WATER QUALITY VOLUNTEER COALITION

(Short Form)

WATER MONITORING SITE PHYSICAL & CHEMICAL DATA PAGE-1

Revised November 2023

SITE ID #	
SITE NAME	
DATE	**TIME**
RECORDER	MONITOR/#
MONITOR/#	MONITOR/#
MONITOR/#	MONITOR/#
MONITOR/#	MONITOR/#

PRECIPITATION			
choose one		*choose one*	
CURRENT		**PAST 24 HR**	
	Storm		Storm
	Rain (continuous)		Rain (continuous)
	Shower (intermittent)		Showers (intermittent)
	Overcast		Overcast
	Clear		Clear

WATER APPEARANCE			
choose at least one by check mark			
	Clear		Foamy
	Orange/red		Milky/white
	Dark brown		Muddy/cloudy
	Green		Multi-colored
	Other (describe below):		

WATER ODORS			
choose at least one by check mark			
	Chlorine		Fishy
	Sulfur		Sewage
	Musty		Earthy
	Manure		Spicy
	Other (describe below):		
	No unusual smells		
	Non-wadable stream		

SEDIMENT DEPOSITS					
choose at least one by check mark					
	Sludge		Gravel		Paper Fiber
	Silt		Mud		Sand
	Other (describe below):				
	No unusual sediments				

STREAM TYPE			
choose at least one by check mark			
	Straight		Channelized
	Meandering/curved		Pool/Riffle
Any other dams present?			Yes
			No

Level of high water above the present stream level (*meters*) _____ *m*

Is this an estimate?		Yes
		No

STREAM BANK			
X-Section Shape		**Erosion**	
	V-Shape		No sign of erosion
	U-Shape		Occasional areas of erosion
	Rectangular		Extensive erosion
	Banks undercut		Rock/concrete stabl. present

STREAM BOTTOM			
At least one entry			
INORGANIC + ORGANIC MUST = 100%			
INORGANIC	**%**	**ORGANIC**	**%**
Bedrock (solid)		Muck-mud	
Boulder >25 cm		Pulpy peat	
Cobble 6.25 - 25 cm		Fibrous peat	
Gravel 0.25 - 6.25 cm		Detritus	
Sand up to 0.25 cm		Logs, limbs	
Silt soft fine sand		Marl (gray, shell frag)	
Clay sticky fine sand		Other:	
Other:		Non-wadable stream	
		TOTAL = 100%	

Observations/Notes:

Internal Use Only:

Flow Factor: 0.8 or 0.9

Lancaster County Conservation District

WATER QUALITY VOLUNTEER COALITION

(Short Form)

WATER MONITORING SITE PHYSICAL & CHEMICAL DATA PAGE-2

PREDOMINANT SURROUNDING LAND USE

Estimated by percentage

At least one entry required

	%		%
Wetlands		Commercial	
Forest		Industrial	
Cropland		Unused/abandoned	
Pasture		Shrubs/small trees	
Residential		Other:	
No change in land use from previous sampling			
TOTAL = 100%			

AVERAGE TEMPERATURE

Air	(_____°F + _____°F)/2 = _____**°F** (_____°C + _____°C)/2 = _____**°C**
Water	(_____°F + _____°F)/2 = _____**°F** (_____°C + _____°C)/2 = _____**°C**

AVERAGE STREAM DEPTH

Conversion: _____ ft * 0.3048 = _____ meters

Average *(m)*:	
Non-Wadable	

AVERAGE STREAM WIDTH

Conversion: _____ ft * 0.3048 = _____ meters

Average *(m)*:	
Non-Wadable	

AVERAGE STREAM VELOCITY

Velocity (m/s) = distance (m) / average time (s)

Velocity *(m/s)*:

