Stream Habitat Assessment Procedure

Bureau of Assessment and Restoration Support
Standards and Assessment Section

Why do habitat assessment?

- Part of designing a SCI sampling strategy for a given site
- Determine if physical conditions are conducive (or not) for a passing SCI
- Distinguish between water quality vs. habitat impairment for failing SCI

DEP SOPs FT 3000, 3001, and 3100.

- Read associated SOPs.
- Have SOPs available for reference.
  - http://www.dep.state.fl.us/water/sas/sop/index.htm
- Gather all field forms before sampling.
  - http://www.dep.state.fl.us/water/sas/qa/forms.htm
- Select site(s) based upon project goals before sampling.

Optimal → Poor

20 points 1 point

Habitat Categories

- Optimal: 121-160
- Suboptimal: 81-120
- Marginal: 41- 80
- Poor: 0 - 40

DEP-SOP-001/01: Form FD 9000-5

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION

STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

SUBMITTING AGENCY CODE: SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (MM/DD/YY):	RECEIVING BODY OF WATER:
REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity ____	Four or more major productive habitats present [snags, tree roots, aquatic vegetation, leaf packs (partially decayed), rock] 20 19 18 17 16	Three major productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) 15 14 13 12 11	Two major productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 8 7 6	One or less major productive habitat. Lack of habitat is obvious, substrates unstable or smothered 5 4 3 2 1
Substrate Availability ____	Greater than 30% major productive habitat present at site 20 19 18 17 16	16% to 30% major productive habitat, by aerial extent 15 14 13 12 11	6% to 15% major productive habitat 10 9 8 7 6	Less than 5% major productive habitat 5 4 3 2 1
Water Velocity ____	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec ≥0.33 0.31 0.29 0.27 >0.25 20 19 18 17 16	Max. observed at typical transect: >0.1 to 0.25 m/sec 0.25 0.21 0.17 0.13 >0.1 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 0.1 0.09 0.07 0.06 0.05 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec <0.05 0.04 0.03 0.01 <0.01 5 4 3 2 1
Habitat Smothering ____ Primary Score ____	Adequate number of stable pools (1-2 per 12 times width) and <25% of habitats affected by sand, silt, or algae. 20 19 18 17 16	Adequate number of stable pools (1-2 per 12 times width) and >25% of habitats affected by sand, silt, or algae. 15 14 13 12 11	Does not have required number of stable pools (1-2 per 12 x width) and/or has shallow pools (<2 x prevailing depth). 10 9 8 7 6	Stable pools are absent. Most habitats affected by sand, silt, or algae accumulation. 5 4 3 2 1
Secondary Habitat Components Artificial Channelization ____	Expected sinuosity given the stream width. No evidence of dredging or artificial straightening. No spoil banks. 20 19 18 17 16	Good sinuosity within old channelized area. Evidence of dredging in the past (>25 yrs) but mostly recovered. 15 14 13 12 11	Straightened with trapezoidal cross section, but has a small degree of sinuosity developed within channelized area. 10 9 8 7 6	Straightened or engineered by dredging, has trapezoidal or box cut cross section, lacks required pools. May have spoil banks. 5 4 3 2 1
Bank Stability Right Bank ____ Left Bank ____	Bankfull > 60% of bank height. Slope of bank ≤ 60° from bankful to top of bank. Bankfull is within or above the root zone with few raw, eroded areas. 10 9	Only meets 2 of the 3 requirements for optimal bank stability. 8 7 6	Only meets 1 of the 3 requirements for optimal bank stability. 5 4	Bankfull < 60% of bank height. Slope of bank > 60°. Bankfull is below the root zone with raw, eroded areas. 3 2 1
Riparian Buffer Zone Width Right Bank ____ Left Bank ____	Width of vegetation greater than 18 m 10 9	Width of vegetation >12 to 18m 8 7 6	Width of vegetation 6 to 12 m. human activities close to system 5 4	Less than 6 m of buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank ____ Left Bank ____ Secondary Score ____	Over 80% of riparian surfaces consist of normal, expected plant community for given sunlight & habitat conditions (e.g., native plants; tree, shrub, and forks represented, if appropriate). Minimal disturbance. 10 9	>50% to 80% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Some disruption in community observed. 8 7 6	25% to 50% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). 3 2 1

