Water Quality Volunteer Coalition

Water Monitoring Site Physical & Chemical Data Page - 1

Updated June 2026

Site ID #:	**Site/Waterbody Name:**
Date:	**Time:**
Recorder:	
Monitor(s):	Equipment:

Precipitation

Current Conditions		*Past 24 Hours*
☐	Stormy Weather	☐
☐	Rain (Continuous)	☐
☐	Showers (Intermittent)	☐
☐	Overcast Skies	☐
☐	Clear Skies	☐

Stream Bank Characteristics

*complete **both** cross -section shaope & erosion section*

Cross-Section Shape

- ☐ V-shape
- ☐ U-shape
- ☐ Rectangular
- ☐ Banks undercut

Erosion

- No sign of erosion ☐
- Occasional areas of erosion ☐
- Extensive erosion ☐
- Artifical stabl. present (rock/log) ☐

Water Appearance

choose at least one by check mark

- ☐ Clear
- ☐ Orange/Red
- ☐ Dark Brown
- ☐ Green
- ☐ Other (describe): _____
- ☐ Foamy
- ☐ Milky/White
- ☐ Muddy/Cloudy
- ☐ Multi-colored

Water Odors

choose at least one by check mark

- ☐ No smell
- ☐ Chlorine
- ☐ Fishy
- ☐ Earthy
- ☐ Other (describe): _____
- ☐ Sewage
- ☐ Manure
- ☐ Musty
- ☐ Non-wadeable stream

Sediment Deposits

choose at least one by check mark

- ☐ No unusual sediments
- ☐ Other (describe):
- ☐ Silt
- ☐ Gravel
- ☐ Mud
- ☐ Paper Fiber
- ☐ Sand
- ☐ Sludge

Stream Type

✳ *if applicable*

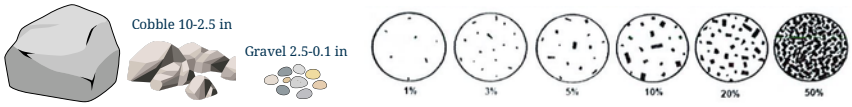
choose at least one by check mark

- ☐ Straight
- ☐ Meandering
- ☐ Channelized
- ☐ Pool/Riffle
- ✳ Estimated level of high water above present stream level: _____ *m*

Stream Bottom

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	%
• Coarse sand <0.25 cm	%	• Logs, limbs	%
• Silt - soft fine sand	%	• Marl (gray, shell frag)	%
• Clay, sticky fine sand	%	• Other:	%
• Other:	%	• Non-wadable stream	☐

Inorganic** + **Organic** **MUST** = **100%



Surrounding Land Use

*Estimated by percentage & **total** should = **100%***

• Wetlands	%	• Commercial	%
• Forest	%	• Industrial	%
• Cropland	%	• Unused/Abandoned	%
• Pasture	%	• Shrubs/Small trees	%
• Residential	%	• Other:	%

No change in land use from previous sampling ☐

TOTAL = 100%

Observation/Notes:

continue to next page

Contact: Noelle at noellelafaver@lancasterconservation.org or 717-874-2557 | **Grace** at gracechamberlain@lancasterconservation.org

Water Quality Volunteer Coalition

Water Monitoring Site Physical & Chemical Data Page - 2

Site ID #:

Site/Waterbody Name:

Physical Stream Dimensions & Characteristics

Stream Width *(m)*

- Stream width is measured across stream from water edge to water edge
- Measured upstream & downstream (~10 meters or 32 feet apart)
- **Conversion:** *1 foot = 0.3048 meters* (_____ feet x 0.3048 = _____ meters)

	Upstream	Downstream
Width in Feet	_____ *ft*	_____ *ft*
	x 0.3048 ↓	*x 0.3048 ↓*
Width in Meters	_____ *m*	_____ *m*

Average Stream Width *(m)* 💧 *(upstream + downstream) / 2 =* _____ ***m***

Stream Depth *(m)*

- Stream depth is measured at three* to five locations evenly spaced across stream width
- Measured at same locations stream width was taken **(up & downstream)**
- **Conversions:** *1 inch = 2.54 cm, 1 cm = 0.01 meters*

Depth samples across stream	Upstream	Downstream	Unit
• Sample 1 (LT side looking up)*			
• Sample 2			
• Sample 3 (stream center)*			
• Sample 4			
• Sample 5 (RT side looking up)*			

Average Stream depth *(m)* 💧 _____ ***m***

Conversions: _____ ***cm*** *x 0.01 =* _____ ***m*** **OR** _____ ***in*** *x 0.0254 =* _____ ***m***

Stream Velocity *(m/s)*

- If using bobber method - perform test at least 3 times*; time (sec) for bobber to **travel 10 m**
- If using flow meter - only one measurement necessary; ensure propeller is in middle of water column

