

Benthic Macroinvertebrate Sampling Certification

- Complete spring training
- Pass written exam at the end of spring training (new or renewing applicants only)
- Acquire all necessary equipment and supplies
- Complete field audit (March 1 – April 30); payment due
- Submit sample for DNR lab analysis
- Your name and affiliation posted on MBSS Registry

Benthic Macroinvertebrate Sampling

“...provide a representative sample of the community composition and relative abundance of benthic macroinvertebrates in *favorable* habitats (habitats supporting the greatest benthic diversity)”

Benthic Macroinvertebrate Sampling

- March 1 – April 30 Index Period
- Same 75 m as summer
- D net (500 or 540 micron)
- **20 square feet of *BEST AVAILABLE* habitat (pooled into one container)**
- **Sample water first**

Focus on:
Habitats with good *FLOW*
Habitats that are *STABLE*

BENTHIC HABITAT SAMPLED

Riffle

Rootwad/Woody Debris

Leaf Pack

Macrophytes

Undercut Banks

Other: _____

Avoid

Shifting sand in runs

Silt in pools



Determine Sampleability

Too deep

High flow

Can't see habitats

Dry stream

Marsh

Impoundment

Tidal

No permission

Equipment Checklist

D-net and spare
Sieve Bucket
Sample buckets and labels
95% Ethanol (2 L/site)
Waders (no felt soles)
Sampling Manual
Data Sheets
Pencils
First Aid Kit
Flagging/Paint
100 m measuring tape



Habitats to Sample

- Riffles

BENTHIC HABITAT SAMPLED		
<input type="checkbox"/>	<input type="checkbox"/>	Riffle
<input type="checkbox"/>	<input type="checkbox"/>	Rootwad/Woody Debris
<input type="checkbox"/>	<input type="checkbox"/>	Leaf Pack
<input type="checkbox"/>	<input type="checkbox"/>	Macrophytes
<input type="checkbox"/>	<input type="checkbox"/>	Undercut Banks
<input type="checkbox"/>	<input type="checkbox"/>	Other: _____

Start at downstream edge and work upstream

Variety of substrate types and velocities

Riffle





No holes

500 or 540 micron mesh

Disturb habitat 5-8 cm below substrate surface



Habitats to Sample

- Riffles
- Rootwad/Woody debris

BENTHIC HABITAT SAMPLED		
<input type="checkbox"/>	Riffle	
<input type="checkbox"/>	Rootwad/Woody Debris	
<input type="checkbox"/>	Leaf Pack	
<input type="checkbox"/>	Macrophytes	
<input type="checkbox"/>	Undercut Banks	
<input type="checkbox"/>	Other:	_____