STREAM FLOW VOLUME

*Flow Volume = width (m) * depth (m) * velocity (m/s)*

Flow Meter ID *(if applicable)*	
Flow Volume *(m^3/s)*	
Non-wadable stream	

Internal Use: (Vol * Factor) → **Final Flow Vol** =

For questions or concerns, contact noellelafaver@lancasterconservation.org or amandagoldsmith@lancasterconservation.org

CHEMICAL DATA

Readings deemed unusual for the site should be questioned

Every 6 visits, perform a duplicate for quality assurance

Parameter	**Water Quality Guidelines**	Original Reading	Duplicate Reading
pH[1] (pH Units)	*6.0 – 9.0*		
Dissolved Oxygen[1] (mg/l)	*≥ 6.0 mg/l*		
Specific Conductivity[2] (µS/cm)	*50 – 1,500 µS/cm*		
Nitrates[1] (ppm = mg/l)	*≤ 10 mg/l as Nitrogen*		
Phosphates (ppm)	-		
Salinity[3] (ppt)	*≤ 1 ppt*		
Total Alkalinity[1] (mg/l)	*≥ 20 mg/l*		
TDS[1] (mg/l)	*≤ 750 mg/l*		
Turbidity (FAU=NTU)	-		
Calibration Data	Specific Conductivity	pH	
Calibration Std.		*4.01*	*7.01*
Std. Solution Readback (Check)			

Water Quality Guidelines derived from PA Code 25, Chapter 93[1], US EPA[2], and USGS[3]. These values help indicate the health of a stream and should only be used as a reference. They do not indicate the range of the instrument

Reagent Lot Numbers/Exp Date:

Lancaster County Conservation District

- Nitrate:
- Phosphate:
- Bromocresol Green:

Equipment

- pH Probe ID:
- Colorimeter #:

Observations/Notes:

Biosurvey: Field Data Sheets for the Lancaster County WQVC Program

ALL of the following data sheets MUST be filled out entirely for the web host. Make sure include all of the monitors' names and be sure to write clearly and use a pencil or water proof pen.

Date: year_____month_____day_____ Time_____hour_____minute_____
(NOTE: Time hr./min. on 24-hour clock, as 10:10 for AM or 22:10 for PM)

County of PaSEC_____Site ID #_____

Recorder Monitors'Information:

Name:_____ID#_____
Name:_____ID#_____
Name:_____ID#_____
Name:_____ID#_____
Name:_____ID#_____

Stream Information

Watershed Name_____
Waterbody Name_____
Township_____County_____State_____
Site Description_____
Site ID#_____
Length of Assessed Area (meters):_____

Precipitation

In the Past 24 hours:
- ☐ Storms (heavy rains >2.5 cm)
- ☐ Rain (steady rain 0.85 cm to 2.5 cm)
- ☐ Showers (intermittent rain up to 0.85 cm)
- ☐ Overcast
- ☐ Clear

Current:
- ☐ Storms (heavy rains >2.5 cm)
- ☐ Rain (steady rain 0.85 cm to 2.5 cm)
- ☐ Showers (intermittent rain up to 0.85 cm)
- ☐ Overcast
- ☐ Clear

Sketch of Site

On your sketch, note features that affect stream habitat, such as: riffles, runs, pools, ditches, wetlands, dams, riprap, outfalls, tributaries, landscape features, logging paths, vegetation, and roads

Macroinvertebrate Survey

Type of Stream

□ Rocky-bottom □ Muddy-bottom

Macroinvertebrate Count

Identify the macroinvertebrates (to order) in your sample using the identification card. We are only concerned with organisms that appear on the identification card. Record the number of organisms below.

Group I – Sensitive

_____ Water Penny
_____ Dobsonfly Hellgrammite
_____ Gilled Snail
_____ Riffle Beetle Adult
_____ Non net spinning caddisfly
_____ Mayfly
_____ Stonefly

Group II – Somewhat Sensitive

_____ Beetle Larvae
_____ Damselfly
_____ Fishfly
_____ Alderfly
_____ Scuds
_____ Dragonfly
_____ Cranefly
_____ Net spinning caddisfly
_____ Sowbug
_____ Clam
_____ Crayfish

Group III – Tolerant

_____ Aquatic Worm
_____ Blackfly
_____ Midge
_____ Leech
_____ Snail

The following letter codes will be assigned automatically to each count when it is entered into the database.