TOTAL SCORE _____

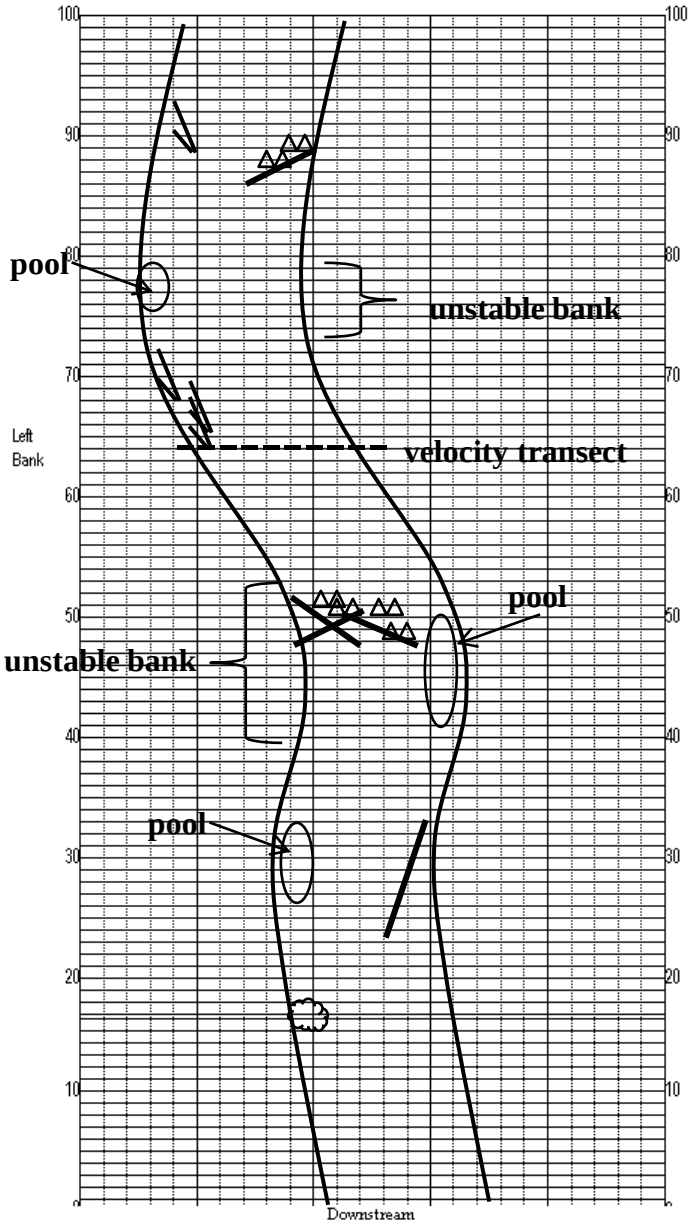
Date:	Analyst:	Signature:

Form FD 9000-5 Revision Date: December 19, 2011

Site Map/Habitat Sketch

- Begin downstream (0 m).
- Measure and mark (with flags/flagging tape) every 10 m, moving upstream, note:
  - Shape of stream channel
  - Location and type of habitat (draw proportionately).
    - Only draw habitats that are worthy of sampling; do not count areas that are too deep to reach or are unproductive.
  - Areas of bank instability.
  - Number of pools.
  - Areas of sand & silt smothering.
  - Riparian zone features
    - Note where width is < 18 m, occurrence of exotic vegetation, etc.

DEP-SOP-001/01 Form FD 9000-4
Stream/River Habitat Sketch Sheet



Location: **Popeye Creek**
Date: **October 14, 2011**
Sampler: **Jeraldo Mendoza**

100 m: Latitude	
Longitude	
0 m: Latitude	
Longitude	

Substrates: Code key, draw proportionate habitat abundance. %

	Snags	
XXX	Roots/undercut banks	
	Leaf Packs (or mats)	
	Aquatic Macrophytes	
	Pools	total # observed = ____ # range expected = ____

Average width **6** m
Average depth **0.4** m

Velocity measured at ____ meter mark.

WQ & chemistry taken at ____ meter mark.

Habitat Smothering:
Note areas (on map) where sand or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetation is altered or eliminated.

Plants observed / other notes:

Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).