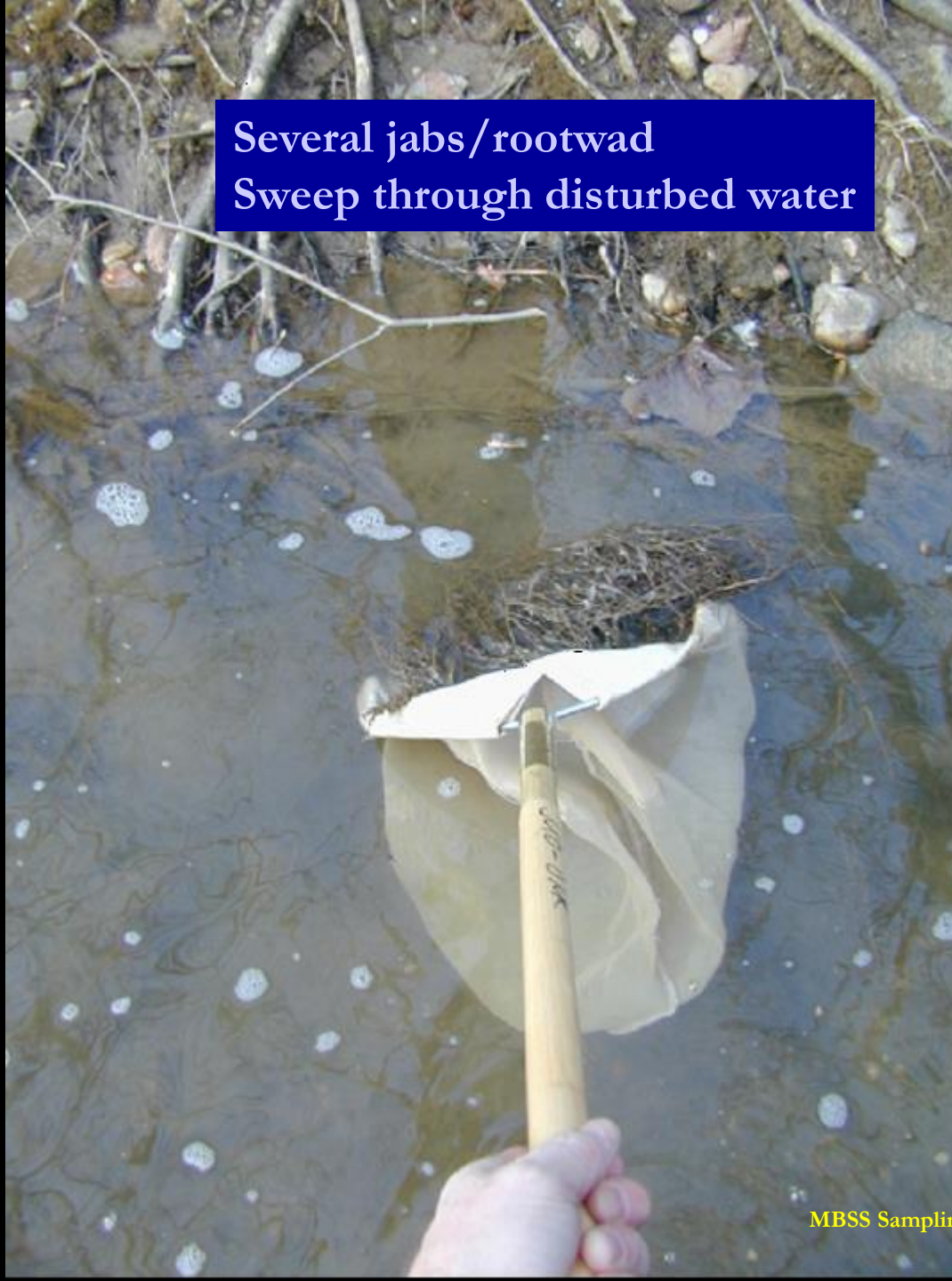
Rootwad

D-net downstream; rub wood
with hand or brush

Woody debris



Several jabs/rootwad
Sweep through disturbed water







Habitats to Sample

- Riffles
- Rootwad/Woody debris
- Leaf pack

BENTHIC HABITAT SAMPLED			
<input type="checkbox"/>	Riffle	<input type="checkbox"/>	Undercut Banks
<input type="checkbox"/>	Rootwad/Woody Debris	<input type="checkbox"/>	Other: _____
<input type="checkbox"/>		<input type="checkbox"/>	Leaf Pack
<input type="checkbox"/>		<input type="checkbox"/>	Macrophytes

A photograph of a stream in a forest. The water is brown and turbulent, flowing over rocks and debris. The banks are covered in fallen leaves and branches. A blue arrow points from the text 'Leaf pack' to a specific area in the stream where a large amount of leaf litter is piled up.

Leaf pack

A close-up photograph of a pile of brown, partially decomposed leaves floating in a stream. The leaves are wet and have a mottled appearance, indicating they have been in the water for some time. The water is dark and turbulent, with white foam visible around the pile of leaves. The leaves are of various shapes and sizes, some showing clear vein patterns. A blue arrow points from the bottom right towards the pile of leaves.

