Monitors checklist for the Va. SOS modified method

1) Choose a site (riffle) that is accessible (public property or with landowner permission) and that has the stream water bubbling over cobblestone sized rocks (3"-10" at the widest part of the particle). We strongly encourage monitors to avoid DEQ monitoring sites and the mixing zone of permitted wastewater discharges.

2) Use a Va. SOS seine net. This mesh is important for quality assurance purposes.

3) Approach the riffle from downstream (so as not to disturb potential collection areas) and position the net just below a spot with maximum bubbling action and a predominant number of cobbles. (approx. 45 degree angle) The net should be spread as widely as possible and set to allow a direct flow of water into the center of the net.

4) The monitor that will do the rubbing should take some cobbles from OUTSIDE the area to be sampled and rub them underwater (and outside of the "net zone")before gently laying them on the bottom of the net to anchor the net to the stream bottom.

5) The person holding the net will then time the other monitor to allow the rubbing of rocks for twenty seconds immediately upstream of the net. The final five seconds will be announced and for that time the "rubber" will scratch the stream bottom with their fingers or a garden cultivator type tool to collect any organism that live in the substrate.

6) Rub the "anchor" stones to remove any critters that may have attached themselves and with a forward and scooping motion remove the net from the stream. Examine the net for any organisms that are not macroinvertabrates (minnows or salamanders) and return them to the stream.

7) Take the net to the streamside and place it on a sheet that will allow for identification of any organisms that may pass through the mesh. Use ice cube trays and dishes to pick ALL organisms. Examine both sides of the net and the sheet beneath to obtain a rigorous count of all aquatic macroinvertabrates that were caught.

8) Repeat this procedure until a composite of all nets yields a total of organisms in excess of 200. Remember to thoroughly pick each net and add the total to the previous total. The time devoted to rubbing can be modified according to the judgment of the monitors but can not exceed 90 seconds per "dip". Also, no more than 4 "dips" can be made in pursuit of exceeding 200 organisms. If the monitors fail to find 200 organisms in 4 "dips" the calculation shall be made with the total that is obtained. Special note of this fact should be made in reporting the data.

9) With the individual counts of the organisms according to the categories as listed on the Va. SOS identification sheet and the total of all categories, calculate the six percentages (metrics) and combine them into one index value using the Va. SOS field calculation sheets. Be sure to report your results to Va. SOS ASAP.

Do this four times a year (every 3 months). Thank you for being a Va. SOS monitor!!!

SAFETY

Four things to remember when monitoring your stream…

1. Always remember to wash your hands after getting into any stream. The VA SOS method can not detect bacteriological pollution.
2. Glass may be hidden in the bottom of the stream - watch out for it!
3. If you do get a cut or scrape while in the stream, use peroxide to clean the wound. Again, bacteriological pollution...
4. Always sample in pairs!

POLLUTION

Sources of Pollution

When people talk about water, they talk about *point source pollution* and *nonpoint source pollution*

1. Point source pollution comes from a specific source: a pipe, a ditch, a container. It has a beginning point and an end point. Here's an easy way to remember, you can point to the pipe that's causing the problem.
2. Nonpoint source pollution comes from many scattered sources. It occurs when water (runoff) moves across and under the ground (think rain storm). The runoff picks up natural and man-made pollutants as its moves across the land. Then the runoff deposits the pollutants at the bottom of the watershed, into streams, rivers, lakes, estuaries, and even underground aquifers. Can you point to the problem? You might be able to point to different sources - but you can't tell if, when, or how the source is getting into the waterbody.

Types of Pollution

1. Toxic pollution, like DDT or other chemicals that cause organisms to die and can threaten human health. Toxic pollution can come from pipes or barrels (point source), but it can also come from runoff (nonpoint source).
2. Sediment pollution can clog our waterways, ruin habitat and clog the gills of organisms in the stream. Lack of vegetative cover and impervious surfaces both have an impact on sedimentation.
3. Nutrient pollution can cause plant life in a stream to overgrow; depleting oxygen and sometimes causing the temperature of the stream to get too high. Nutrients can come from fertilizers used in lawns and gardens and animal waste or human waste (nonpoint source or point source).
4. Bacteria pollution can cause human health problems - usually gastrointestinal. Bacteria pollution comes from animal and human waste (nonpoint source or point source).