Revision Date: June 2, 2011

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Substrate Diversity

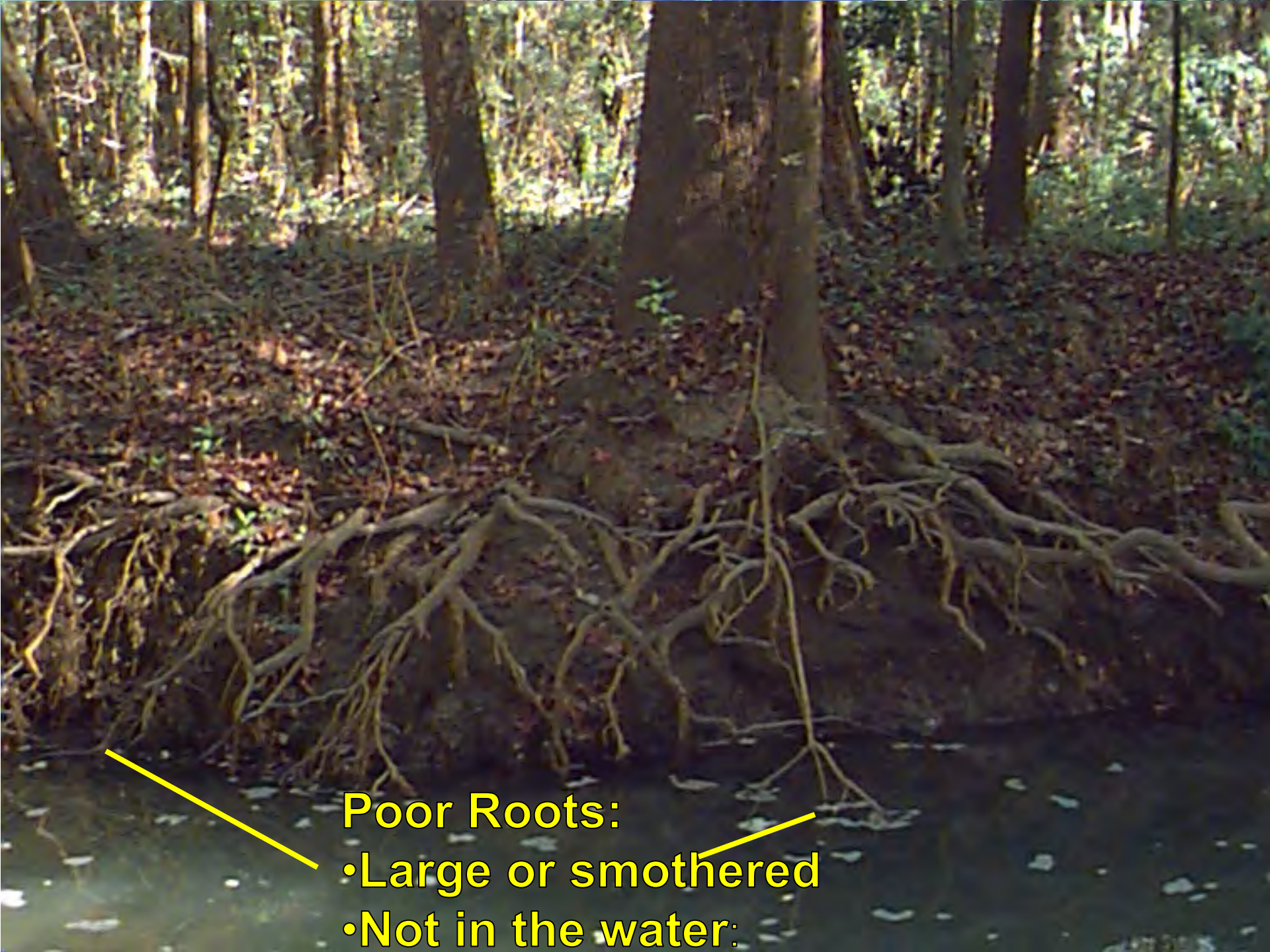
- The greater the variety and extent of available microhabitats or attachment sites, typically the greater the variety of invertebrates in the stream.
- The quality of the habitat, as well as the different types of substrates present, is emphasized in this score.

Substrate Diversity

- Evaluate the number of different kinds of productive substrates (snags, leaf packs, roots, aquatic vegetation, rock) present to determine category.
  - **Minimum amount to score = 2 m^2**
- Factor in quality by scoring within the category chosen above.