R (rare) = 1-9 organisms; C (common) = 10-99 organisms; or D (dominant) = 100 plus organisms

The database will then calculate the water quality score for the stream site by adding together assigned index values (a factor by which each count is multiplied) for each group. The Water Quality Score for a stream site will fall into one of the following categories:

_____ Good >40 _____ Fair 20 – 40 _____ Poor <20

Water Quality Rating

To calculate the index value, add the number of letters found in the three groups above and multiply by the indicated weighing factor.

Group I – Sensitive

(# of R's) x 5.0 = _____
(# of C's) x 5.6 = _____
(# of D's) x 5.3 = _____
Sum of the Index Value for Group I = _____

Group II – Somewhat Sensitive

(# of R's) x 3.2 = _____
(# of C's) x 3.4 = _____
(# of D's) x 3.0 = _____
Sum of the Index Value for Group II = _____

Group I – Tolerant

(# of R's) x 1.2 = _____
(# of C's) x 1.1 = _____
(# of D's) x 1.0 = _____
Sum of the Index Value for Group III = _____

To calculate the water quality score for the stream site, add together the index values for each group. The sum of these values equals the water quality score

WATER QUALITY SCORE = _____

Physical Habitat Evaluation Form for Riffle/Run Prevalence

Waterbody Name:	GIS Key (YYYYMMDD-hhmm-User):
Location:	
Investigators:	Completed By:

Parameter	Optimal	Suboptimal	Marginal	Poor
†**1. Instream Cover**[1] *(fish)*	Greater than 50% mix of boulder, cobble, submerged logs, undercut banks, or other stable habitat.	30-50% mix of boulder, cobble, or other stable habitat; adequate habitat.	10-30% mix of boulder, cobble, or other stable habitat; habitat availability less than desirable.	Less than 10% mix of boulder, cobble, or other stable habitat; lack of habitat is obvious.
	20 19 18 17 16	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1**
†**2. Epifaunal Substrate**[1] *(riffle quality)*	Well-developed riffle and run; riffle is as wide as stream and length extends two times the width of stream; abundance of cobble.	Riffle is as wide as stream but length is less than two times width; abundance of cobble; boulders and gravel common.	Run area may be lacking; riffle not as wide as stream and its length is less than 2 times the stream width; gravel or large boulders and bedrock prevalent; some cobble present.	Riffles or run virtually nonexistent; large boulders and bedrock prevalent; cobble lacking.
	20 19 18 17 16	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1**
†***3. Embeddedness**[1] *(evaluate in upstream & central portions of riffles)*	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
	20 19 18 17 16	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1**
4. Velocity/Depth Regimes[1]	All four velocity/depth regimes present (slow-deep, slow shallow, fast-deep, fast shallow)	Only 3 of the 4 regimes present if fast-shallow is missing, score lower than if missing other regimes.)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score lower than if missing other regimes).	Dominated by 1 velocity/depth regime (usually slow-deep).
	20 19 18 17 16	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1**
5. **Channel Alteration**[2] *(only include downstream alteration when affecting reach)*	No channelization or dredging present.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging (greater than 20 yr.) may be present, but recent channelization is not present.	New embankments present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement over 80% of the stream reach channelized and disrupted.
	20 19 18 17 16	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1**
***6. Sediment Deposition**[2] *(evaluate in pools & depositional areas)*	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar information, mostly from coarse gravel; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel coarse sand on old and new bars; 30-50% of the bottom affected; sediment deposits at obstruction, construction and bends, moderate depositions of pools prevalent.	Heavy deposits of fine material increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	20 19 18 17 16	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1**

Note: Wadeable couplet scores only calculated if the Wadeable Riffle-Run Protocol (Chapter 3.1) is used. Semiwadable couplet score only calculated if Semiwadeable Large River Protocol (Chapter 3.4) is used.

