Past, Present, and Future of the Maryland Biological Stream Survey

Spring Training 2018

February 26th, 2018



Monitoring and Non-Tidal Assessment Division

Maryland Biological Stream Survey Goal and Objectives

<u>Goal:</u>

Provide the best possible information to ensure the protection and restoration of Maryland's stream ecological resources

Objectives:

- Assess Stream Conditions
- Identify Potential Stressors
- Document changes



Maryland Biological Stream Survey Sites



Landscape

25 year comparison of water quality conditions

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Sampling Methods and Biological Indicator Development



http://dnr.maryland.gov/streams/Publicati ons/R4Manual.pdf MARYLAND BIOLOGICAL STREAM SURVEY 2000-2004



http://dnr.maryland.gov/streams/Publications/ ea-05-13_new_ibi.pdf

MBSS Indices of Biotic Integrity

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		Thresholds		
Fish IBIs (metrics)	5	3	1	
Coastal Plain				
Abundance per square meter	≥ 0.72	0.45 - 0.71	< 0.45	
Number of Benthic species *	≥ 0.22	0.01 - 0.21	0	
Percent Tolerant	≤ 68	69 - 97	> 97	
Percent Generalist, Omnivores, Insectivores	≤ 92	93 - 99	100	
Percent Round-bodied Suckers	≥ 2	1	0	
Percent Abundance Dominant Taxa	≤ 40	41 - 69	> 69	
Eastern Piedmont				
Abundance per square meter	≥ 1.25	0.25 - 1.24	< 0.25	
Number of Benthic species *	≥ 0.26	0.09 - 0.25	< 0.09	
Percent Tolerant	≤ 45	46 - 68	> 68	
Percent Generalist, Omnivores, Insectivores	≤ 80	81 - 99	100	
Biomass per square meter	≥ 8.6	4.0 - 8.5	< 4.0	
Percent Lithophilic Spawners	≥ 61	32 - 60	< 32	
Warmwater Highlands			•	
Abundance per square meter	≥ 0.65	0.31 - 0.64	< 0.31	
Number of Benthic species *	≥ 0.25	0.11 - 0.24	< 0.11	
Percent Tolerant	≤ 39	40 - 80	> 80	
Percent Generalist, Omnivores, Invertivores	≤ 61	62 - 96	> 9	
Percent Insectivores	≥ 33	1-32	< 1	
Percent Abundance of Dominant Taxa	≤ 38	39 - 89	> 89	
Coldwater Highlands				
Abundance per square meter	≤ 0.88	0.89 - 2.24	> 2.24	
Percent Tolerant	≤ 0.22	0.23 - 0.81	> 0.81	
Percent Brook Trout	≥ 0.14	0.01 - 0.13	< 0	
Percent Sculpins	≥ 0.44	0.01 - 0.43	< 0	
-		1	1	

V	Maria	Thresholds				
Benthic IBIs (metrics)	5	3	1			
Coastal Plain						
Number of Taxa	≥ 22	14 – 21	< 14			
Number of EPT Taxa	≥ 5	2-4	< 2			
Number of Ephemeroptera Taxa	≥ 2	1 - 1	< 1			
Percent Intolerant Urban	≥ 28	10 - 27	< 10			
Percent Ephemeroptera	≥ 11	0.8 - 10.9	< 0.8			
Number of Scraper Taxa	≥ 2	1 – 1	< 1			
Percent Climbers	≥ 8	0.9 – 7.9	< 0.9			
Piedmont		_				
Number of Taxa	≥ 25	15 - 24	< 15			
Number of EPT Taxa	≥ 11	5 - 10	< 5			
Number of Ephemeroptera Taxa	≥ 4	2-3	< 2			
Percent Intolerant Urban	≥ 51	12 - 50	< 12			
Percent Chironomidae	< 24	24 -63	> 63			
Percent Clingers	≥ 74	31 - 73	< 31			
Combined Highlands						
Number of Taxa	≥ 24	15 - 23	< 15			
Number of EPT Taxa	≥ 14	8-13	< 8			
Number of Ephemeroptera Taxa	≥ 5	3-4	< 3			
Percent Intolerant Urban	≥ 80	38 - 79	< 38			
Percent Tanytarsini	≥ 4	0.1 - 3.9	< 0.1			
Percent Scrapers	≥13	3 - 12	< 3			
Percent Swimmers	≥18	3 - 17	< 3			
Percent Diptera	≤ 26	27-49	> 50			



Biological Condition of Maryland's Streams





Round Four Consists of Re-Sampling and Comparing Conditions from Some Sites Sampled During Rounds One and Two



2018 is the final data collection year for Round Four

High Quality Waters



MBSS data are also used to help identify some potential Use Class III (reproducing trout) waters







Stronghold Watersheds





Sentinel Sites

High Quality Streams
Natural Variability
Possible Climate Change
Reference for comparing other MBSS sites
Reference for evaluating restoration
Reference for evaluating protection



Sentinel Site temporal variability





Focus on Stream Restoration and Other Practices



Biology associated with physical and chemical variables



Temperature Ranges for Fish and Insects







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Biological Restoration Also Requires Unimpeded Access



Migratory American Eels influence stream biology













Non-Native Fish, Crayfish, Mussel Species in Maryland Streams



Stream Waders Volunteer Sampling





- Annual Training
- Family-level IBI
- 2018 Focus on DNR restoration project priority areas.

MBSS data are available on the streamhealth web site and by request



www.streamhealth.maryland.gov

Why Training?

- Make sure we use consistent protocols and provide quality data
- Offer an opportunity for others to participate and learn protocols

Why Certification?

To ensure and document consistency and comparability

Why Certification?

- Data of known quality for regulatory programs
- Increased non-DNR use of MBSS methods
- Demonstrate and document comparability
- Enhance data sharing
- Add datasets to StreamHealth website
- Qualify individuals to say "We use MBSS methods"

What is MBSS Certification?

- MBSS Certification is the process by which MD/DNR grants recognition to an individual who has proven that he or she has the knowledge, experience, and skills to perform specific MBSS protocols. The proof of this competence comes in the form of a certificate earned by <u>training, testing, and auditing</u>.
- MBSS Certification is NOT a license that infers any legal ability.

MBSS crew members participate in the same training and testing as non-DNR folks applying for certification

Maryland Biological Stream Survey Certifications Currently Offered

•Benthic Macroinvertebrate Sampling

•Benthic Macroinvertebrate Laboratory Processing and Sub-sampling

•Fish Crew Leader

•Fish Taxonomy

Possible Future Certification Opportunity

•Physical Habitat Assessment

Possible Future MBSS Focus

- Round Four stream symposium
- Biological Condition Gradient
- Environmental DNA
- Structure for motion technology
- Stream Waders stream side assessment
- Certifications in other MBSS protocols



Maryland Biological Stream Survey Personnel

Questions?

