

Great Swamp Watershed Association

Protecting the waters of the Passaic River region, from source to sea.



## Great Swamp Watershed Association

Stream Assessment Training – Part 3  
2020

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Director of Water Quality Programs

# Did you ever wonder how healthy the stream is that you like to walk along?

- Welcome to **Part 3** of GSWA's Stream Assessment Training Program
  - Each part of the Assessment Program will cover a section of the NJDEP's Habitat Assessment for High Gradient Streams – download the form on the **GSWA** web site.
  - If you missed PARTS 1 & 2 you can find it on the GSWA web site here: <https://www.greatswamp.org/wp-content/uploads/2020/02/GSWA-Stream-Assessment-Training-Part-1-1.pdf>



In this section we will learn more about stream habitat parameters in **high gradient streams**.



## Let's review what a High Gradient stream is -



- It is a stream with a relatively steep slope over long distance with fast flowing water
- It originates in areas of hilly terrain and usually contains riffles
  - Riffles are areas of fast, shallow water running over rocks
- It is often found in the headwater regions of the stream

# Remember to look at your whole stretch -

- When assessing a stream we choose a 100 meter section.  
(this is about the length of a football field)
- Before starting your assessment, you should walk the whole length of your section so your observations take in all of it



# Page 2 – Habitat parameters 6 - 10

- For each question there are four main categories

- Optimal
- Suboptimal
- Marginal
- Poor

- First, reading each description, decide which category fits your stream reach

- Then decide what number within that category best represents your area

	Optimal	Suboptimal	Marginal	Poor
<b>6. Channel Alteration</b>	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.
<b>SCORE</b>	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
<b>7. Frequency of Riffles</b>	Occurrence of riffles relatively frequent; distance between riffles is 5-7 times stream width; variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles is 7 to 15 times stream width.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles is 15 to 25 times stream width.	Generally all flat water or shallow riffles; poor habitat; distance between riffles is >25 times stream width.
<b>SCORE</b>	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
<b>8. Bank Stability (score each bank)</b> Note: determine left or right side by facing upstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
<b>SCORE (LB)</b>	Left Bank 10 9	8 7 6	5 4 3	2 1 0
<b>SCORE (RB)</b>	Right Bank 10 9	8 7 6	5 4 3	2 1 0
<b>9. Bank Vegetative Protection (score each bank)</b>	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or non-woody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
<b>SCORE (LB)</b>	Left Bank 10 9	8 7 6	5 4 3	2 1 0
<b>SCORE (RB)</b>	Right Bank 10 9	8 7 6	5 4 3	2 1 0
<b>10. Riparian Vegetative Zone Width (score each bank riparian zone)</b>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
<b>SCORE (LB)</b>	Left Bank 10 9	8 7 6	5 4 3	2 1 0
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HABITAT SCORE (1-5)

+

HABITAT SCORE (6-10)

=

TOTAL HABITAT SCORE  
Rating:

HABITAT SCORES	VALUE
OPTIMAL	160 - 200
SUB-OPTIMAL	110 - 159
MARGINAL	60 - 109
POOR	< 60

# Page 2 – Habitat parameters 6 - 10

- For questions 8 – 10
- These questions refer to the areas adjacent to the stream
- You will score the right and left sides of the stream separately