*** WADEABLE COUPLET SCORE (EMBEDDEDNESS + SEDIMENT DEPOSITION)** _____

† SEMIWADEABLE TRIPLET SCORE (INSTREAM COVER + EPIFANUAL SUBSTRATE + EMBEDDEDNESS) _____

Note: Wadeable couplet scores only calculated if the Wadeable Riffle-Run Protocol (Chapter 3.1) is used. Semiwadable triplet score only calculated if Semiwadeable Large River Protocol (Chapter 3.4) is used.

Parameter	Optimal	Suboptimal	Marginal	Poor
7. Riffle Frequency[2] *(riffle quantity; consider run:bend ratio)*	Occurrence of riffles relatively frequent; distance between riffles divided by the width of the stream equals 5 to 7; variety of habitat.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream equals 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is >25.
	20 19 18 17 16	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1**
8. Channel Flow Status[2]	Water reaches base of both lower banks and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	20 19 18 17 16	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1**
****9. Condition of Banks**[3] *(edge of water to bankfull delineation)*	Banks stable; no evidence of erosion or bank failure.	Moderately stable; infrequent, small areas of erosion mostly healed over.	Moderately unstable; up to 60% of banks in reach have areas of erosion.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; on side slopes, 60-100% of bank has erosional scars.
LDB	**10 9 8**	**7 6**	**5 4 3**	**2 1**
Total RDB	**10 9 8**	**7 6**	**5 4 3**	**2 1**
****10. Bank Vegetative Protection**[3] *(edge of water to bankfull delineation)*	More than 90% of the stream bank surfaces covered by vegetation.	70-90% of the stream bank surfaces covered by vegetation.	50-70% of the stream bank surfaces covered by vegetation.	Less than 50% of the stream bank surfaces covered by vegetation.
LDB	**10 9 8**	**7 6**	**5 4 3**	**2 1**
Total RDB	**10 9 8**	**7 6**	**5 4 3**	**2 1**
11. Grazing or Other Disruptive Pressure[3] *(bankfull through riparian zone)*	Vegetative disruption through grazing or mowing is minimal or not evident; almost all plants allowed to grow naturally.	Disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	Disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Disruption of stream bank vegetation is very high; vegetation has been removed to 2 inches or less in average stubble height.
LDB	**10 9 8**	**7 6**	**5 4 3**	**2 1**
Total RDB	**10 9 8**	**7 6**	**5 4 3**	**2 1**
12. Riparian Vegetative Zone[3] *(bankfull through riparian zone)*	Width or riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
LDB	**10 9 8**	**7 6**	**5 4 3**	**2 1**
Total RDB	**10 9 8**	**7 6**	**5 4 3**	**2 1**

**** WADEABLE COUPLET SCORE (CONDITION OF BANKS + BANK VEGETATIVE PROTECTION)** _____

TOTAL HABITAT SCORE _____

[1] Reach scale: Evaluate parameter within the immediate vicinity of biological sampling reach.

[2] Expanded scale: Evaluate parameter within sampling reach and at least 100m UPS of sampled reach, longer if visual extent allows.

[3] Macro scale: Evaluate parameter based on expanded scale; can be extended further to account for characteristics within representative reach.

Water Monitoring Field Data Sheet *(p 5 of 12)*

Stream Flow Volume or Discharge Check to see if the United States Geological Survey (USGS) has the information for Stream Flow Volume or Discharge for your site. Check this Internet address:

water.usgs.gov/
"USGS Water Resources of the United States"
Look under "Water Data"; "Real-time"

If stream discharge data is available for your site, you can use this information rather than performing the procedures on the following pages (stream width, depth, and velocity). Make sure to check for this information BEFORE you go out to the stream site.