**What's 1 sq. ft.?
A moderate handful**

**Partially decomposed
leaves preferred**

Habitats to Sample

- Riffles
- Rootwad/Woody debris
- Leaf pack
- Macrophytes

BENTHIC HABITAT SAMPLED					
<input type="checkbox"/>	Riffle	<input type="checkbox"/>	Leaf Pack	<input type="checkbox"/>	Undercut Banks
<input type="checkbox"/>	Rootwad/Woody Debris	<input checked="" type="checkbox"/>	Macrophytes	<input type="checkbox"/>	Other: _____




Macrophytes



Habitats to Sample

- Riffles
- Rootwad/woody debris
- Leaf pack
- Macrophytes
- Undercut banks

BENTHIC HABITAT SAMPLED		
<input type="checkbox"/>	Riffle	<input type="checkbox"/>
<input type="checkbox"/>	Rootwad/Woody Debris	<input type="checkbox"/>
<input type="checkbox"/>	Leaf Pack	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Macrophytes	Undercut Banks
		Other: _____



Undercut bank – soil and/or rock (not vegetation)

Habitats to Sample

- Riffles
- Rootwad/woody debris
- Leaf pack
- Macrophytes
- Undercut banks
- Gravel/peat/clay/detritus/sand/silt/stable refuse (only when necessary)

BENTHIC HABITAT SAMPLED					
<input type="checkbox"/>	Riffle	<input type="checkbox"/>	Leaf Pack	<input type="checkbox"/>	Undercut Banks
<input type="checkbox"/>	Rootwad/Woody Debris	<input type="checkbox"/>	Macrophytes	<input type="checkbox"/>	Other: _____

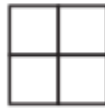
Total must be 20 sq. ft.