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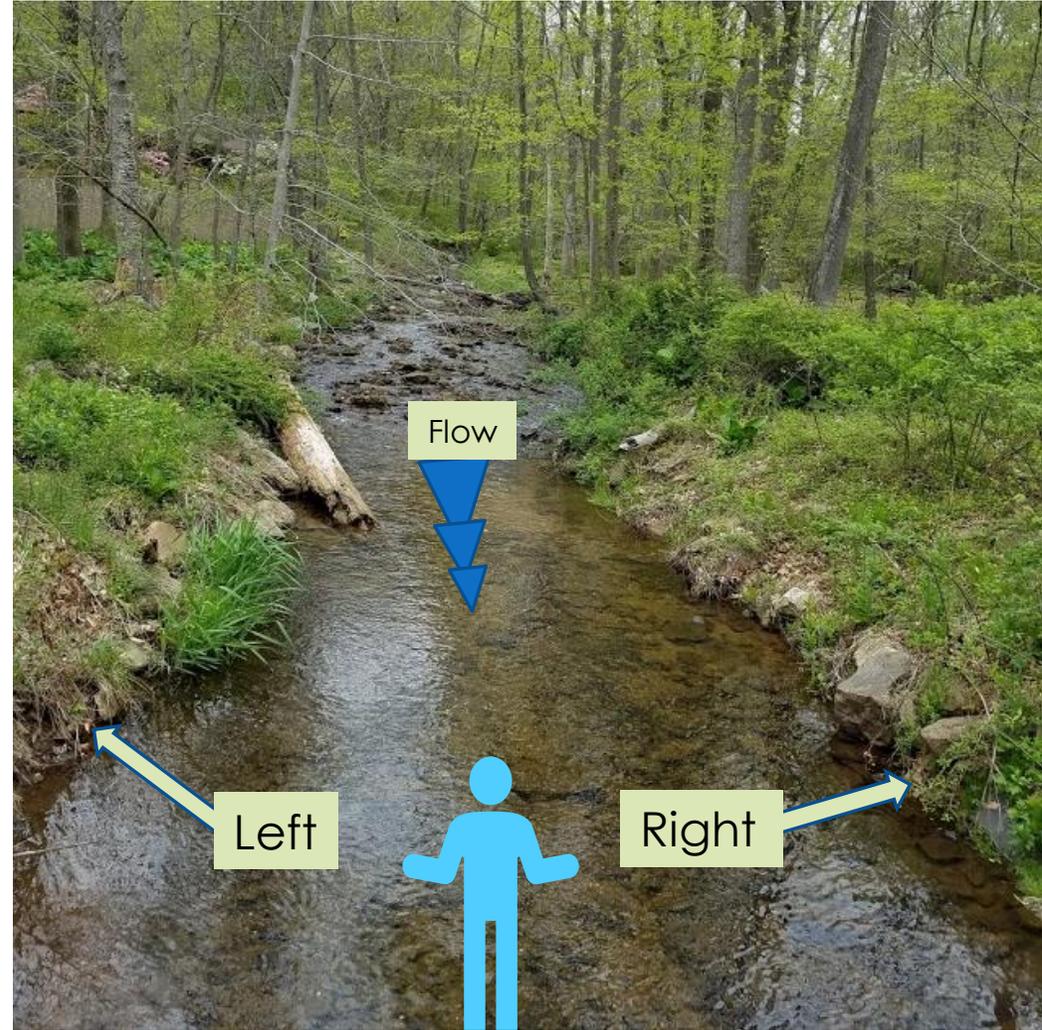
  

HABITAT SCORE (1-5)	+	HABITAT SCORE (6-10)	=	TOTAL HABITAT SCORE
				Rating:

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

- Stand in the stream, or on the stream bank, facing up stream
  - This means that the water is flowing towards you
- The left bank is now on your left
- and the right bank is on your right

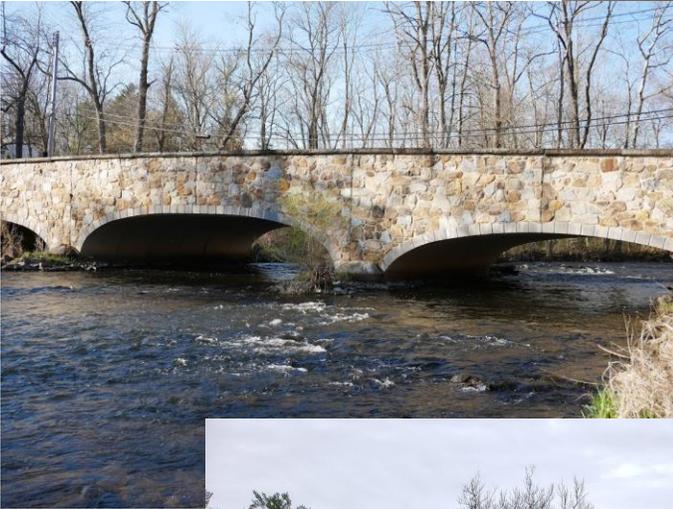


Determining Left bank and right bank

## Question 6 -

# Channel Alteration

- This refers to ways in which humans have altered the flow of water in a stream
- It can include channelizing
  - Ranging from just straightening the stream stretch to fully lining with concrete.
- Bridge culverts
  - Often narrowing streams as they pass under a roadway
- Retaining walls



# Channel Alteration

- Optimal – small foot bridge does not significantly impact stream flow
- Marginal – right bank natural, left bank some suring up, low dam

