

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

<div style="display: flex; align-items: center;"><div style="border: 1px solid black; width: 40px; height: 40px; margin-right: 10px;"><div style="border: 1px solid black; width: 15px; height: 15px; margin: 2px;"></div><div style="border: 1px solid black; width: 15px; height: 15px; margin: 2px;"></div><div style="border: 1px solid black; width: 15px; height: 15px; margin: 2px;"></div><div style="border: 1px solid black; width: 15px; height: 15px; margin: 2px;"></div></div><div><p>Riffle</p><p>Rootwad/Woody Debris</p></div></div>	<div style="display: flex; align-items: center;"><div style="border: 1px solid black; width: 40px; height: 40px; margin-right: 10px;"><div style="border: 1px solid black; width: 15px; height: 15px; margin: 2px;"></div><div style="border: 1px solid black; width: 15px; height: 15px; margin: 2px;"></div><div style="border: 1px solid black; width: 15px; height: 15px; margin: 2px;"></div><div style="border: 1px solid black; width: 15px; height: 15px; margin: 2px;"></div></div><div><p>Leaf Pack</p><p>Macrophytes</p></div></div>	<div style="display: flex; align-items: center;"><div style="border: 1px solid black; width: 40px; height: 40px; margin-right: 10px;"><div style="border: 1px solid black; width: 15px; height: 15px; margin: 2px;"></div><div style="border: 1px solid black; width: 15px; height: 15px; margin: 2px;"></div><div style="border: 1px solid black; width: 15px; height: 15px; margin: 2px;"></div><div style="border: 1px solid black; width: 15px; height: 15px; margin: 2px;"></div></div><div><p>Undercut Banks</p><p>Other: _____</p></div></div>
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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



Lower Case D



Upper Case D

Habitats to Sample

- Riffles

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Start at downstream edge and work upstream

Variety of substrate types and velocities

Riffle



A photograph showing a person's hand holding a white mesh bag in a stream. The person is wearing a white long-sleeved shirt and a black digital watch. A blue arrow points from the text '500 or 540 micron mesh' to the mesh bag. The background shows water and rocks.