Velocity Readings	Bobber Method	Flow Meter
• Sample 1 (LT side looking up)*	*sec*	
• Sample 2	*sec*	
• Sample 3 (stream center)*	*sec*	*m/s*
• Sample 4	*sec*	
• Sample 5 (RT side looking up)*	*sec*	

Bobber Method Calculation: 10 m / _____ *(Avg time (sec)) = average surface velocity*

Average Stream Velocity 💧 _____ ***m/s***

Stream Flow/Volume

Stream flow *(m^3/s) = avg width* ***x*** *avg depth* ***x*** *avg velocity*

_____ ***m x*** _____ ***m x*** _____ ***m/s =*** _____ ***m^3/s***

avg width 💧 *avg depth* 💧 *avg velocity* 💧 ***x flow factor*** *(if applicable)* ***0.8 or 0.9***

Observation/Notes:

Water Chemistry

Average Temperature

Take 2 readings and then average them

Air *Use weather app or thermometer*	(_____°F + _____°F) / 2 = _____°F
	(_____°C + _____°C) / 2 = _____°C
Water *Use DO meter*	(_____°F + _____°F) / 2 = _____°F
	(_____°C + _____°C) / 2 = _____°C

Parameter *Equipment*	*Water Quality Guidelines*	Original Reading	Duplicate Reading
Dissolved Oxygen[1] *DO Meter / YSI (mg/l)*	≥ 6.0 mg/l		
pH[1] *PocketPro*	6.0 - 9.0		
Specific Conductivity[2] *PocketPro (µS/cm)*	50 - 1,500 µS/cm		
Total Dissolved Solids[1] *PocketPro (mg/l)*	≤ 750 mg/l		
Salinity[3] *PocketPro (ppt)*	< 1 ppt		
Total Alkalinity[1] *Alkalinity Kit (mg/l)*	≥ 20 mg/l		
Nitrate[1] *Colorimeter (mg/l)*	≤ 10 mg/l		
Phosphate *Colorimemter (mg/l)*	-		
Turbidity *Colorimeter (NTU)*	-		

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

Nitrate Reagent (Lot # & Exp):

Phosphate Reagent (Lot # & Exp):

Alkalinity Reagent (Lot # & Exp):

Contact: Noelle at noellelafaver@lancasterconservation.org or 717-874-2557 | **Grace** at gracechamberlain@lancasterconservation.org

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 #** _____

Biosurvey: Field Data Sheets *(p 1 of 3)*

Macroinvertebrate Survey

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)

Site ID#_____ Creek:_____

Recorder Information
Name_____

Monitor Information
Name_____

Monitor Information
Name_____

Monitor Information
Name_____

Monitor Information
Name_____

Precipitation In the past 24 hours:
___ Storm (heavy rain > 1in)
___ Rain (steady rain ¼in to 1in)
___ Showers (intermittent rain up to ¼in)
___ Overcast
___ Clear

Current:
___ Storm (heavy rain > 1in)
___ Rain steady rain ¼in to 1in)
___ Showers (intermittent rain up to ¼in)
___ Overcast
___ Clear

Type of Stream
_____ Rocky-bottom
_____ Muddy-bottom

LANCASTER COUNTY Conservation District

Please return this form to Grace Chamberlain and/or Noelle Cudney at the Lancaster County Conservation District

Biosurvey: Field Data Sheets *(p 2 of 3)*

Macroinvertebrate Count

Identify the macroinvertebrates (to order) in your sample using the identification sheets. We are only concerned with organisms that appear on the identification sheets. Record the number of organisms below and then assign them letter codes based on their abundance:

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

example: 20 (C) *WaterPenny larvae*

Group I - Sensitive

_____ (____) Water Penny larvae
_____ (____) Hellgrammites
_____ (____) Mayfly nymphs
_____ (____) Gilled snails
_____ (____) Riffle beetle adults
_____ (____) Stonefly nymphs
_____ (____) Non-net spinning caddisfly larvae (case-making & free-living)

Group II - Somewhat Sensitive

_____ (____) Beetle larvae
_____ (____) Clams
_____ (____) Cranefly larvae
_____ (____) Crayfish
_____ (____) Damselfly nymphs
_____ (____) Dragonfly nymphs
_____ (____) Scuds
_____ (____) Sowbugs
_____ (____) Fishfly larvae
_____ (____) Alderfly larvae
_____ (____) Net-spinning caddisfly larvae

Group III - Tolerant

_____ (____) Aquatic worms
_____ (____) Blackfly larvae
_____ (____) Leeches
_____ (____) Midge larvae
_____ (____) Snails

Biosurvey: Field Data Sheets *(p 3 of 3)*

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 III – 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 = _____

Compare this score to the following number ranges to determine the quality of your stream site.

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

- *Note: The tolerance groupings (Group I, II, III) and the water quality rating categories were developed for streams in the Mid-Atlantic states.*

Contact Information

Grace Chamberlain - gracechamberlain@lancasterconservation.org or 717-874-2565

Noelle Cudney - noellelafaver@lancasterconservation.org or 717-874-2557

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.