BENTHIC HABITAT SAMPLED



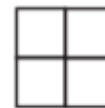
Riffle

Rootwad/Woody Debris



Leaf Pack

Macrophytes

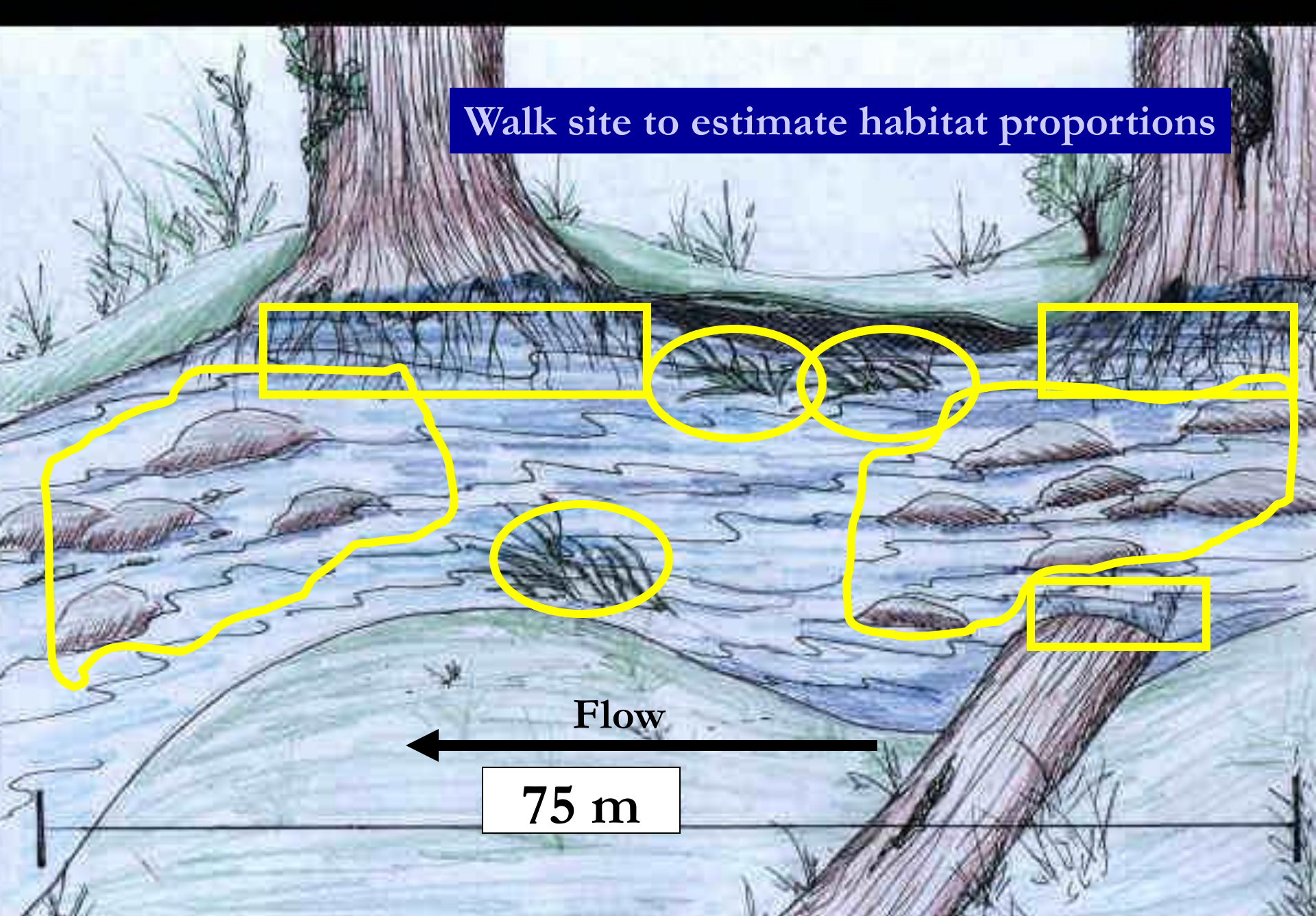


Undercut Banks

Other: Tire, engine block,
Shopping cart



Walk site to estimate habitat proportions



Total must be 20 sq. ft.