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** ____	Four or more major productive habitats present [snags, tree roots, aquatic vegetation, leaf packs (partially decayed), rock] 20 19 18 17 16	Three major productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) 15 14 13 12 11	Two major productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 8 7 6	One or less major productive habitat. Lack of habitat is obvious, substrates unstable or smothered 5 4 3 2 1


Good Roots:
•In the flow
•Fine & fibrous (less than thumb diameter)
•Individual fibers visible (not smothered)


Poor Roots:
•Large or smothered
•Not in the water:

Good Aquatic Vegetation
- In the flow
- In contact with water

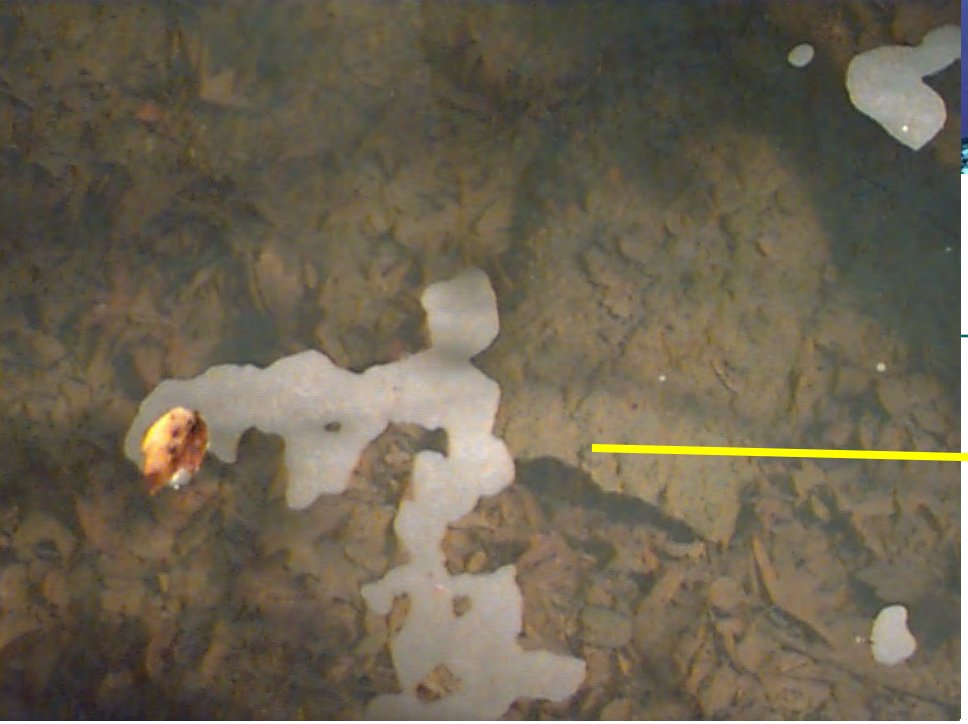

Poor Aquatic Vegetation
Out of the water


Good Snag
•In the flow
•Larger than thumb diameter
•Lots of crevices for bugs to hide


Poor Snag (sand-smothered)


Good Leaf Packs
• In the flow
•Partially decayed


Close-up of Good Leaf Packs



Poor Leaf Mats (silt-smothered)

Poor Leaf Packs
•Fresh leaves
•Pine & cypress needles

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Rock

- > 5 cm diameter
- No pipe clay
- No asphalt
- Structural complexity

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Substrate Availability

- Only good quality habitat should be included in the mapping and scoring process (*e.g.*, no anaerobic or smothered leaf mats).
- Score is based on the sum of the percentages of productive habitats in the stream reach.

Substrate Availability

- Estimates the relative spatial abundance of productive habitats present.
- Refer to the *Site Map/Habitat Sketch*.
- Minimum of $2m^2$
- Count the number of blocks with a given substrate and divide this by the total number of blocks within the stream sketch.

Substrate Availability ____	Greater than 30% major productive habitat present at site 20 19 18 17 16	16% to 30% major productive habitat, by aerial extent 15 14 13 12 11	6% to 15% major productive habitat 10 9 8 7 6	Less than 5% major productive habitat 5 4 3 2 1