For Office Use Only
Name of Reviewer_____
Date Reviewed_____
Data sent to_____
VA SOS Data Entry Date _____

Virginia
Save Our Streams
Stream Quality Survey

The purpose of this form is to aid you in gathering and recording important data about the health of your stream. By keeping accurate and consistent records of your observations and data from your macroinvertebrate count, you can document changes in ecological condition. Refer to the Virginia Citizen Monitor's Methods Manual for instructions on how to collect and identify stream macroinvertebrates. *Please note, this method was designed and tested for conditions in the state of Virginia and may not be appropriate in other areas.*

Date_____

Stream_____ Station_____ # of participants_____

Group or individual_____

Name of certified* monitor_____

County_____ Latitude_____ Longitude_____

Location (please be specific) _____
_____

Average stream width _____ft Average stream depth _____in

Flow rate: High_____ Normal_____ Low_____ Negligible_____

Weather last 72 hours _____
_____

Water Temperature_____°F (Please specify if reporting temperature in Celsius)

Collection Time:

Net 1:_____sec

Net 2:_____sec

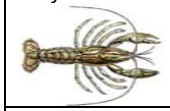
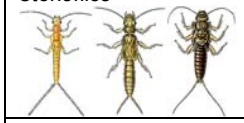
Net 3:_____sec

Net 4:_____sec

Other comments:
_____
_____
_____
_____
_____
_____
_____

Please send data sheets to your regional coordinator or to VA SOS, P.O. Box 8297, Richmond, Va 23226. If you have any questions about the modified method or this particular collection, please call 804-615-5036 or e-mail stacey@vasos.org

* Your data is most useful when you pass your certification. Please contact VA SOS to schedule your certification!

Macroinvertebrate	Tally	Count
Worms 		
Flat Worms 		
Leeches 		
Crayfish 		
Sowbugs 		
Scuds 		
Stoneflies 		
Mayflies 		
Damselflies and Dragonflies 		
Hellgrammites, Fishflies, and Alderflies 		

Macroinvertebrate	Tally	Count
Common Netspinner 		
Most Caddisfly 		
Beetles 		
Midges 		
Blackflies 		
Most True Fly 		
Gilled Snail 		
Lunged Snail 		
Clams 		
Other Subsurface Invertebrates		
TOTAL NUMBER OF ORGANISMS IN SAMPLE		

Individual Metrics

Metric Number	Metric Organism Group	Number of metric organism		Total number of organisms in the sample		Percent (This is your value for this metric)
1	Mayflies + Stoneflies + Most Caddisflies		÷		Multiply by 100	**%**
2	Common Netspinners		÷		Multiply by 100	**%**
3	Lunged Snails		÷		Multiply by 100	**%**
4	Beetles		÷		Multiply by 100	**%**

Metric 5 - % Tolerant

Taxon	Number
Worms	
Flatworms	
Leeches	
Sowbugs	
Scuds	
Dragonflies and Damselflies	
Midges	
Black Flies	
Lunged Snails	
Clams	
Total Tolerant	
Total Tolerant divided by the total number of organisms in the sample	
Multiply by 100 **This is your Value for Metric 5**	

Metric 6 - % Non-Insects

Taxon	Number
Worms	
Flatworms	
Leeches	
Crayfish	
Sowbugs	
Scuds	
Gilled Snails	
Lunged Snails	
Clams	
Total Non-Insects	
Total Non-Insects divided by the total number of organisms in the sample	
Multiply by 100 **This is your Value for this Metric 6**	

EXAMPLE

Metric	Metric Organism Group	Number of metric		Total number		Percent
1	Mayflies + Stoneflies +	80	÷	204	X 100	**39.2%**
2	Common Netspinners	40	÷	204	X 100	**19.6%**
3	Lunged Snails	0	÷	204	X 100	**0%**
4	Beetles	9	÷	204	X 100	**4.4%**

METRIC 5 - % Tolerant

Taxon	Number
Worms	10
Flatworms	0
Leeches	0
Sowbugs	5
Scuds	0
Dragonflies and Damselflies	5
Midges	20
Black Flies	10
Lunged Snails	0
Clams	10
Total Tolerant	60
Total Tolerant divided by the total number of organisms in the sample	204
Multiply by 100 - **This is your Value**	29.4

Metric 6 - % Non-Insects

Taxon	Number
Worms	10
Flatworms	0
Leeches	0
Crayfish	5
Sowbugs	5
Scuds	0
Gilled Snails	10
Lunged Snails	0
Clams	10
Total Non-Insects	40
Total Non-Insects divided by the total number of organisms in the sample	204
Multiply by 100 - This is your Value	19.6

