enough suitable habitat available for aquatic life including macroinvertebrates, fish and amphibians. Generally, as cobbles and gravel become embedded, the surface area available to these critters for shelter, spawning and egg incubation decreases.

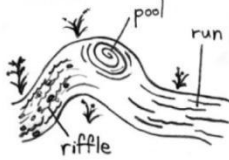


**How to Score this Parameter:** Rated on a scale from 0-10, choose a value that reflects the degree to which cobble and gravel are embedded ranging from 'slightly to completely.' Evaluate this parameter by picking up gravel or cobble out of the streambed with your fingertips, and estimating what percentage of the particle was buried. Observations should be taken in the upstream and central portions of riffles.

### Definition of Terms

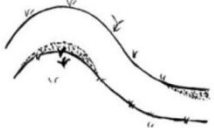
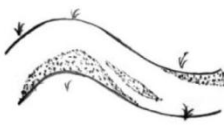
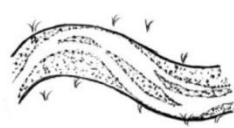
- **EMBEDDEDNESS:** The amount of silt and sand that surrounds and covers the gravel and cobbles found in a stream.
- **RIFFLE:** A shallow section in a stream where water is breaking over rocks, cobble, wood or other substrate in the streambed causing surface agitation.



### #3 RIFFLE/RUN/POOL: Is a diversity of instream habitats available: riffle, runs and pools?

Habitat Parameter	Excellent -----Poor										
3. Riffle/Run/Pool	Yes, all <b>three (3)</b> habitat types (riffle, run, pool) are present and frequent.			Two (2) habitat types are present.			Only <b>one (1)</b> habitat type present and dominant.			What did you see?	
Is a diversity of instream habitats available: riffle, runs and pools?											
	10	9	8	7	6	5	4	3	2	1	0
											Score

## #4 SEDIMENT DEPOSITION: Are point bars and islands present?

Habitat Parameter	Excellent -----Poor			
<b>4. Sediment Deposition</b>	Point bars and islands <b>stable</b> and of small size and frequency with some vegetation. Composed mostly of gravel and cobble.	Point bars and islands <b>less stable</b> and of moderate size and frequency with some sparse vegetation. Composed mostly of some gravel and finer sediment.	Point bars and islands <b>unstable</b> and of a large size with little or no vegetation. Composed almost entirely of fine sediment.	What did you see?
<b>Are point bars and islands present?</b>				
	10 9 8 7	6 5 4	3 2 1 0	Score <input type="text"/>



**What to Look for:** This parameter relates to the amount of sediment that has gathered in the channel and the changes that have occurred because of sediment deposits. Deposition can cause the formation of islands, point bars, shoals or result in the filling of pools. Sediment typically comes from bank erosion within the stream and watershed as a result of land disturbance.

**Why is it Important?** Deposition of sediments naturally occurs in slow-low flow sections. High levels of sediment deposition create a dynamic and unstable system, making habitat unsuitable for aquatic life by smothering available cover and lowering oxygen levels. This parameter is a reflection of the stability of the point bars and islands.

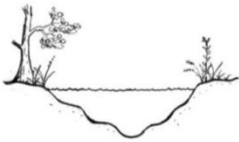


**How to Score this Parameter:** Rated on a scale from 0-10, choose a value that reflects the size and composition, as well as frequency of vegetated islands and point bars in the channel.

### Definition of Terms

- **POINT BARS:** Deposits of sediment on the inside of a meander or bend of stream.
- **VEGETATED ISLANDS:** A small islet or sandbar within a river having a grouping or thicket of trees.



## #5 CHANNEL FLOW STATUS: How much water is in the stream channel?

Habitat Parameter	Excellent -----Poor										
5. Channel Flow Status	Water reaches base of both lower banks; little substrate exposed.			Some substrate is exposed and water partially fills channel.			Most substrate is exposed and very little water in channel.			What did you see?	
How much water is in the stream channel?											
	10	9	8	7	6	5	4	3	2	1	0



**What to Look for:** This is the degree to which the channel is filled with water during base or average annual flow, and how much, if any, of the stream substrate is exposed.




**Why is it Important?** The more water covering available habitat within the substrate, the better for aquatic organisms.

**How to Score this Parameter:** Use the vegetation line on the lower bank as your reference point to estimate channel flow status. Rated on a scale from 0-10, choose a value that reflects the amount of water reaching the base of both banks from 'very little water' to 'reaches both banks,' and look at how much the stream substrate is exposed from 'most to little.'

### Definition of Terms

- SUBSTRATE:** The mineral or organic material that forms the bed (bottom) of a stream.