Water Velocity

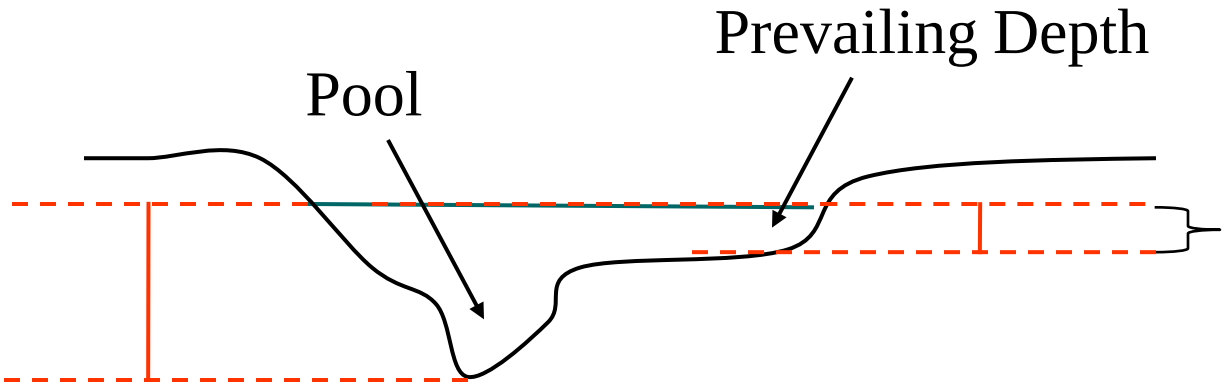
- Score based on the maximum velocity observed at the typical cross section of stream, based upon the ranges given.
- Avoid areas immediately before or after snags or other restrictions
- Too low : dissolved oxygen, food movement, recruitment are reduced.
- Too high: catastrophic drift.

Water Velocity ____	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec					Max. observed at typical transect: >0.1 to 0.25 m/sec					Max. observed at typical transect: 0.05 to 0.1 m/sec					Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec				
	≥0.33	0.31	0.29	0.27	>0.25	0.25	0.21	0.17	0.13	>0.1	0.1	0.09	0.07	0.06	0.05	<0.05	0.04	0.03	0.01	<0.01
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

Habitat Smothering

Assesses the deposition of sand and silt onto otherwise productive habitats.

- Check for sand deposition (pool loss, buried habitats).
  - Pools: 2 x the prevailing depth, with 1-2 pools in a length of stream equal to 12 times the stream width (*e.g.*, a 4 m wide stream should have 1-2 pools per 48 m or 2-4 per 100 m).



Habitat Smothering

- Check for silt or sand on visible habitats
  - Any more than a light dusting.
- Probe with the dip net for buried habitats
  - Partially buried snags are a good indicator.
- Silt smothering
  - Turbidity plume when moving through stream or agitating the habitats or by observing silt.

Habitat Smothering

Smothering

1. Determine if "pools" are present:
   "None" scores in the "poor" category
   "Minimal" scores in the "marginal" category
   "Yes" then:

2. Determine percent smothering and score accordingly

	Pools Present		Minimal	None
Habitat Smothering ____ --------- ------ Primary Score ____	Adequate number of stable pools (1-2 per 12 times width) and <25% of habitats affected by sand, silt, or algae. 20 19 18 17 16	Adequate number of stable pools (1-2 per 12 times width) and >25% of habitats affected by sand, silt, or algae. 15 14 13 12 11	Does not have required number of stable pools (1-2 per 12 x width) and/or has shallow pools (<2 x prevailing depth). 10 9 8 7 6	Stable pools are absent. Most habitats affected by sand, silt, or algae accumulation. 5 4 3 2 1
	Optimal	Suboptimal	Marginal	Poor

Artificial Channelization

- Measure of large-scale changes in the shape of the stream channel.
- Is it straightened, deepened, down-cut, or diverted?

Secondary Habitat Components **Artificial Channelization** ____	Expected sinuosity given the stream width. No evidence of dredging or artificial straight-ening. No spoil banks. 20 19 18 17 16	Good sinuosity within old chan-nelized area. Evidence of dredging in the past (>25 yrs) but mostly recovered. 15 14 13 12 11	Straightened with trapezoidal cross section, but has a small degree of sinuosity developed within channelized area. 10 9 8 7 6	Straightened or engineered by dredging, has trapezoidal or box cut cross section, lacks required pools. May have spoil banks. 5 4 3 2 1


No Artificial Channelization
Optimal
•No spoil banks
•Diversity of depths
•No evidence of dredging
•No artificial straightening