BENTHIC HABITAT SAMPLED

16	
	3

Riffle

Rootwad/Woody Debris

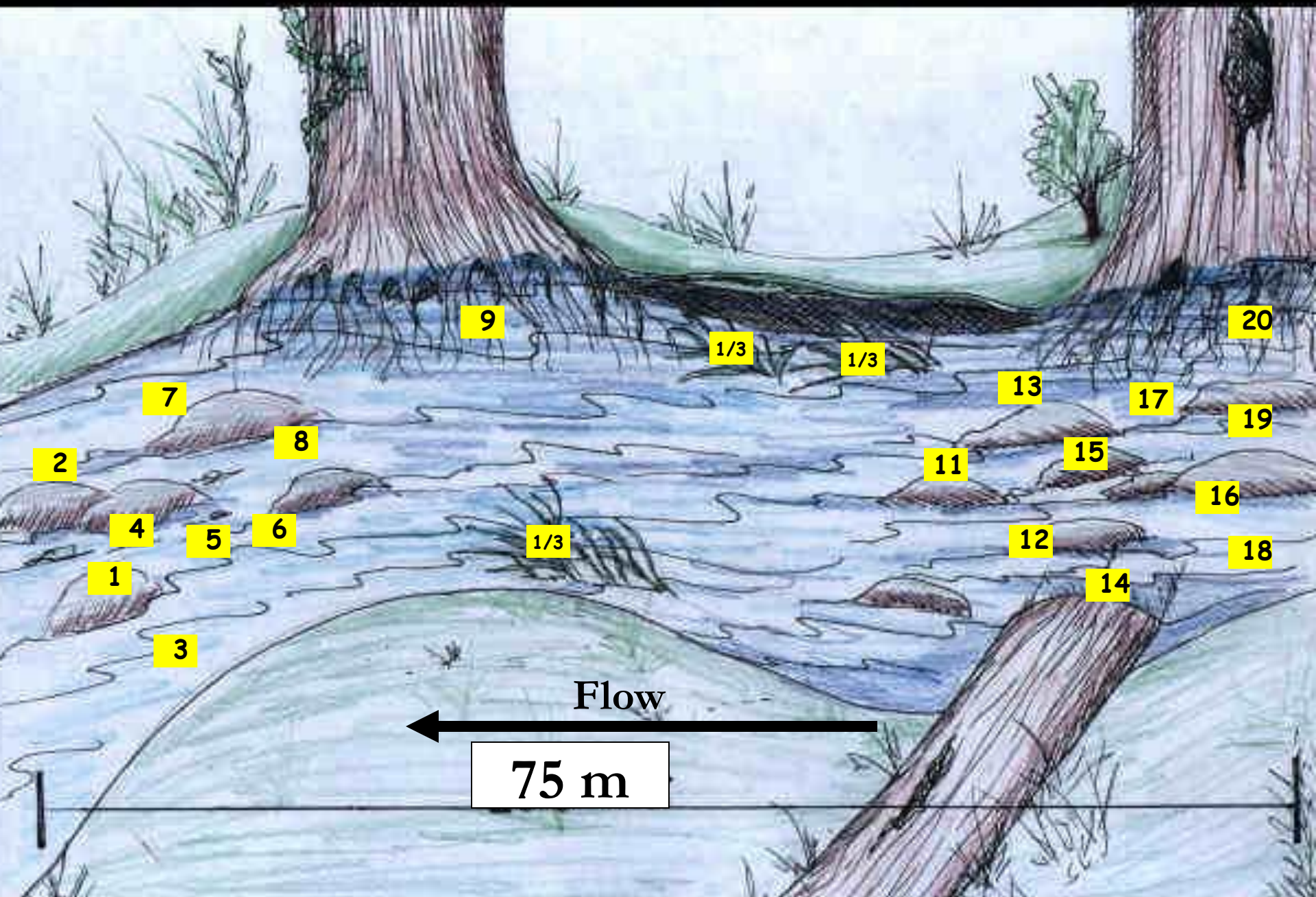