No holes

500 or 540 micron mesh

Disturb habitat 5-8 cm below substrate surface



Habitats to Sample

- Riffles
- Rootwad/Woody debris

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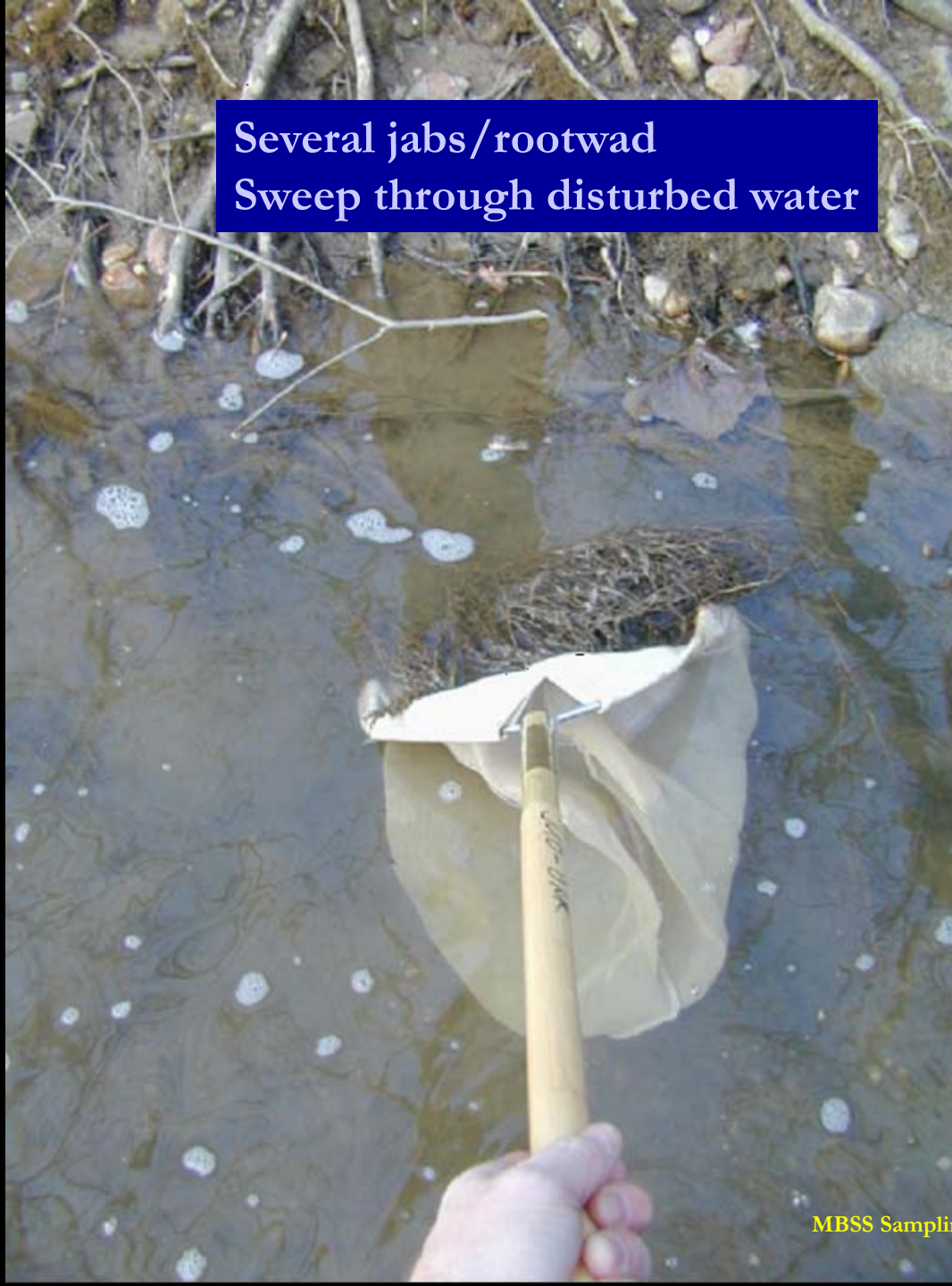
Rootwad

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"/>	
<input type="checkbox"/>		<input type="checkbox"/>	

A photograph of a stream in a forest. The water is brown and murky, flowing through a rocky bed. 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 leaf pack is located. The background shows a dense forest of bare trees.

Leaf pack

A close-up photograph of a pile of brown, partially decomposed leaves floating in a stream. The leaves are mostly oak leaves, showing various stages of decay. The water is dark and turbulent, with white foam visible around the pile of leaves. A blue arrow points from the text box at the bottom right to 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

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Macrophytes



Habitats to Sample

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

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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					
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Total must be 20 sq. ft.