Artificially Channelized

Poor

- Spoil banks
- Box-cut, monotypic depth
- Straightened

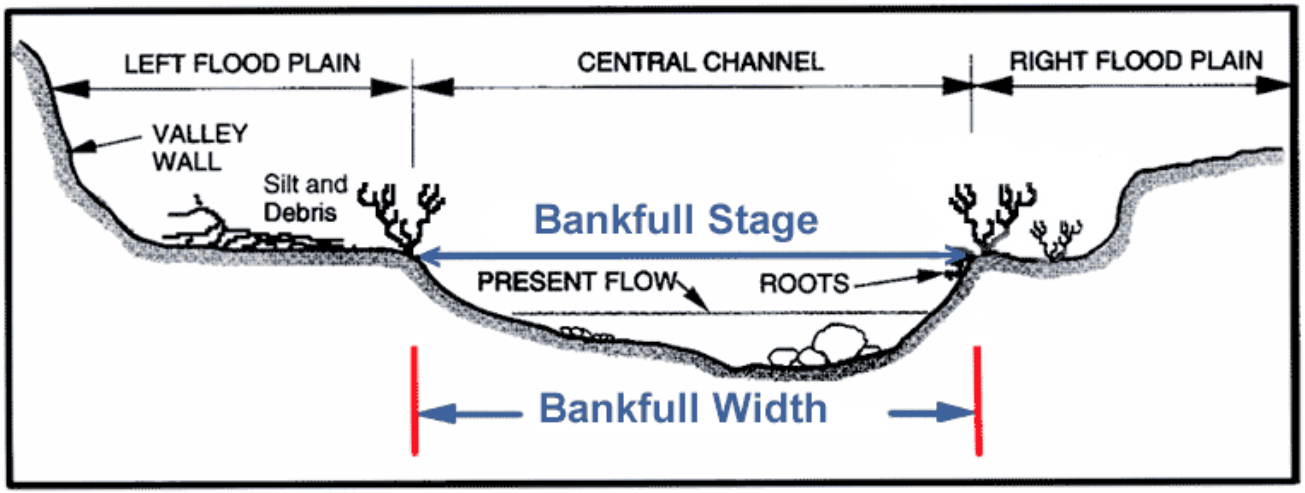
Bank Stability

- Refer to sketch for areas that have eroded or have the potential for sloughing
- Steep, unvegetated banks will collapse and erode (unstable). Gently sloping banks or banks with thick vegetation, limestone, moss, or root mats are the most stable.

Bank Stability

Determine Bankfull Stage

- In natural systems, it is the water level where channel maintenance is most effective. Has an average recurrence of 1.5 years.

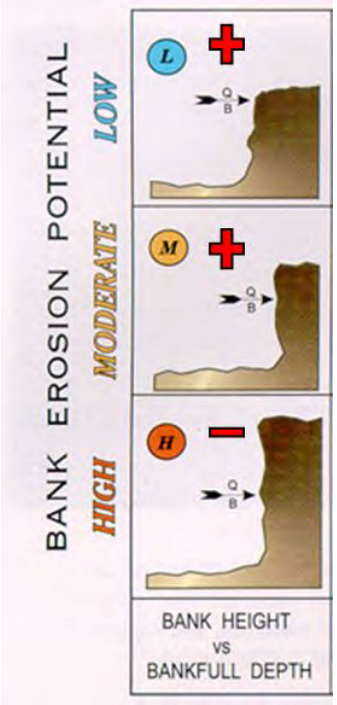


Bank Stability

- If banks are limestone, pipe clay or concrete at bankfull, then the bank scores in the "optimal" category (e.g. Suwannee River).
- Otherwise, follow these 3 steps:

1. Determine height of bank relative to bankfull height

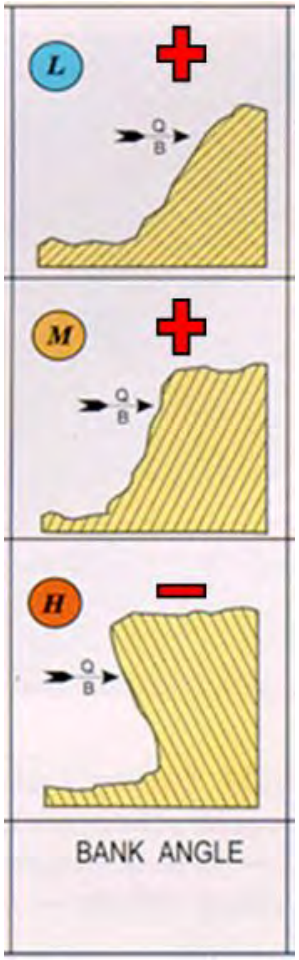
  - Bankfull is > 60% of bank height = +
  - Bankfull is < 60% of bank height = –



