Site Observations
Background Information

Water Color
Green: May indicate an overabundance of algae caused by nutrients from surrounding land (fertilizer runoff, inadequate sewage treatment, animal wastes, high organic material, erosion)

Orange-red: May indicate acid mine drainage, oil well runoff, natural staining from swamps rich in tannins, or water enriched with iron in groundwater or scrap metal site.

Brown (tea colored): May indicate natural staining from tannic acids (oak & pine), or fine silt from erosion

Milky white: May indicate glacial sources of water, pulp and paper mill discharges, dairy discharge / spill, or fine silt from clay source.

Reds/purples/blues: May indicate dyes from leather tanning, printing operations, clothing manufacturing, etc...

Water Appearance
Muddy / Cloudy: May indicate erosion or sedimentation (construction sites, heavy foot or automobile traffic, agriculture), or bottom disturbance (dredging, high populations of bottom feeding fish like carp)

Oily sheen: May indicate oil runoff from road surfaces, petroleum discharge, or natural break down of organic material

Foam: May indicate detergents or soaps, high levels of phosphorus from fertilizers, or mixture of natural oils from soil and break down of organic material

Liter / Trash: Always indicates presence of humans either at site in areas that drain to site.

Water Odors
Rotten eggs (sulfur): May indicate sewage pollution or decomposition in environment lacking oxygen (bottom of pond)

Musky: May indicate the presence of untreated sewage, livestock waste, excess algal growth, or heavy decomposition

Harsh/bitter/acid: May indicate industrial or commercial waste

Chlorine: May indicate excessive chlorination of waste water through direct discharge or groundwater contamination

Appearance of Pond Bottom
Observations of the bottom of aquatic systems can help to make inferences about the history or geology of the site that may determine present habitat suitability - i.e.) heavy silt may show a recent disturbance to the pond (erosion), whereas observing a sand bottom with little or not organic matter may show a stable system, with slower plant growth, and cleaner water conditions.

Habitat Structures
Presence of absence of habitat within an area can impact organisms by providing proper food, water, shelter, and space. Elimination of a specific habitat may not preclude an individual species from living there presently, but may alter the life cycle and long term survival of this species in that area. Habitat loss can have even greater negative impacts on certain species than pollution or contamination.

Habitat Around Shoreline
Surrounding habitat may help explain conditions and quality of water. Presence of a riparian buffer (vegetation around shoreline) and the ability to decrease overland flow and filter water before it enters water OR it could signify poor conditions resulting from human impacts (erosion or contaminated runoff). Observations expanded to the larger landscape can increase the ability to make inferences about land use impacting conditions in the water.

Volunteer Stream Survey Form

This form was developed to meet the goals of the State of Michigan's Strategic Surface Water Quality Monitoring Program and the Muskegon Conservation District's Adopt-A-Watershed Program. The information will be used to restore and protect local water resources. Please send copies of your completed forms to 1) Muskegon Conservation District, 1001 E. Wesley, Muskegon, MI 49442, attn: Kathy Evans and to 2) MDEQ-Surface Water Quality Division, 350 Ottawa St. N.W., Grand Rapids, MI 49503, attn: Charamy Butterworth.

Section 1: General Information

Stream Name:_____ Site Number:_____

Location: _____ County: _____

Township/City: _____ Sec _____ T: _____ R: _____

Date: _____ Time: _____ Investigators: _____

Section 2: Weather Conditions

2.1 ( ) Sunny ( ) Partly Cloudy ( ) Cloudy ( ) Rain

2.2 Any precipitation in the Last 5 days? ( ) Yes ( ) No
If Yes, Approximate Amount:

2.3 Air Temperature (F) (C): Water Temperature (F) (C):

Section 3: Stream Habitat

3.1 Average Stream Width (ft): [ ] [1. _____ = 2. _____ + 3. _____] ÷ 3 = _____

3.2 Average Stream Depth (ft): [ ] [1. _____ = 2. _____ + 3. _____] ÷ 3 = _____

3.3 Surface Water Velocity (ft/sec.): [ ]

distance (ft): _____ distance (ft): _____ distance (ft): _____
time (sec): _____ time (sec): _____ time (sec): _____
[Trial 1 velocity: _____ + Trial 2 velocity: _____ + Trial 3 velocity: _____] ÷ 3 = _____