## #6 CHANNEL ALTERATION: Is the stream channel altered by humans?

Habitat Parameter	Excellent -----Poor										
6. Channel Alteration	No evidence of channelization (straightening) or alterations such as dredging, agriculture, concrete banks or construction activities.			Some evidence of channelization (straightening) and/or alterations such as dredging, agriculture, concrete banks or construction activities.			Most of stream reach channelized and/or many alterations present such as dredging, agriculture, concrete banks or construction activities.			What did you see?	
Is the stream channel altered by humans?											
	10	9	8	7	6	5	4	3	2	1	0



**What to Look for:** This parameter examines changes in sinuosity and if the shape of the channel and/or the instream habitat have been impacted by alterations. Examples of alterations include: riprap, artificial embankments or stabilization structures, impoundments, diversions, straightening or the presence of dams and bridges.

**Why is it Important?** Streams tend to follow a normal and natural meandering pattern. Streams that have been altered typically have fewer natural habitats for aquatic organisms and have an unnatural shape that leads to major differences in energy distribution, structures, and flow regimes.

**How to Score this Parameter:** Rated on a scale from 0-10, choose a value that reflects the occurrence of bends (sinuosity) in the channel ranging from 'most of the stream reach is channelized to no evidence of channelization.' Look for evidence of alterations to score this parameter including: dredging, agriculture, concrete banks or construction activities.

### Definition of Terms

- **CHANNELIZATION:** Straightening of a stream channel.



**#7 CHANNEL SINUOSITY:** Does the channel have lots of curves and bends?  
(Score for MUDDY BOTTOM streams only)

Habitat Parameter	Excellent ..... Poor										
<b>7. Channel Sinuosity</b>											What did you see?
* For MUDDY BOTTOM streams only											
Does the channel have lots of curves and bends?	Yes, bends in the channel are frequent.			There are more bends than straight sections.			There are more straight sections than sections with bends or channel is entirely straight.				
	10	9	8	7	6	5	4	3	2	1	0
											Score <input type="text"/>



**What to Look for:** This parameter is a measure of how much the stream meanders, or its sinuosity. These meanders or bends can be measured using aerial views and maps of the stream channel. This parameter is only to be scored if evaluating muddy bottom streams.

**Why is it Important?** More meanders in a stream provide for a higher diversity of habitat and aquatic critters. The bends absorb energy from higher and faster flows, protecting the stream from excessive flooding and erosion.



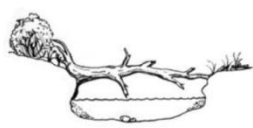
**How to Score this Parameter:** Rated on a scale from 0-10, choose a value that reflects the occurrence of bends in the channel ranging from 'straight sections to frequent bends.'

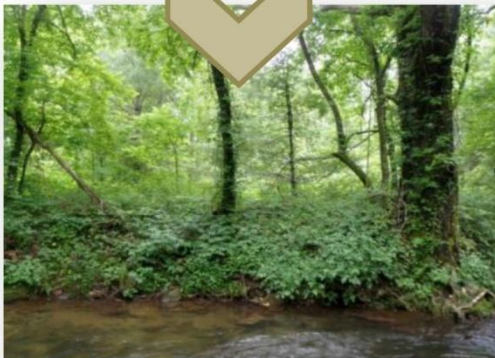
**Definition of Terms**

- **CHANNEL SINUOSITY:** The frequency of bends that occur in a stream.

## #8 BANK STABILITY: How stable are the streambanks?

(Look at both left and right banks)

Habitat Parameter	Excellent ----- -Poor											
8. Bank Stability	<b>Bank stable;</b> erosion, scouring, undercutting or bank failure absent or minimal. Vegetation overhanging the stream is abundant.			<b>Bank moderately stable;</b> evidence of small areas of erosion, undercutting and scouring, or bank failure present. Moderate amounts of overhanging vegetation present.				<b>Bank unstable;</b> many eroded and scoured areas with undercutting; bank failure present; steep banks. Little over hanging vegetation present.				What did you see?
<b>How stable are the streambanks?</b>  Determine right/left bank by facing downstream												
Left bank	5	4.5	4	3.5	3	2.5	2	1.5	1	.5	0	Score (Add both banks)
Right bank	5	4.5	4	3.5	3	2.5	2	1.5	1	.5	0	



**What to Look for:** This parameter is a measure of the potential for soil to detach from the upper and lower streambanks and move into the stream.

**Why is it Important?** Steep banks, considered more unstable, are more likely to collapse from erosion and cause channel widening than gently sloping banks. Eroded banks indicate scarcity of cover and organic inputs to the stream as well as problems with sediment movement and deposition.




**How to Score this Parameter (score each bank separately):** Rate both the left and right banks separately (facing downstream). Rated on a scale from 0-5, choose a value that reflects the stability of each bank from 'unstable to stable.' Are there any of the following signs of erosion: bare exposed soil, crumbling banks, exposed tree roots and undercutting? Combine these scores when finished for a cumulative score ranging from 0-10.

### Definition of Terms

- **UNDERCUTTING:** A type of erosion which occurs when soils are swept away by the action of the stream, especially on the outer banks of curves. The result is an unstable, overhanging bank.



