

Stream Health Data Sheet

Record information on this sheet as you conduct assessments to determine overall health of your stream. There are three stream assessments for this investigation: (1) **physical**, rating the condition of the stream habitat based on observable characteristics; (2) **biological**, using living animals present to indicate stream health; and (3) **chemical**, testing the water quality based on the chemical content of the stream. Use all three to get a more thorough rating of your stream's health. You may share your findings and compare data with others on the [Maryland Student Stream Health](#) map.

Stream Site and Stream Investigator's Information

Name (Teacher / Observer)	Date	Time of Day
School or Organization Name	Group Members	
Stream Study Site Name (used for stream study permit, example: ERMS19 Rocky Gap HS Science Team)		
Name of Stream	River or Body of Water (into which stream flows)	
Latitude _____ degrees NORTH	Longitude _____ degrees WEST	

Weather

Today's Air Temperature: _____ ° C or ° F	Today's Humidity: _____ %
Today's Cloud Cover: _____ Clear _____ Partly Cloudy _____ Cloudy	Yesterday's Precipitation: https://water.weather.gov/precip/ _____ Inches
How could yesterday's weather affect today's field investigation?	
PREDICTION: Do you think this stream is healthy or unhealthy? Support your prediction and explain why you think so.	

Stream Health Assessment: Instructions

Next, use the three stream assessments in this data sheet to guide your investigations. At the end of each section, you will use your tests and observations to give your stream a rating for that individual assessment. Then, at the end, use the results from all three assessments to determine an overall stream health rating. How does this rating compare with the prediction you made above?

This "Stream Health Data Sheet" was originally created and designed by Amanda Sullivan for "Explore and Restore Maryland Streams", MD Department of Natural Resources, circa 2016. Modifications have been made to the original by Jen Wolfe, 2019.

Physical Assessment: Stream Corridor Assessment

Based on Stream Corridor Assessment protocols developed by Kenneth Yetman, adapted by Amanda Sullivan and Alison Armocida, MD Department of Natural Resources.

Instructions: Observe the stream habitat in and around the water and use the accompanying Stream Corridor Assessment [photographs](#) to rank each characteristic. Based on your findings, you will give your stream habitat a rating.

CHARACTERISTIC	Good (4)	Fair (3)	Marginal (2)	Poor (1)	Score
Floodplain Vegetation	Lots of plants, bushes, and trees along banks and floodplain.	Some plants, bushes, and trees along banks and floodplain.	Most trees and bushes are gone.	Very little plant life at all along banks and floodplain.	
Channel Alteration	Channel formed by natural processes and allowed to bend often around rocks and wood.	Channel straightened in some places but some natural bends are still present.	Channel mostly straightened but vegetation still present and no cement.	Channel straightened and flowing along a paved channel.	
Embeddedness – Are there rocks on the bottom covered in silt?	Rocks and cobbles cover almost all of the stream bed. Very little sand or silt between rocks.	Rocks and cobbles cover most of the stream bed. Some sand/silt between and on rocks.	Rocks and cobbles more than halfway buried (embedded) into sand/silt.	Rocks and cobbles entirely buried by sand and silt.	
Erosion	Banks only slightly above the surface of the water.	Banks somewhat higher above the surface of the water.	Banks significantly above the surface of the water.	Banks extremely high compared to water surface.	
Attachment Sites for Macroinvertebrates	Lots of different sized rocks, wood, and plenty of leaf litter.	Only small, gravel sized rocks, some wood and leaf litter present.	No rocks or wood but some leaf litter present.	No rocks, no wood, no leaf litter present.	
Shelter for Fish	Lots of pools, woody debris, and undercut banks present in the water.	Some pools, wood, and undercut banks present.	Few pools, wood, and undercut banks present.	No pools, no wood, no undercut banks present in the water.	
Riparian Buffer Width (Estimate or Measure)	More than 50ft of trees and brushy vegetation extending out from EACH bank of the stream.	20-50ft of trees and brushy vegetation extending out from EACH bank of the stream.	5-20ft of trees and brushy vegetation extending out from EACH bank of the stream.	0-5ft of trees and brushy vegetation extending out from EACH bank of the stream.	