Bank Stability

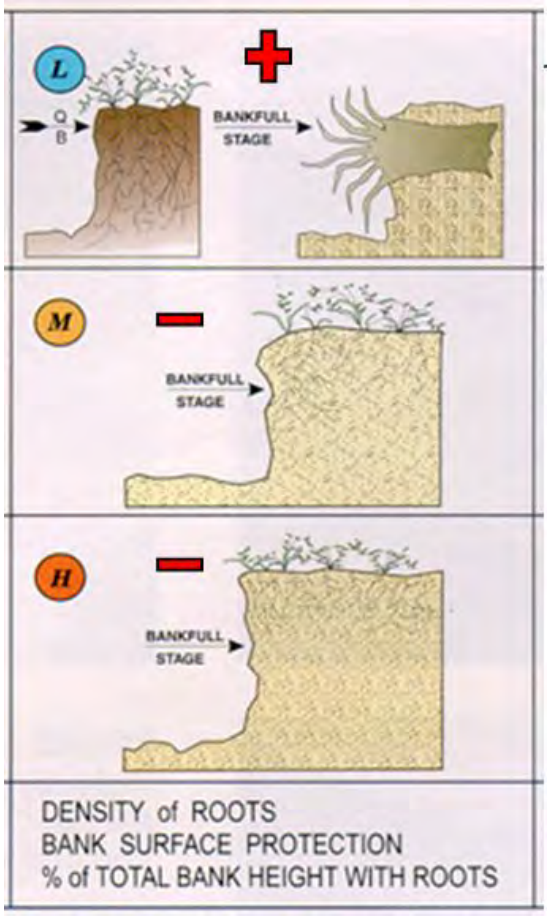
2. Determine Bank Slope:

- Bank angle is $\leq 60^{o}$ = ✚
- Bank angle is $> 60^{o}$ = ▬



Bank Stability

- 3. Determine bank armoring
  - Bankfull above woody root zone with few raw, eroded areas = +
  - Bankfull is below woody root zone with raw, eroded areas = −



Bank Stability

Determine the number of “pluses” for each bank and score accordingly:

	+ 3	+ 2	+ 1	+ 0
Bank Stability Right Bank ___ Left Bank ___	Bankfull > 60% of bank height. Slope of bank ≤ 60°. Bankfull is within or above the root zone with few raw, eroded areas. 10 9	Only meets 2 of the 3 requirements for optimal bank stability. 8 7 6	Only meets 1 of the 3 requirements for optimal bank stability. 5 4	Bankfull < 60% of bank height. Slope of bank > 60°. Bankfull is below the root zone with raw, eroded areas. 3 2 1
	Optimal	Suboptimal	Marginal	Poor


Stable Banks
+ Bankfull > 60% bank height
+ Bank slope < 60°
+ Good woody root armoring

Riparian Buffer Zone Width

- Measured from the edge of the stream bank to where clearing or other adverse human activities begin.
- A vegetated buffer zone of greater than 18 m (approximately 60 feet) is currently considered optimal.

Riparian Buffer Zone Width Right Bank ____ Left Bank ____	Width of vegetation greater than 18 m 10 9	Width of vegetation >12 to 18m 8 7 6	Width of vegetation 6 to 12 m. human activities close to system 5 4	Less than 6 m of buffer zone due to intensive human activities 3 2 1


Poor Buffer Width


Good Buffer Width

Riparian Zone Vegetation Quality

- Be familiar with native plant communities in the area where you are sampling. Also be aware of the problem exotic plant species in the area.
- Based on the classes of plants present, the degree of stream-bank vegetative cover, and how closely the plant community at the site approaches that expected of an undisturbed community in the region.
- An optimal riparian zone has a canopy, mid-story, and under-story of native plant species.


Poor Riparian Vegetation


Good Riparian
Vegetation

Summary of Steps

- Measure 100 m segment, flags every 10 m are helpful.
- Draw Site Map/Habitat Sketch
- Fill out Physical/Chemical Characterization Form (use map where appropriate)
- Complete Habitat Assessment Form (making certain all three forms are consistent with one another)

Questions?