BENTHIC HABITAT SAMPLED



Riffle

Rootwad/Woody Debris



Leaf Pack

Macrophytes

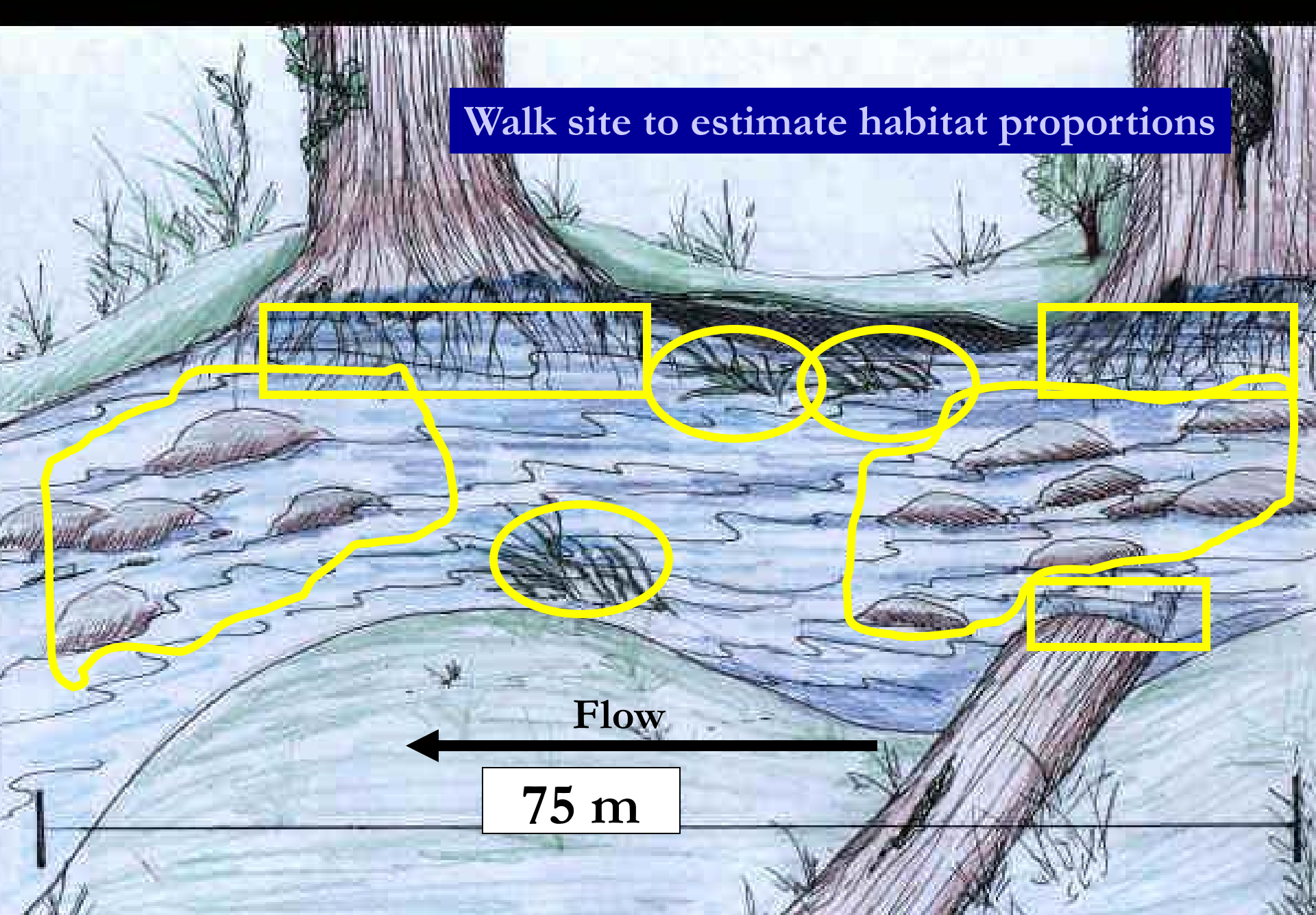


Undercut Banks

Other: Tire, engine block,
Shopping cart



Walk site to estimate habitat proportions



Total must be 20 sq. ft.