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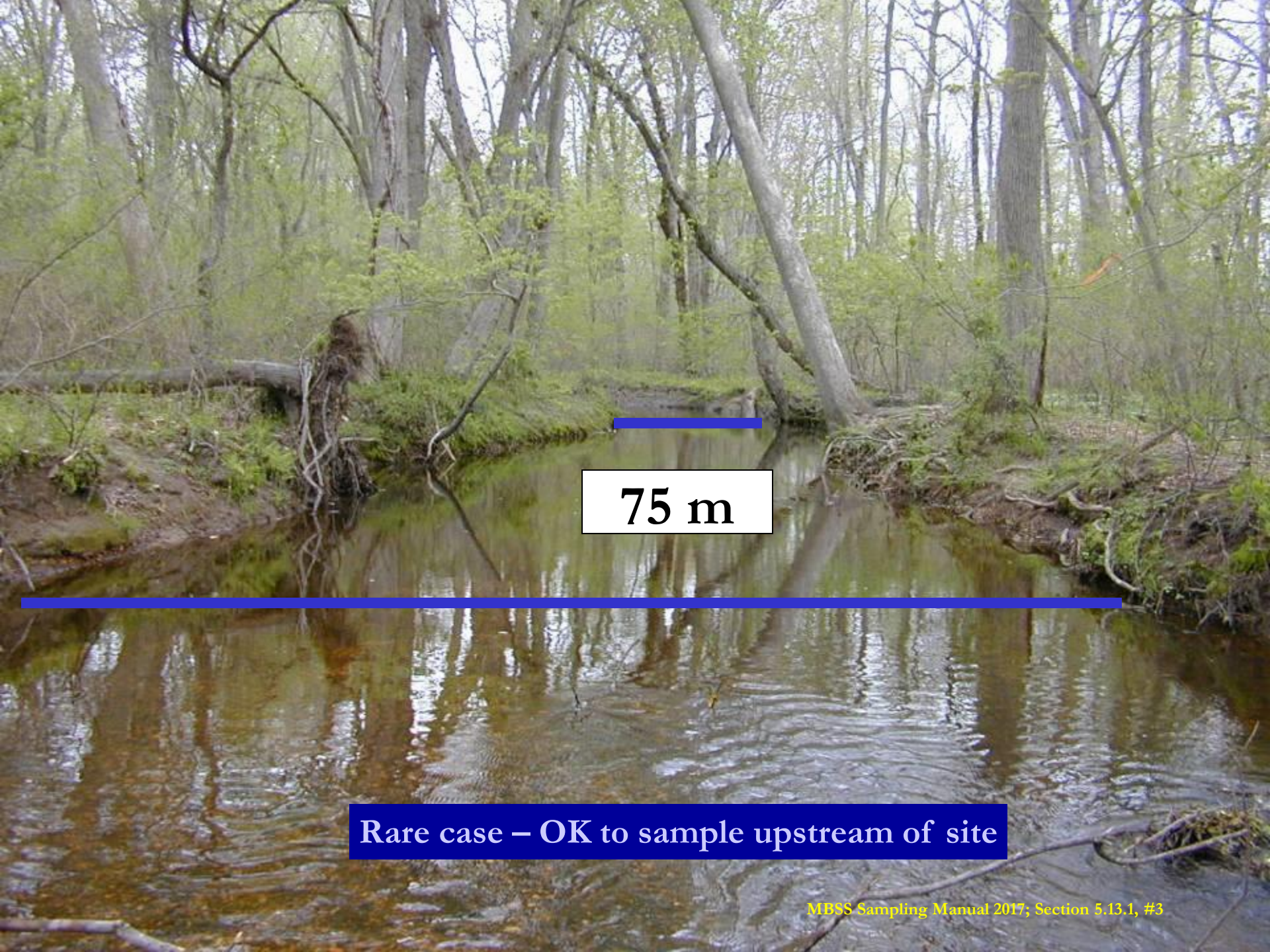
Leaf Pack