Metric Number	Metric Organism	Your Metric Value	2	1	0
1	% Mayflies + Stoneflies + Most	39.2	Greater than 32.2 X	16.1 – 32.2	Less than 16.1
2	% Common Netspinners	19.6	Less than 19.7 X	19.7 – 34.5	Greater than 34.5
3	% Lunged Snails	0	Less than 0.3 X	0.3 – 1.5	Greater than 1.5
4	% Beetles	4.4	Greater than 6.4	3.2 – 6.4 X	Less than 3.2
5	% Tolerant	29.4	Less than 46.7 X	46.7 – 61.5	Greater than 61.5
6	% Non-Insects	19.6	Less than 5.4	5.4 – 20.8 X	Greater than 20.8
	Subtotals:		Total # of 2s: 4	Total # of 1s: 2	Total # of 0s: 0
			Multiply by 2: 8	Multiply by 1: 2	Multiply by 0: 0

Now add the 3 subtotals to get the Save Our Streams Multimetric Index score:_____10_____

_X_Acceptable ecological condition (9 to 12)
_____ Ecological conditions cannot be determined at this time (Gray Zone) (8)
_____Unacceptable ecological condition (0 to 7)

Save Our Streams Multimetric Index

Write your metric value from the previous page in the 2nd column (Your Metric Value). Determine whether each metric should get a score of 2,1, or 0 – depending upon the range of your metric value. Put a check in the appropriate box for your metric value under 2,1, or 0. Count the total number of 2's, 1's, and 0's. Follow the multiplication at the bottom of the chart to determine your Save Our Streams Multimetric Index score and determine whether the site has acceptable or unacceptable ecological condition.

Metric Number	Metric Organism	Your Metric Value	2	1	0
1	% Mayflies + Stoneflies + Most Caddisflies		Greater than 32.2	16.1 – 32.2	Less than 16.1
2	% Common Netspinners		Less than 19.7	19.7 – 34.5	Greater than 34.5
3	% Lunged Snails		Less than 0.3	0.3 – 1.5	Greater than 1.5
4	% Beetles		Greater than 6.4	3.2 – 6.4	Less than 3.2
5	% Tolerant		Less than 46.7	46.7 – 61.5	Greater than 61.5
6	% Non-Insects		Less than 5.4	5.4 – 20.8	Greater than 20.8
			Total # of 2s:	Total # of 1s:	Total # of 0s:
			Multiply by 2:	Multiply by 1:	Multiply by 0:
		Subtotals:			

Now add the 3 subtotals to get the Save Our Streams Multimetric Index score:_____

_____Acceptable ecological condition (9 to 12)

_____ Ecological conditions cannot be determined at this time (Gray Zone) (8)

_____Unacceptable ecological condition (0 to 7)

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Fish water quality indicators	**Barriers to fish movement**	**Surface water appearance**
scattered individuals scattered schools trout (pollution sensitive) bass (somewhat sensitive) catfish (pollution tolerant) carp (pollution tolerant)	beaver dams man-made dams waterfalls (>1ft.) other none	clear milky clear, tea colored black colored sheen (oily) foamy other _____ muddy gray
Stream bed deposit (bottom) gray orange/red yellow black brown silt sand other _____	**Odor**: none musky oil sewage other _____	**Stability of steam bed**: Bed sinks beneath your feet in: no spots a few spots many spots
Algae color: light green dark green brown coated matted on stream bed hairy	**Algae located**: everywhere in spots ____ % bed covered	**Stream Channel Shade**: >75% full 50%-74% high 25%-49% moderate 1%-24% slight none
Stream bank composition ____% trees ____% shrubs ____% grass ____% bare soil ____% rocks ____% other _____	**Stream bank erosion potential** >75% severe 50%-75% high 25%-49% moderate 1% - 24% slight none	**Riffle composition** (=100%) ___ % silt (mud) ___ % sand (1/64"-1/4" grains) ___ % gravel (1/4"-2" stones) ___ % cobbles (2"-10" stones) ___ % boulders (>10" stones)

Land uses in the watershed: Record all land uses observed in the watershed area upstream and surrounding your sampling site. Indicate whether the following land uses have a high (H), moderate (M), or slight (S) potential to impact the quality of your steam. (Leave the space blank if there is no impact or if the land use is not present in your watershed.) Refer to the SOS standard operating procedures to determine how to assess H, M, or S.

___ Oil & gas drilling ___ Housing developments ___ Forest ___ Logging ___ Urban uses (parking lots, highways, etc.	___ Sanitary landfill ___ Active construction ___ Mining (types) _____ ___ Cropland (types) _____	___ Trash dump ___ Fields ___ Livestock pasture ___ Other _____ _____ _____

Describe the amount of litter in and around the stream. Also describe the type of litter in and around the stream.

_____
_____

Comments: Indicate what you think are the current and potential threats to your stream's health. Feel free to attach additional pages or photographs to better describe the condition of your stream._____
_____