BENTHIC HABITAT SAMPLED

1	6
	3

Riffle

Rootwad/Woody Debris

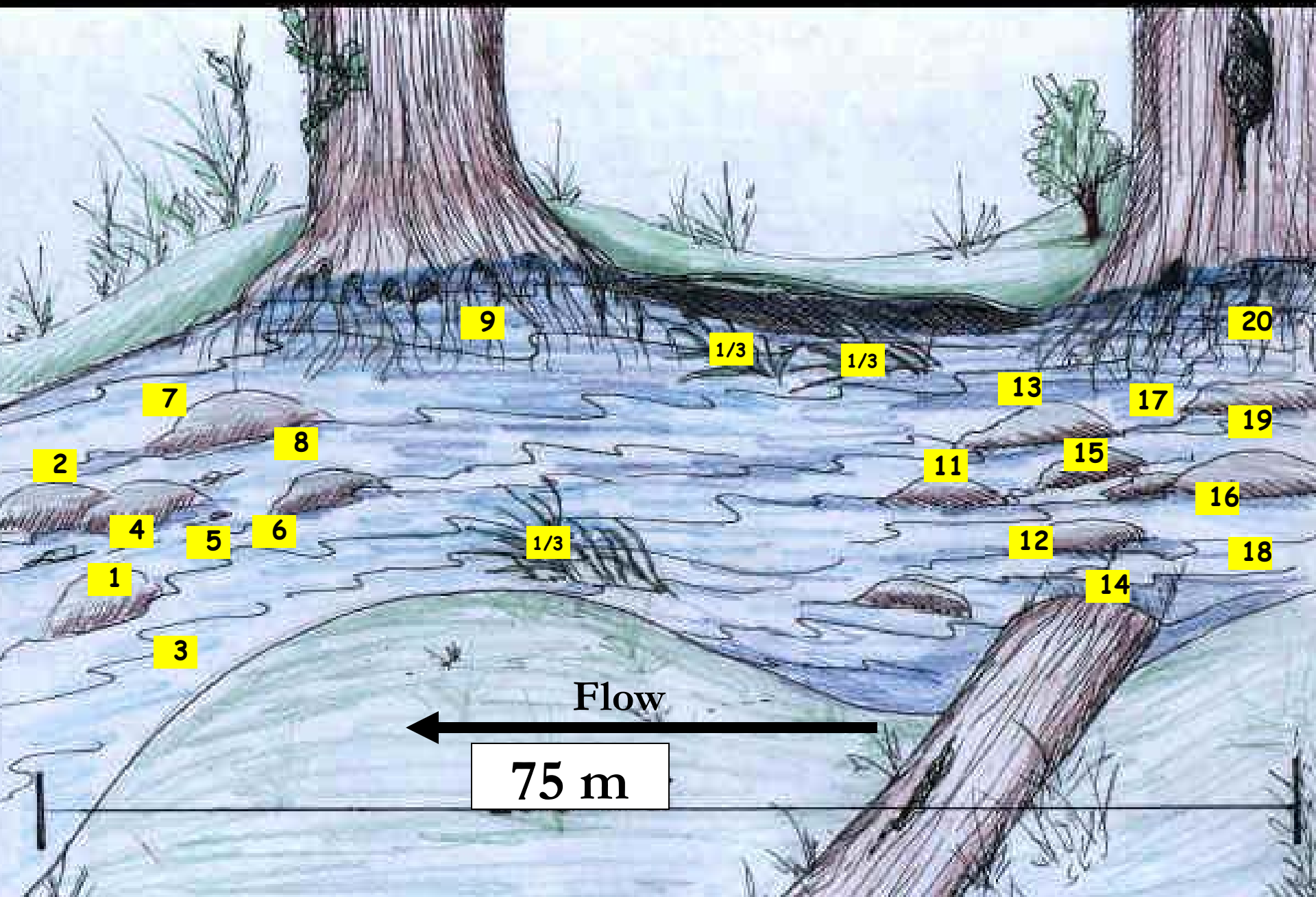