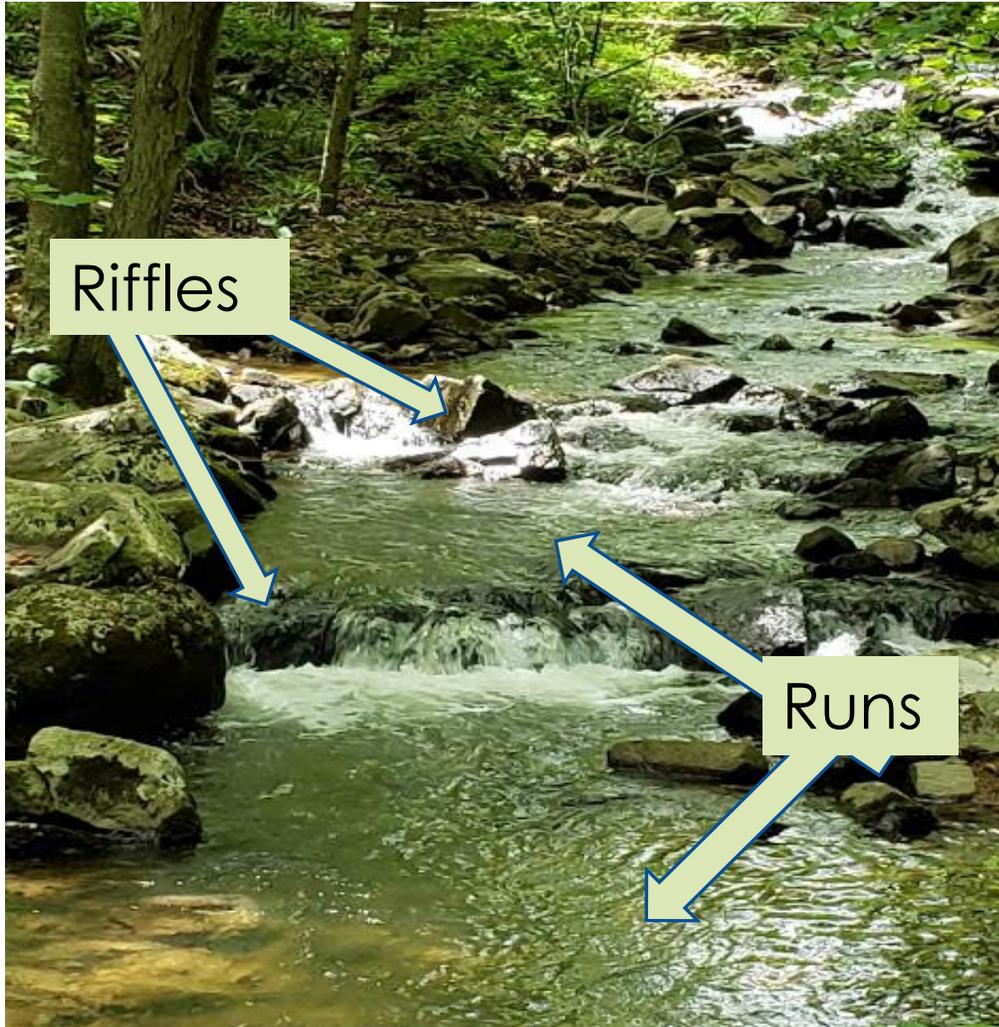


# Riffles

- Riffles are areas in the stream where shallow water runs over rocky areas.
  - Rocks usually range in size from kick ball size to large gravel
- These areas are important habitat for macroinvertebrates
- The bubbles formed as the water runs over the rocks also helps to oxygenate the water.



# Riffles



- The area between riffles is called a run.
- Frequency is measured by approximating the distance between riffles based on the width of the stream.
- In optimal habitat the distance between riffle sections will be less than 5 times the width of the stream
- A mix of riffles and runs provides a variety of habitat and is ideal