Macrophytes

Undercut Banks

Other: _____





75 m


Rare case – OK to sample upstream of site



Partially submerge sieve bucket

A close-up photograph showing a person's hand, wearing a black wristband, holding the top of a brown paper bag. The bag is positioned over the rim of a white bucket. The background is a body of water with ripples. A brass-colored metal rod is visible on the right side of the bucket. The scene is outdoors, likely on a boat or pier.

Rinse/use forceps to clean D Net



Remove fish, mussels, salamanders, turtles, large sticks, stones over 3 cm, large leaves, etc. Crayfish stay **IN** the sample.












**Up and Down;
Not side-to-side**



**Thoroughly clean sieve bucket;
Minimize water into sample bucket**



95%
Denatured
Ethanol

The total volume of preservative plus solids should be about twice the volume of solids



Ethanol

Sample (solids)

MBSS 1 of 2



Pencil

Dec-204-R-2001 BASIN:
Date: 02/26/2001 Time:
Sampler: Kline MBSS of

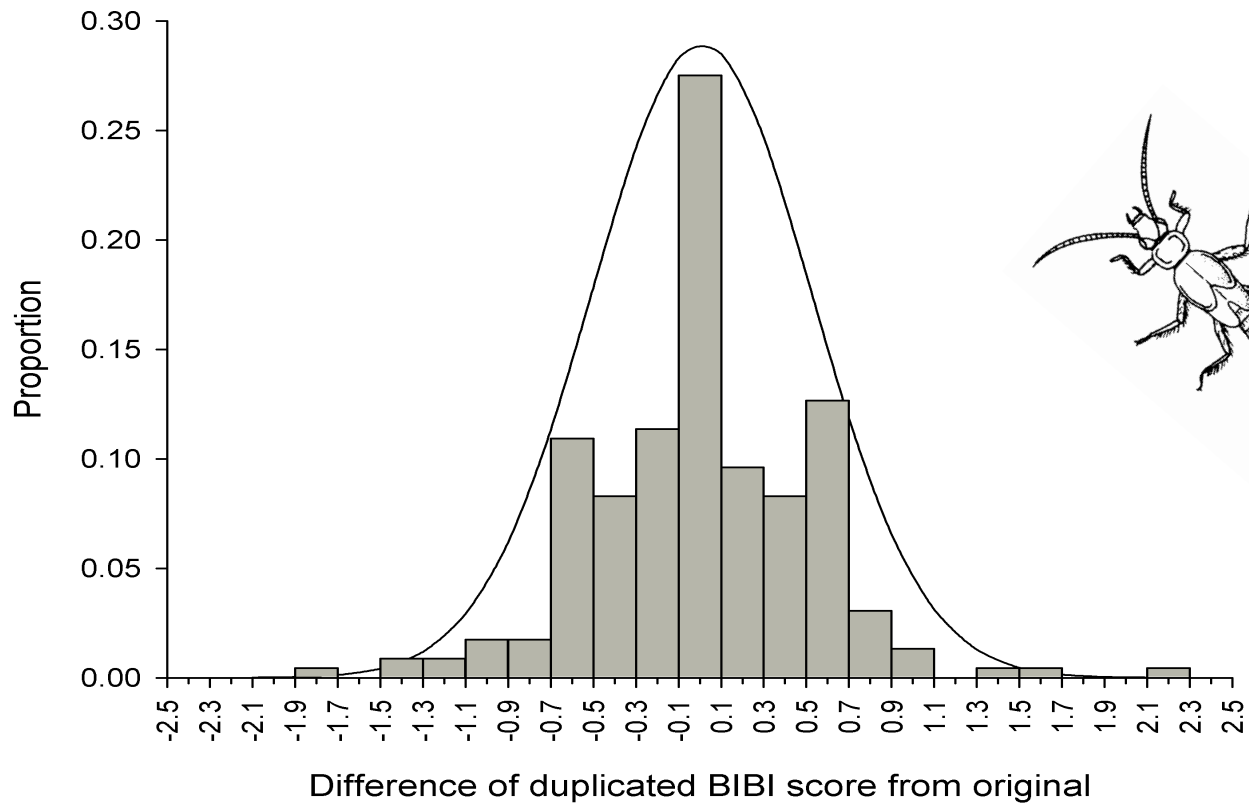
Lid on and gently invert and mix



Benthic Duplicate Analysis

214 MBSS sites had duplicate benthic field samples (2000-2016)

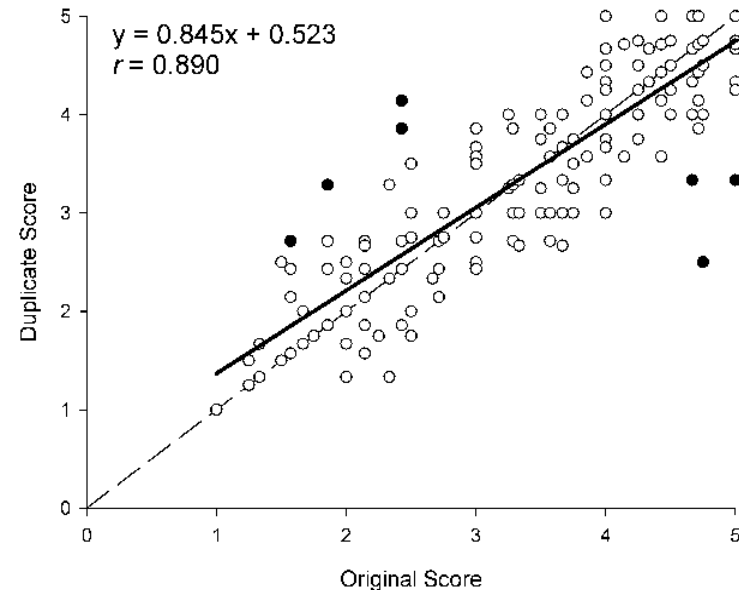
The IBI ranges from 1 to 5



96% of sites had a difference in BIBI scores ≤ 1.0

Benthic Duplicate Analysis

- Mean difference in duplicate MBSS BIBI scores = 0.37
- Max difference in duplicate BIBI scores = 2.25



For MBSS certification the difference in BIBI scores between your sample and MBSS should be ≤ 1.0