3.4 Estimated Flow (width x depth x velocity): [ ] cfs

3.5 Has the Stream Been Channelized? ( ) Yes ( ) No

3.6 Water Clarity/Coloration (describe): _____ Water Odor (describe): _____

3.7 Trash along banks? ( ) Yes ( ) No
Trash/Debris in Trees Above Stream? ( ) Yes ( ) No

3.8 Substrate (Report relative percentage of each. Leave blank if absent.)
_____Clay
_____Silt
_____Sand
_____Gravel (.25-2")
_____Cobble (2-10")
_____Boulder (>10")

3.9 Obvious siltation?
( ) Yes
( ) No

3.10 Substrate Embeddedness
( ) Completely
( ) Mostly (75%)
( )Halfway (50%)
( ) Little/None (0-25%)

Please provide additional notes and descriptions. Take pictures, too!

3.11 Riparian Vegetation
(Report relative percentage of each. Leave blank if absent.)
_____Trees
_____Shrubs
_____Herbaceous Plants
_____Grass
_____Bare
Other (please describe): _____

3.12 Stream Shading
( ) 75-100%
( ) 50-74%
( ) 25-49%
( ) 0-24%

3.13 Bank Erosion
( ) Extensive
( ) Moderate
( ) Little/None

3.14 Stream Habitat (Check all that are present)
( ) Riffles
( ) Runs
( ) Pools
( ) Eddies

3.15 Woody Debris
( ) Abundant
( ) Common
( ) Rare
( ) None

3.16 Dams Present: ( ) Yes ( ) No
If Yes: ( ) Man-made ( ) Beaver

3.17 Aquatic Plants: ( ) Periphyton ( ) Filamentous Algae ( ) Macrophytes
Are Any Of These Plants Very Abundant? ( ) Yes ( ) No

3.18 Surrounding Land Use: (Rank relative abundance 1 most common, etc. Leave blank if absent)

Woodland: _____ Wetland: _____ Open Field: _____ (Grassland / Meadow)

Farmland: _____ (Agricultural / Livestock) Residential: _____ Commercial: _____

Other (please describe): _____

3.19 Does the Road Ditch Discharge Directly To the Stream At the Crossing?
( ) Yes ( ) No

3.20 Any Obvious Pollution Sources? ( ) Yes ( ) No
If Yes, Please Describe:

Other Observations:

Please Attach Photos To Survey Form (downstream, upstream, and others of interest)

Sample Flow Data Sheet

Depth Conversion Chart

Inches	Tenths of ft.
3/8-7/8	0.05
1-1 1/2	0.1
1 5/8-2	0.15
2 1/8-2 5/8	0.2
2 3/4-3 1/4	0.25
3 3/8-3 7/8	0.3
4-4 3/8	0.35
4 1/2-5	0.4
5 1/8-5 5/8	0.45
5 3/4-6 1/4	0.5
6 3/8-6 7/8	0.55
7-7 3/8	0.6
7 1/2-8	0.65
8 1/8-8 5/8	0.7
8 3/4-9 1/4	0.75
9 3/8-9 7/8	0.8
10-10 3/8	0.85
10 1/2-11	0.9
11 1/8-11 5/8	0.95
11 3/4-12	1.0

Name: Vick Volunteer Date: 6/5/2002 Time: 9:30 AM Water Action Volunteers

Stream Sampled: Lee Creek Location: Berg Rd crossing, Iowa Co., T6N R2E, S10
(County, Road, Site # if known, Township, Range, Section)

1. SITE LOCATION

Length Assessed: 20 ft.