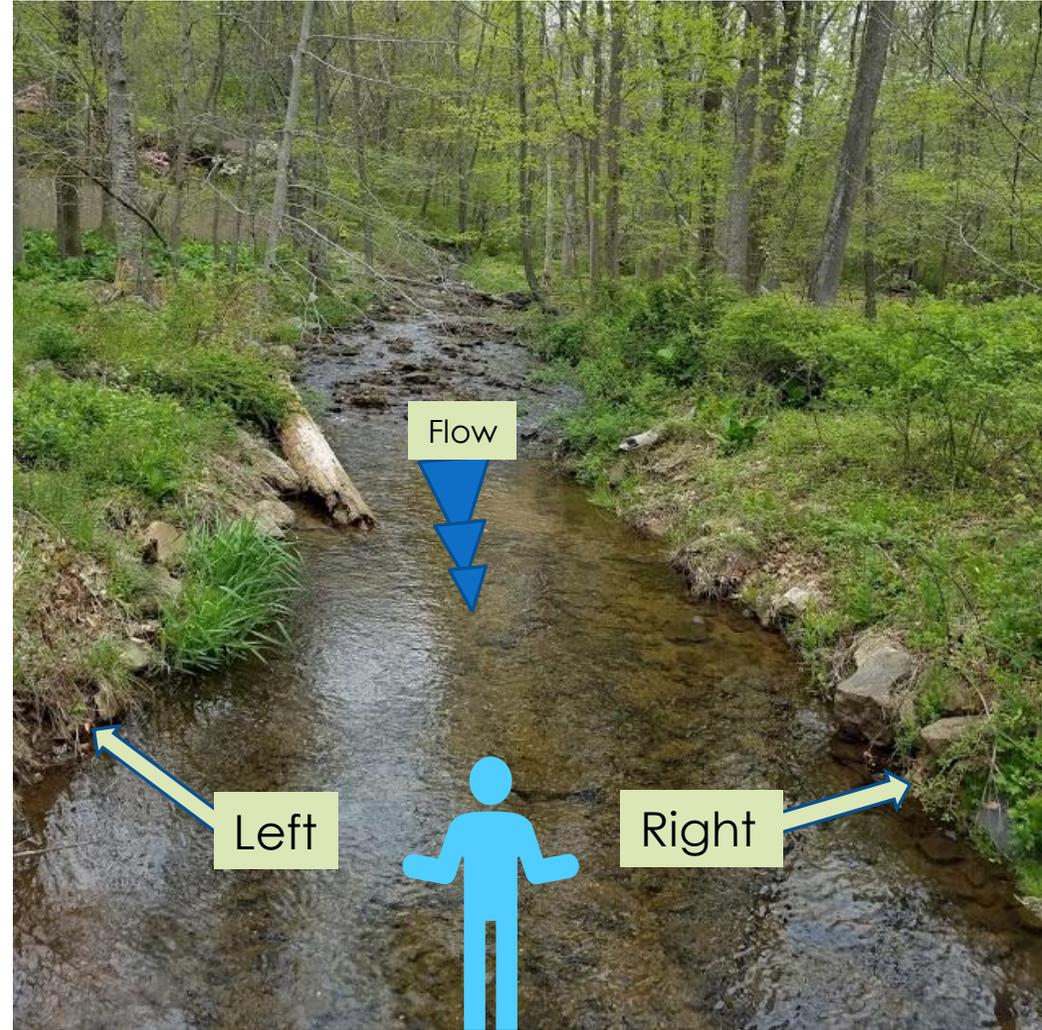
# Measuring Riffles



- First approximate **stream width**
- Then estimate how many “stream widths” between riffles.
- Distance between riffles = Optimal
- These riffles are one stream width apart

## Let's review -

- Stand in the stream, or on the stream bank, facing up stream
  - This means that the water is flowing towards you
- The left bank is now on your left
- and the right bank is on your right



