

WATER QUALITY VOLUNTEER COALITION

(Short Form)

WATER MONITORING SITE PHYSICAL & CHEMICAL DATA PAGE-2

PREDOMINANT SURROUNDING LAND USE			
<i>Estimated by percentage</i>			
<i>At least one entry required</i>			
	%		%
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	
<i>Conversion:</i> _____ ft * 0.3048 = _____ meters	
Average (m):	
Non-Wadable	

AVERAGE STREAM WIDTH	
<i>Conversion:</i> _____ ft * 0.3048 = _____ meters	
Average (m):	
Non-Wadable	

AVERAGE STREAM VELOCITY	
<i>Velocity (m/s) = distance (m) / average time (s)</i>	
Velocity (m/s):	

STREAM FLOW VOLUME	
<i>Flow Volume = width (m) * depth (m) * velocity (m/s)</i>	
Flow Meter ID <i>(if applicable)</i>	
Flow Volume (m³/s)	
Non-wadable stream	
<i>Internal Use: (Vol * Factor) → Final Flow Vol =</i>	

CHEMICAL DATA			
<i>Readings deemed unusual for the site should be questioned</i>			
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 93¹, US EPA², and USGS³. 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:



- Nitrate:
- Phosphate:
- Bromocresol Green:

Equipment

- pH Probe ID:
- Colorimeter #:

Observations/Notes:

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



Please return this form to Amanda Goldsmith 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	_____ (____) Riffle beetle adults
_____ (____) Hellgrammites	_____ (____) Stonefly nymphs
_____ (____) Mayfly nymphs	_____ (____) Non-net spinning caddisfly larvae (case- making & free-living)
_____ (____) Gilled snails	

Group II - Somewhat Sensitive

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

Group III - Tolerant

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

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
†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
†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
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. 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
*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

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

Parameter	Optimal	Suboptimal	Marginal	Poor	
7. Riffle Frequency² (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 Status²	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 Banks³ (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 Protection³ (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 Pressure³ (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 Zone³ (bankfull through riparian zone)	Width of 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 =	_____
<i>meters</i>		<i>meters</i>		<i>meters</i>		<i>meters</i>		<i>meters</i>		<i>meters</i>		<i>meters</i>
<i>Sample 1</i>		<i>Sample 2</i>		<i>Sample 3</i>		<i>Sample 4</i>		<i>Sample 5</i>		<i>Total</i>		<i>Average Width</i>

_____ 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 =	_____
<i>meters</i>		<i>meters</i>		<i>meters</i>		<i>meters</i>		<i>meters</i>		<i>meters</i>		<i>meters</i>
<i>Sample 1</i>		<i>Sample 2</i>		<i>Sample 3</i>		<i>Sample 4</i>		<i>Sample 5</i>		<i>Total</i>		<i>Average Depth</i>

_____ 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

$$\frac{\text{Avg. Width}}{\text{(meters)}} \times \frac{\text{Avg. Depth}}{\text{(meters)}} \times \frac{\text{Avg. Velocity}}{\text{(meters sec.)}} \times \frac{k^*}{\text{(stream bottom constant)}} = \frac{\text{Streamflow Volume}}{\text{cms}}$$

*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 # _____