If the USGS does not have this information for your site, make sure to do all of the physical assessments and all of the math to save yourself or your SEC's designated Web Host time.

Stream Width Determine the average width of wadeable streams by measuring at 5 places within your sampling area and dividing the total by 5. For the purpose of converting feet to meters use: feet x 0.3048 = meters.

_____ + _____	+ _____	+ _____	+ _____	+ _____	= _____	÷ 5 = _____
meters	*meters*	*meters*	*meters*	*meters*	*meters*	*meters*
Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*	*Total*	*Average Width*

____ Non-wadeable Stream
For non-wadeable streams, if you have recorded stream width, note WHAT you have done below.
Notes: _____
_____
_____

Stream Depth Determine the average depth for wadeable streams by measuring at 5 equal intervals along the width of the stream and dividing the total by 5. For the purpose of converting use: inches x 2.54 =centimeters centimeters ÷ 100 = meters.

_____ + _____	+ _____	+ _____	+ _____	+ _____	= _____	÷ 5 = _____
meters	*meters*	*meters*	*meters*	*meters*	*meters*	*meters*
Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*	*Total*	*Average Depth*

____ Non-wadeable Stream
For non-wadeable streams, if you have recorded stream depth, note WHAT you have done below.
Notes: _____
_____
_____

Date _____/_____/_____
Site ID # _____

Water Monitoring Field Data Sheet *(p 6 of 12)*

Surface Velocity

Complete the following steps to determine the surface velocity of wadeable streams:

1. Measure and mark a 10 meter distance at your stream site, using the depth management line as the up stream mark. Each of the 5 intervals marked off to measure stream depth should be used as starting points for the weighted bobber.

2. Release the bobber at each of the 5 intervals, and time how long it takes the bobber to travel from the upstream mark down 10 meters to the downstream mark.

3. Divide the 10 meter distance by the travel time of the bobber to determine the stream's surface velocity.

4. Run the test 5 times, once at each of the 5 intervals you used for measuring depth along the transect, and take the average.

Trial #1: _____ meters ÷ _____ time (seconds) = _____ meters per second

Trial #2: _____ meters ÷ _____ time (seconds) = _____ meters per second

Trial #3: _____ meters ÷ _____ time (seconds) = _____ meters per second

Trial #4: _____ meters ÷ _____ time (seconds) = _____ meters per second

Trial #5: _____ meters ÷ _____ time (seconds) = _____ meters per second

Total = _____ ÷ 5 = _____ meters per second

Average Velocity

_____ Non-wadeable stream

For non-wadeable streams, if you have recorded surface velocity, note WHAT you have done below.

Notes: _____

_____

_____

Date _____/_____/_____

Site ID # _____

Water Monitoring Field Data Sheet *(p 7 of 12)*

Stream Flow Volume or Discharge
Calculate the streamflow volume (cubic meters/second - cms) using the above measurements.
Check here if stream discharge data was obtained from the USGS. ____
Enter this data below as the Stream Flow Volume in cubic meters/second.
(You will need to convert cubic feet/second to cubic meters/second.)
For the purpose of converting cfs (cubic feet/second) to cms use: cfs x 0.0283 = cms

w x d x v x k = cms

_____	X	_____	X	_____	X	_____	= _____ cms
Avg. Width (meters)		Avg. Depth / (meters)		Avg. Velocity / (meters sec.)		k * / (stream bottom constant)	Streamflow Volume

*k = stream bottom constant (0.8 if it's rubble/gravel or 0.9 if it is sand, mud, silt or bedrock)

Ice Coverage, if any (refer to page 46) _____%

Snow Depth, if any _____inches

Wildlife seen (alive or dead) or heard – Please identify species (see Extras Appendix) when possible, and/or take a photo when able.

_____
_____
_____
_____

Seasonal Changes Observed

_____
_____
_____

Weather Notes (example: our county is under a drought watch, tornados touched down in area earlier this week)

_____
_____
_____
_____

Date _____/_____/_____ **Site ID #** _____