Determining Left bank and right bank

# Bank Stability

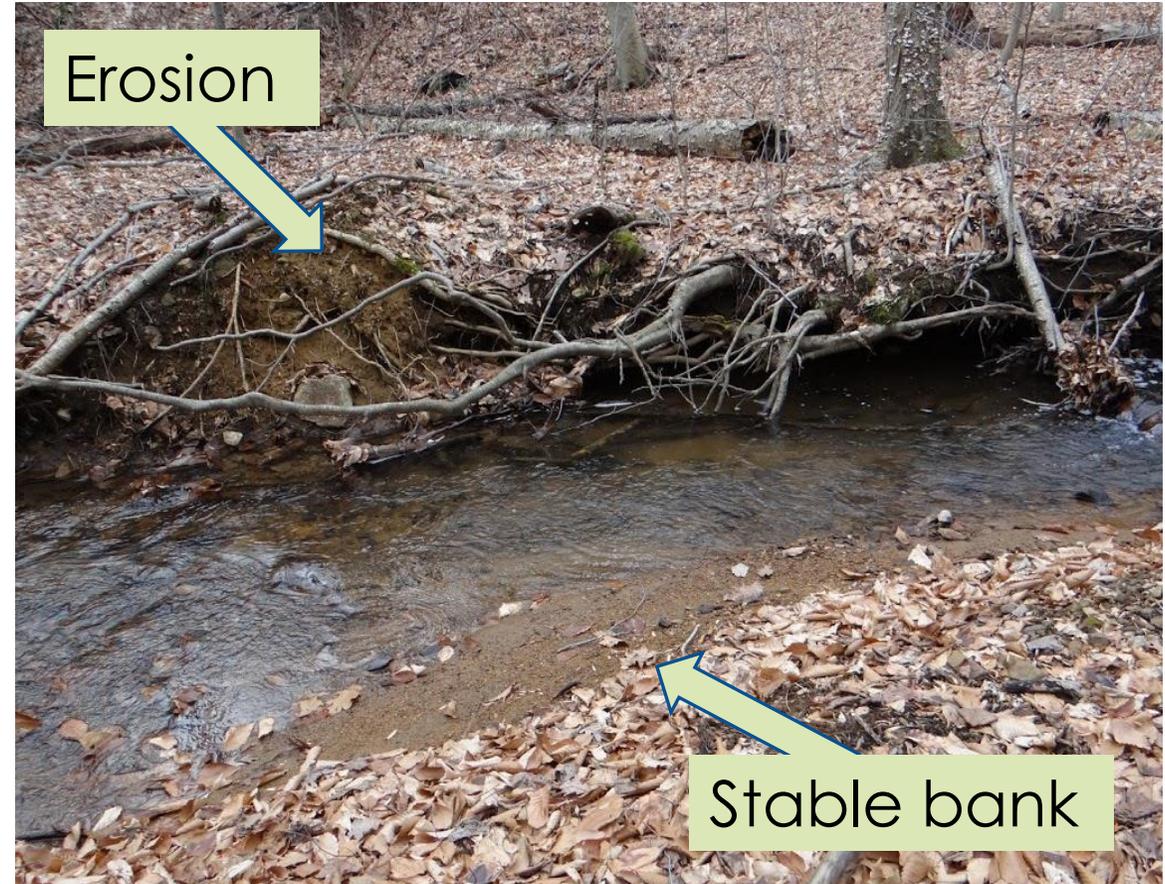
- This refers to the wearing away, or erosion of the stream banks.
- Some bank erosion is part of the natural process, but excessive erosion can impact stream health and habitat
  - This can be caused by heavy rainfalls and flooding brought on by climate change



# Streambank Stability

- Indications of unstable banks are bare soil (often with no vegetation), exposed tree roots and undercut areas
- Different sides of the stream can have very different amounts of erosion.
  - Often the outside of a stream curve will have more erosion than the inside.
  - Remember to consider the entire stream length when determining the amount of erosion

- Left bank – poor
- Right bank – optimal



# Bank Vegetative Protection



Immediate bank area

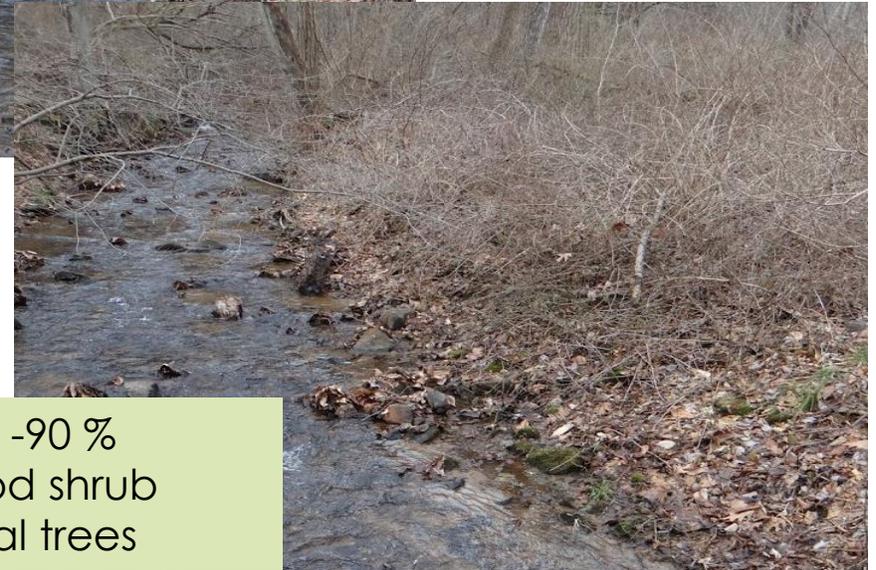
- Vegetation can help prevent erosion
- The riparian zone is the area of land adjacent to the river
- This question addresses the immediate stream bank
  - Trees, shrubs and herbaceous plants that have their roots growing in the bank of the stream