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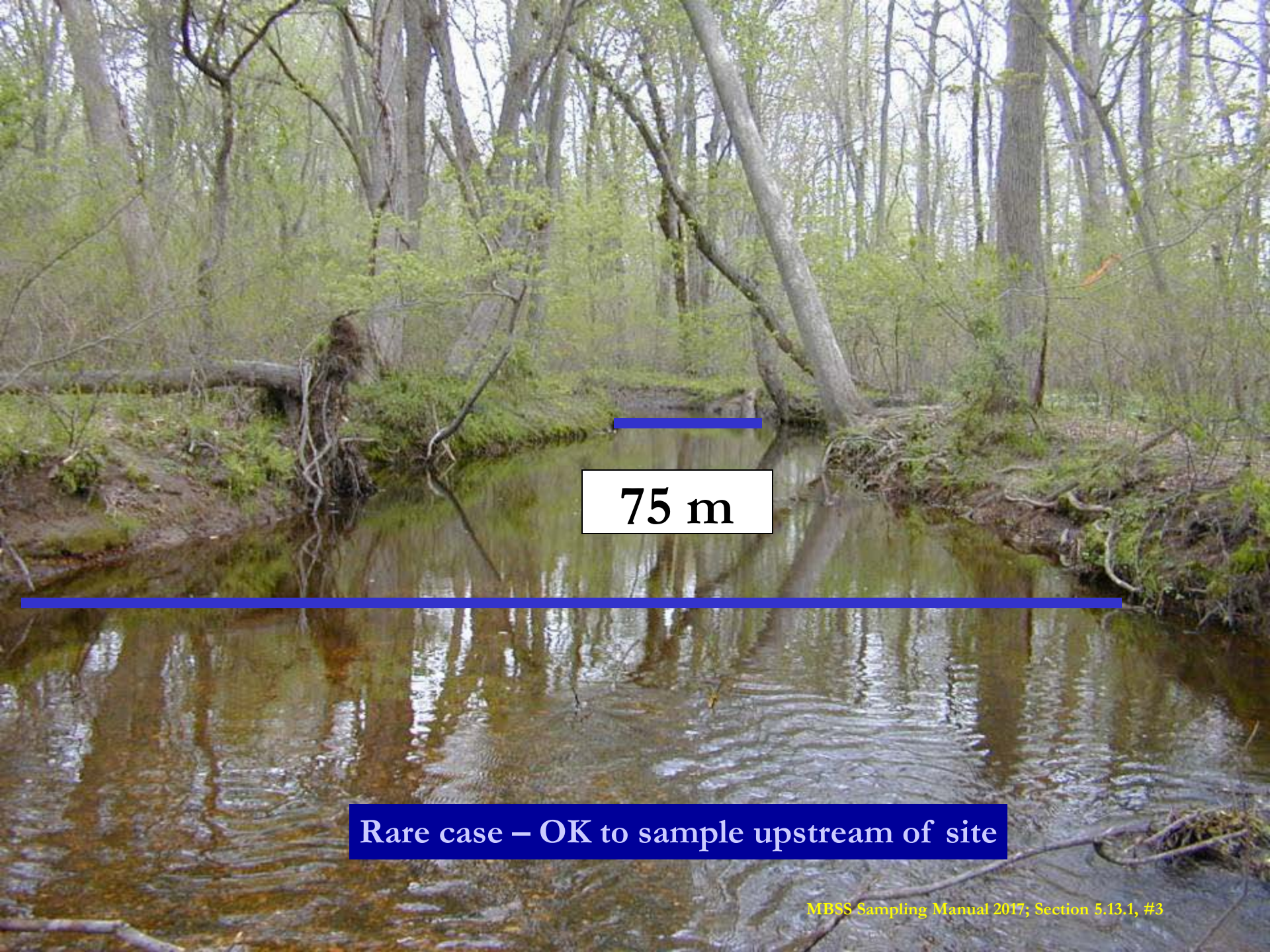
Leaf Pack