2. STREAM WIDTH & DEPTH

Stream Width: 7.85 ft.

If stream ≤ 20 ft. wide, measure depth every foot across the width. If stream is > 20 ft. wide, measure depth at 20 equal intervals across the entire width.

Interval	Depth (ft./in.)	Depth (10ths ft.)	Interval	Depth (ft./in.)	Depth (10ths ft.)
1	0	0	11		
2	6 3/8"	0.55	12		
3	7 5/8"	0.65	13		
4	8 1/4"	0.7	14		
5	9 5/8"	0.8	15		
6	1ft 1 1/2"	1.1	16		
7	9 3/4"	0.8	17		
8	8 1/8"	0.7	18		
9	7 1/4"	0.6	19		
10			20		
sum		5.9 ft.	← Add together →		ft. sum

Total Sum of depths: 5.9 ft.

5.9 ft. (sum of depths) ÷ 9 (# of intervals) = 0.66 ft. (Average Depth)

3. VELOCITY MEASUREMENT

Float Trials	Time (seconds)
1	11.62
2	11.59
3	9.66
4	9.22
sum	42.1

42.1 ÷ 4 (# of trials) = 10.5 sec. (Average Float Time)

20 ft. (length assessed) ÷ 10.5 sec. (ave. float time) = 1.9 ft./sec. (Ave. Surface Velocity)

4. CALCULATING STREAM FLOW

Correction value for rough, loose, coarse, weedy bottom: 0.8
Correction value for smooth bottom: 0.9

0.9 (correction value) × 1.9 ft./sec. (ave. surface velocity) = 1.7 ft./sec. (Corrected Surface Velocity)

Compute Ave. Cross-Sectional Area:

0.66 ft. (average depth) × 7.85 ft. (width) = 5.2 ft.² (Cross-Sectional Area)

5.2 ft.² (cross-sectional area) × 1.7 ft./sec. (corrected surface velocity) = 8.8 (STREAM FLOW: cubic feet per sec., round to the nearest tenth)

Name_____ Date_____ Time_____

Water Action Volunteers

Stream Sampled_____ Location_____
(County, Road, Site # if known, Township, Range, Section)

1. SITE LOCATION

Length Assessed: _____ ft.

2. STREAM WIDTH & DEPTH

Stream Width: _____ ft.

If stream ≤ 20 ft. wide, measure depth every foot across the width. If stream is > 20 ft. wide, measure depth at 20 equal intervals across the entire width.

Interval	Depth (ft./in.)	Depth (10^{ths} ft.)	Interval	Depth (ft./in.)	Depth (10^{ths} ft.)
1	0	0	11		
2			12		
3			13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		
	sum	_____ ft.	← Add together →		_____ ft. sum

Total Sum of depths: _____ ft

_____ ft. (sum of depths) ÷ _____ (# of intervals) = _____ ft. (Average Depth)

Compute Ave. Cross-Sectional Area:

_____ ft. (average depth) X _____ ft. (width) = _____ $ft.^2$ (Cross-Sectional Area)

3. VELOCITY MEASUREMENT

Float Trials	Time (seconds)
1	
2	
3	
4	
sum	

sum ÷ _____ (# of trials) = _____ sec. (Average Float Time)

_____ ft. (length assessed) ÷ _____ sec. (ave. float time) = _____ ft./sec. (Ave. Surface Velocity)

4. CALCULATING STREAM FLOW

Correction value for rough, loose, coarse, or weedy bottom: 0.8
Correction value for smooth bottom: 0.9

_____ (correction value) X _____ ft./sec. (ave. surface velocity) = _____ ft./sec. (Corrected Surface Velocity)

_____ $ft.^2$ (cross-sectional area) X _____ ft./sec. (corrected surface velocity) = **STREAM FLOW:** _____ cubic feet per sec. (round to the nearest tenth)

Stream Profile Sample

(See Experiment 7)