## #9 VEGETATIVE PROTECTION: Are streambanks covered & shaded by a variety of vegetation? (Look at both left and right banks)

Habitat Parameter	Excellent -----Poor											
9. Vegetative Protection												
Are streambanks covered & shaded by a variety of vegetation?	Most streambank surfaces covered and shaded by a <b>large variety</b> of vegetation (trees, shrubs, flowering plants and grasses).			Some streambank surfaces covered and shaded by <b>some variety</b> of vegetation (trees, shrubs, flowering plants and grasses).			Few streambank surfaces covered and shaded by vegetation. <b>Little variety</b> of vegetation. Streambank dominated by one type of vegetation (trees, shrubs, flowering plants and grasses).			What did you see?		
Determine right/left bank by facing downstream										Did you see any nonnative vegetation? Check here if YES <input type="checkbox"/>		
Left bank	5	4.5	4	3.5	3	2.5	2	1.5	1	.5	0	Score (Add both banks)
Right bank	5	4.5	4	3.5	3	2.5	2	1.5	1	.5	0	



**What to Look for:** This is a measure of the amount of vegetation covering the streambanks and the near-stream portion of the riparian zone. It provides information on the ability of the banks to resist erosion.

**Why is it Important?** Banks with full plant growth are more beneficial for aquatic life, as the root systems of plants growing in the streambanks help hold soil in place, control erosion/undercutting, provide shade and habitat, and lessen the amount of runoff coming into the waterway.

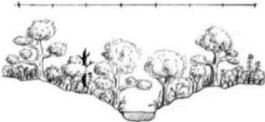
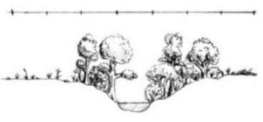
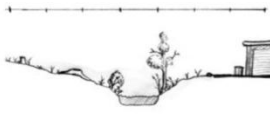
**How to Score this Parameter (score each bank separately):** Rate both the left and right banks separately (facing downstream). Rated on a scale from 0-5, choose a value that reflects the **amount** of streambank surfaces covered by a **variety** of healthy, living vegetation (i.e. trees, shrubs, flowering plants and grasses) from 'few to most' surfaces. Factors to consider when scoring this parameter include the balance of upper/under/lower story cover presence and during which season the assessment is being conducted. Also, please note if any nonnative vegetation is present, if known. You will combine these scores when finished for a cumulative score ranging from 0-10. To learn about nonnative species in the Southeast visit <http://www.invasive.org/eastern/srs>

### Definition of Terms

- **NONNATIVE:** A species living outside its native distributional range, which has arrived there by human activity.
- **UNDERCUTTING:** A type of erosion which occurs when fine sediment are swept away by the action of the stream, especially around curves. The result is an unstable overhanging bank.
- **RIPARIAN VEGETATIVE ZONE:** The vegetated area along the stream channel.



## #10 RIPARIAN VEGETATIVE ZONE WIDTH: What is the amount of buffer available? (Look at both left and right banks)

Habitat Parameter	Excellent -----Poor												
<b>10. Riparian Vegetative Zone Width</b>  <b>What is the amount of buffer available?</b>  Determine right/left bank by facing downstream  Left bank Right bank	Buffer present; a large variety of vegetation extends at least <b>three channel widths</b> on each side.  			Some buffer present; some variety of vegetation extends <b>two to one channel width</b> on each side. Human activities have impacted buffer zone.  			Little or no buffer present; vegetation extends <b>less than one channel width</b> on each side. Human activities substantially impact buffer zone.  					What did you see?  Did you see any nonnative vegetation? Check here if YES <input type="checkbox"/>	<b>Score (Add both banks)</b>
	5	4.5	4	3.5	3	2.5	2	1.5	1	.5	0		
	5	4.5	4	3.5	3	2.5	2	1.5	1	.5	0		



**What to Look for:** This parameter is a measure of the amount of the vegetation from the edge of the streambank into the riparian zone (buffer).

**Why is it Important?** The riparian zone performs many important functions such as removing pollutants from runoff, providing shade to cool the water, controlling erosion by reducing the velocity and volume of runoff and by providing habitat for aquatic life (i.e. organic matter inputs). Depending on the stream size and order, the width of the riparian zone may vary.

**How to Score this Parameter (score each bank separately):** Rate both the left and right banks separately (facing downstream). Rated on a scale from 0-5, choose a value that reflects the width of the riparian zone from 'less than one channel width to at least three channel widths.' Also, please note if any nonnative vegetation is present, if known. You will combine these scores when finished for a cumulative score ranging from 0-10. To learn about nonnative species in the Southeast visit <http://www.invasive.org/eastern/srs>

### Definition of Terms

- **RIPARIAN VEGETATIVE ZONE:** The vegetated area along the stream channel.
- **BUFFER:** A vegetated area near a stream, usually forested, which helps shade and partially protect a stream from the impact of adjacent land uses.
- **NONNATIVE:** A species living outside its native distributional range, which has arrived there by human activity.