Macrophytes

Undercut Banks

Other: _____



A photograph of a forest stream. The water is calm, reflecting the surrounding trees and foliage. The banks are covered in green moss and small plants. A blue horizontal line spans the width of the stream, with a white box containing the text "75 m" centered on it.

75 m

Rare case – OK to sample upstream of site

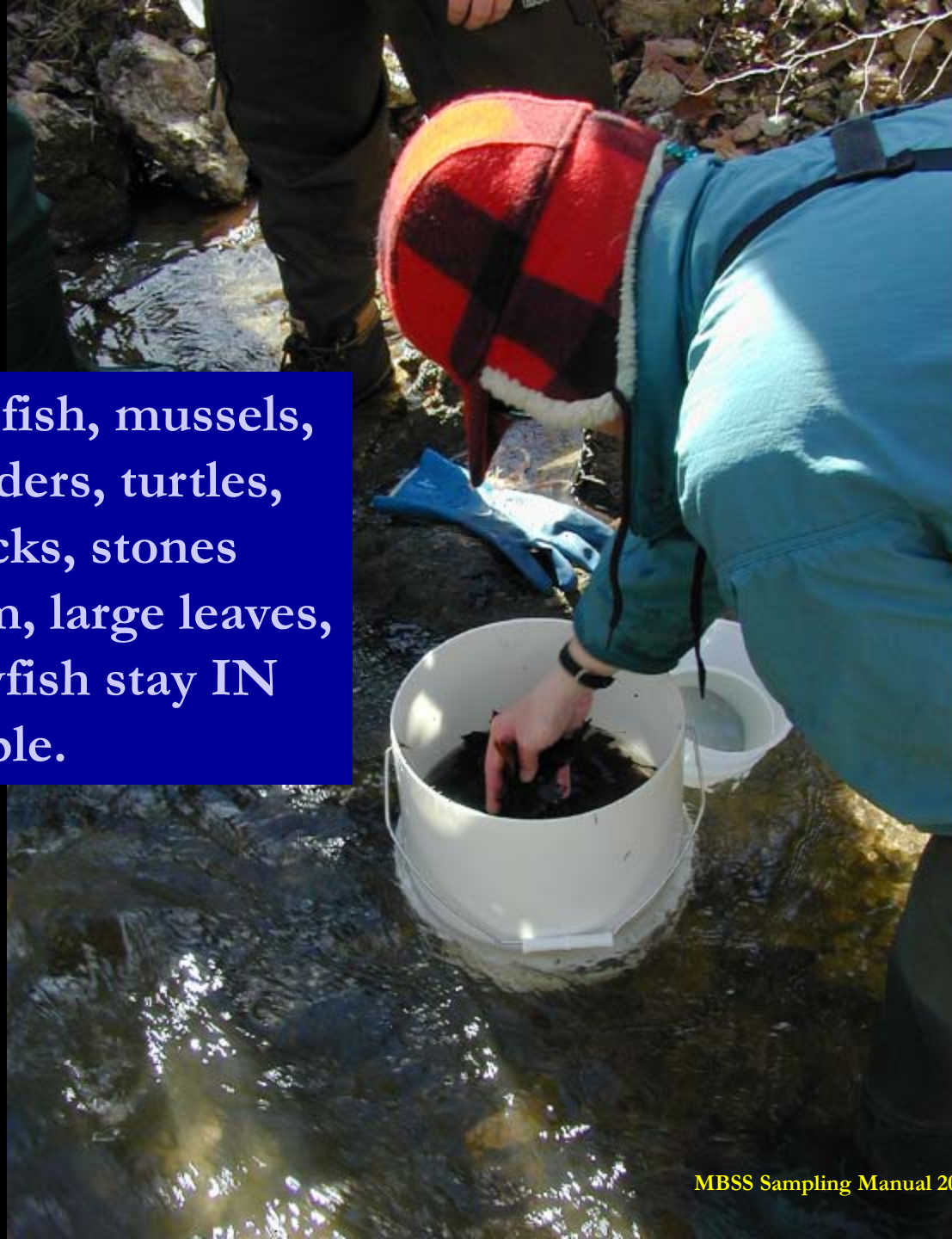


Partially submerge sieve bucket

A photograph showing a person's hand, wearing a black wristband, holding a brown paper bag over a white bucket. The bucket is partially submerged in dark, rippling water. The bag is open and appears to contain some material. A yellow tool is visible in the water to the right of the bucket.

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

MBSS 1 of 2



Ethanol

Sample (solids)



Pencil

Lid on and gently invert and mix

MBSS Benthic Macroinvertebrate Sample Chain-of-Custody Sheet

Site ID	Number of Buckets	Collector (print)	Collection Date (DD/MM/YY)	Date Delivered to Field Office (DD/MM/YY)	Relinquished by (print)	Received by (print)	Field Office Log Number