# Bank Vegetative Protection

- Even in the winter you can get some idea of the amount of vegetative cover
- While this question asks specifically about native vegetation, the important factor is diversity of vegetation.
  - A mix of shrubs, trees and herbaceous plants will offer the best stabilizing as well as the best habitat diversity



Poor – less than 50% coverage – no shrubs



Suboptimal – 70 -90 % coverage – good shrub layer but minimal trees

# Riparian Vegetative Zone Width



- The width of the vegetated area along a stream has a direct impact on the water quality
  - The wider the area the better the rainwater runoff can be filtered through the stems and roots of the vegetation before reaching the stream making it cleaner
- The measurement is from the edge of the water away from the stream

# Riparian Vegetative Zone Width

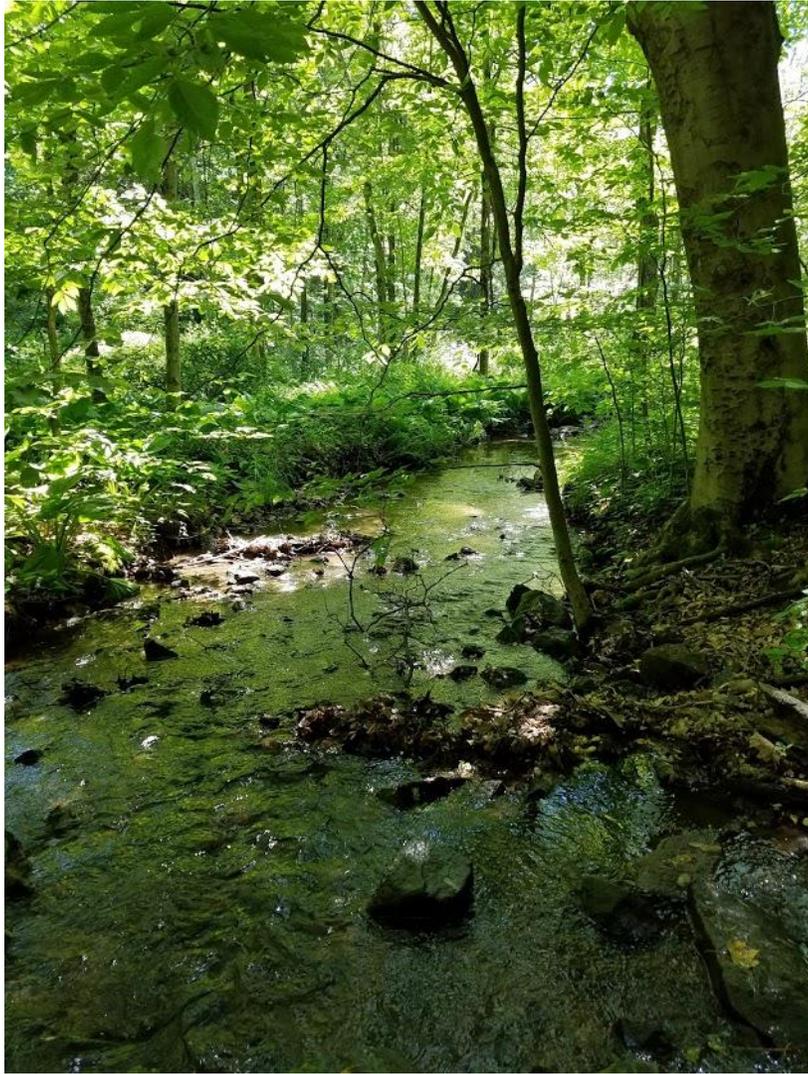
- Below the right bank falls in the optimal category with no human activity within 18 meters (about 60 feet)
- The left bank falls in the marginal category with a road and houses with 6 – 12 meters (40 feet)



## Remember when heading out to your site -

- When you are ready to head out to your stream site for your assessment remember these important rules
  - No trespassing – stay on public property
  - Be cautious – don't go into areas that aren't safe
  - Watch out for poison ivy – leaves of three let it be
- Always bring a friend – never go out alone





GSWA thanks you  
for looking out for  
your streams!

For more information about your  
local water quality and what you can do  
to protect it head over to the GSWA web  
site at: [www.greatswamp.org](http://www.greatswamp.org)