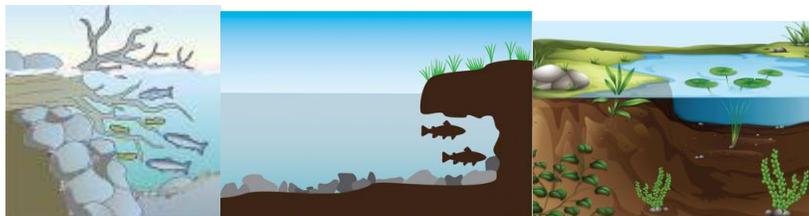
Biological Assessment: Macroinvertebrate Survey

Collection Method

Kick seine or D-Net (circle the method used)

If using a kick seine, collect 3 samples.

If using a D-Net, collect 20 samples and record the number of samples taken from each of the habitat areas in the table to the right.



Benthic Habitat Sampled

Habitat	# of Samples
Riffle	
Root wads/Woody debris/Leaf pack	
Submerged vegetation	
Undercut banks	
Other (Specify):	
TOTAL	20

Your Stream's Biotic Index

Check all of the macroinvertebrates that you find in your stream and calculate the stream's water quality rating. (You may also record the number of each captured, but to calculate the rating at the bottom, only count each KIND of animal once, regardless of the quantity found).

✓	Sensitive	✓	Less Sensitive	✓	Somewhat Tolerant	✓	Tolerant
	Case maker caddisflies		Net-spinning caddisflies		Freshwater clams		Aquatic sow bugs
	Mayflies		Crane flies		Freshwater mussels		Black flies
	Stoneflies		Dragonflies		Planarian		Midge flies
	Water pennies		Riffle beetles		Gilled snails		Leeches
	Hellgrammites				Crayfish		Lunged Snails
					Scuds		Damselflies
							Aquatic worms
	# of checkmarks		# of checkmarks		# of checkmarks		# of checkmarks
	_____		_____		_____		_____
	# above x 3 =		# above x 2 =		# above x 1 =		# above x 0 =
	_____		_____		_____		_____

Biological Water Quality Rating:

Add up the numbers you calculated for all four categories above. Write the total number here: _____

Circle the rating that corresponds to the total of your columns.

Good: >22

Fair: 17 – 22

Marginal: 11 – 16

Poor: <11

Explore and Restore Maryland Streams ratings correspond with the Maryland Biological Stream Survey (MBSS) and Maryland Stream Waders ratings of streams found on the Stream Health website. Stream sites rated **Good** are shown there in green, **Fair** in yellow, and **Marginal/Poor** in red.



Sizes shown are for mature larvae/nymphs or adult animals, but individuals in earlier stages of development may be significantly smaller

Explore & Restore Maryland Streams Key to Stream Macroinvertebrates

Companion to the Explore & Restore Stream Health Data Sheet



NO LEGS

Shell

No shell

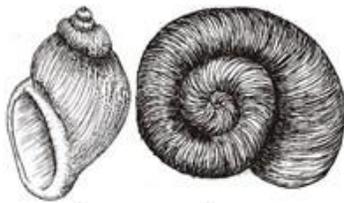
Single

Double

Gilled snail
Spiral, open on right



Lunged snail
Spiral with opening on left or coiled



Clam
Small, whitish tan or brown



Mussel
Large (upto 5"), elongate, dark in color



Leech
Suckers, expands and contracts, soft, slimy body



Midge
Dark head, body white, gray or reddish



Aquatic worm
Small, hair-like or thicker like earthworm, can reach 2 1/2" long



Black fly
Black head, shaped like a bowling pin



Crane fly
Plump, grub-like, often can see guts



Planaria
Flat, triangular head, soft, unsegmented body



Sizes shown are for mature larvae/nymphs or adult animals, but individuals in earlier stages of development may be significantly smaller