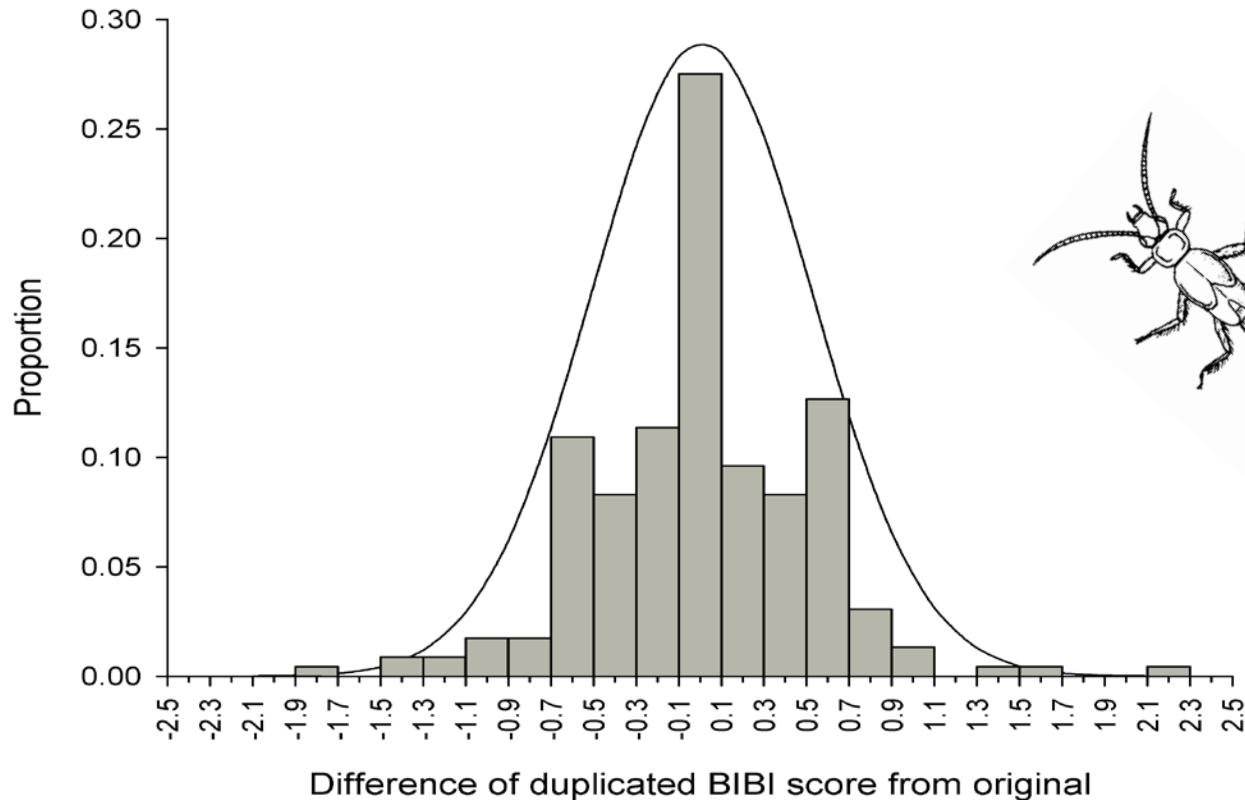
Comments _____



Benthic Duplicate Analysis

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

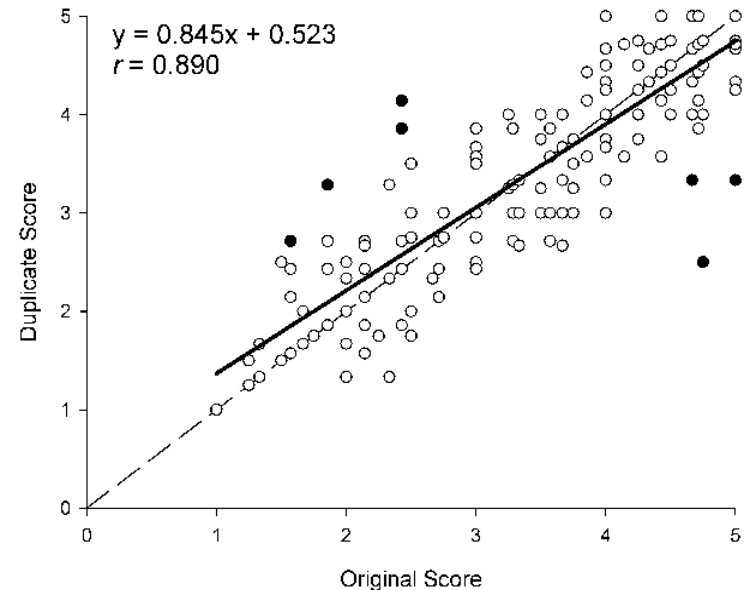
The IBI ranges from 1 to 5



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