Explore & Restore Maryland Streams Key to Stream Macroinvertebrates

Companion to the Explore & Restore Stream Health Data Sheet

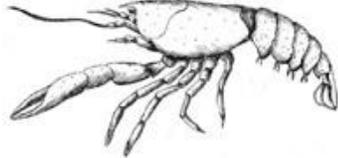


LEGS

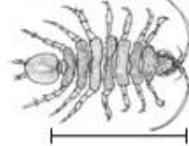
10+ legs

3 pairs of legs

Crayfish
Lobster-like, can reach 6" long



Aquatic sowbug
Two long antennae, flatter top to bottom



Scud
Shrimp-like, swims on side



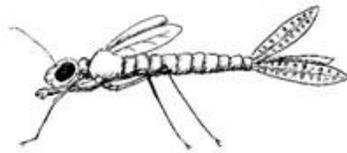
2 tails

Mayfly
Thread-like tails, gills along abdomen



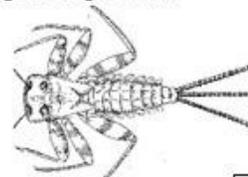
Damselfly

Paddle-like "tails", no gills along abdomen



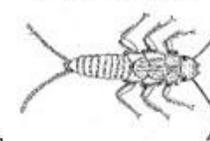
Mayfly

Thread-like tails, gills along abdomen



3 tails

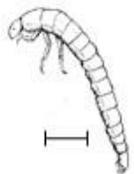
Stonefly
Thread-like tails, gill tufts under legs



No obvious tails

Riffle beetle

Larva- Brown, hardened body, no gills on abdomen



Adult- small, dark, crawls on bottom



Water penny

Flat, oval disk



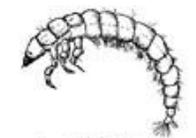
Casemaker caddisfly

May be housed in a case of sticks, stones, sand or leaves



Net spinning caddisfly

Dark head, tan, green or orangish body, gill tufts may be present on abdomen, 1 or 3 armored plates behind head



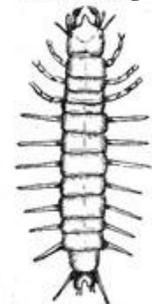
Dragonfly

Large eyes, bullet shaped or leaf-like body



Hellgrammite

Large pinching jaws, feelers down sides, can reach 4" long



Chemical Assessment: Water Quality Testing

- (1) Follow instructions provided with each test kit to test different parameters.
- (2) Record your data here:

	Water Temperature (C°)	Dissolved Oxygen (DO) (mg/L)	Dissolved Oxygen (DO) % Saturation <small>See conversion chart</small>	pH	Phosphate (mg/L)	Nitrate (mg/L)	Transparency (cm)	Turbidity (JTU ~ = NTU)	Total Dissolved Solids (TDS) (ppm = mg/L)	Conductivity (µs/cm)
Trial 1										
Trial 2										
Trial 3										

- (3) Circle the corresponding value here:

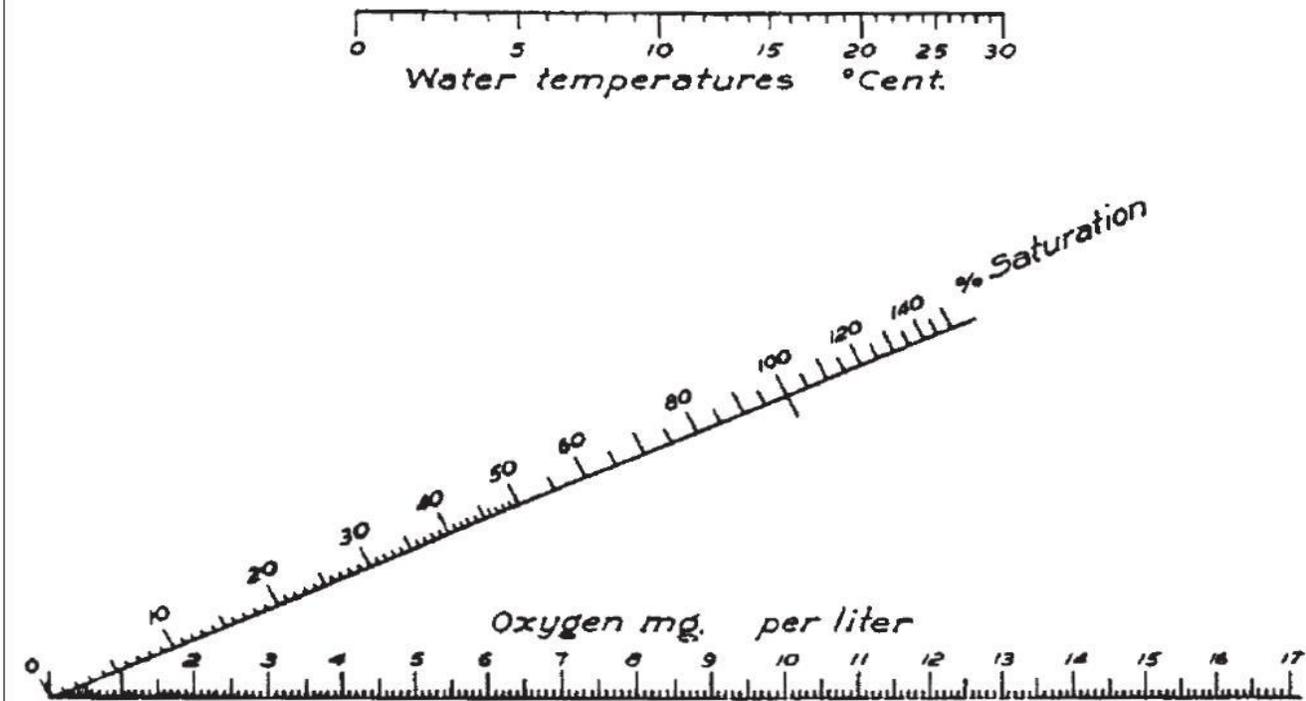
Water Quality Summation for Chemical Tests				
Parameter	GOOD	FAIR	MARGINAL	POOR
Dissolved Oxygen (DO) (mg/L)	>=7	>=6 - <7	>=5 - <6	<5
pH (units)	>=7 - <=7.5	>=6.5 - <7.0 >7.5 - <=8.5	>=5.5 - <6.5 >8.5 - <=9.0	<5.5 >9.0
Phosphate (PO ₄ X ³) (mg/L)	0 - <=0.1	>0.1 - <=0.2	>0.2 - <=1.0	>1.0
Nitrate (NO ³) (mg/L)	<1.5	>1.5 - <=2.6	>2.6 - <=3.8	>3.8
Temperature (°F/°C)	Not to exceed > 68°F/20°C			
Transparency (cm)	>=65	<65 - >=35	<35 - >=5	<5
Turbidity (JTU ~ = NTU)	0 - <=4	>4 - <=10	>10 - <=20	>20
Total Dissolved Solids (ppm = mg/L)	0 - <=150	>150 - <=250	>250 - <=350	>350
Conductivity (µs/cm)	0 - <=170	>170 - <=240	>240 - <=500	>500

Water Quality thresholds above are based on [MDE \(Maryland Department of the Environment\)](http://www.mde.state.md.us) Maryland specific data updated in 2018.

Based on your tests and observations, how would you rate the overall water quality for this stream? For example, if you had some Good, some Poor, but mostly Fair, you might give an overall of Fair.

Chemical Water Quality Rating:	Good	Fair	Marginal	Poor
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FINDING THE PERCENT SATURATION OF DISSOLVED OXYGEN



To read this chart, use a straight edge. Place the straight edge on the mg/L of oxygen you have determined for your site, then place the other end of the straight edge on the water temperature you have measured. The point where the straight line passes through the line labeled “% Saturation” is your percent saturation.

Diagram reprinted with permission from M.K. Mitchell and W. B. Stapp, *Field Manual for Water Quality Monitoring*

Overall Stream Health Assessment

Record your ratings from all three of the tests above (Physical, Biological, and Chemical) here:

Based on your tests and observations, how would you rate the health of your stream overall?

Assessment	Good	Fair	Marginal	Poor
Stream Corridor Assessment – Physical				
Macroinvertebrate Survey – Biological				
Water Quality Tests - Chemical				

Comments:

OVERALL STREAM HEALTH _____

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“Explore and Restore Maryland Streams” – Maryland Department of Natural Resources - 2019