

A Day in the Life of the Buffalo River Data Results 2013

Participant: Reinstein Woods Staff

Date of Sampling: Friday, October 4th, 2013

Sampling Site: Red Jacket Riverfront Park
Smith St, Buffalo, NY

Waterway: Buffalo River

GPS Coordinates: 42.863623, -78.851860

Latitude: +42° 51' 49.04"

Longitude: -78° 51' 6.70"

Activity 1: Currents

1	2	3	4	5	6
Time (HH:MM am/pm)	Distance in 60 sec. (cm)	Speed (cm / sec)	Knots (cm / sec) / 51.44	Direction (East/West)	Ebb, Flood, Slack
10:45 AM	0	0	0	n/a	slack

Observation: The wind was blowing hard in the opposite direction of the current, and the two forces probably cancelled each other out so that the stick did not move with the current.

Does the current appear to be different mid-river than it is near the shoreline area?

No.

Is there anything about the river or shoreline that may cause the current near shore to flow in a different direction than mid-river? (pier, etc)

Concrete pier structure.

Is your sampling site located upstream or downstream from old industrial sites?

Both.

Is there any evidence of cleanup efforts at your site?

No – there was trash everywhere.

Based on your location and the river's history, form a hypothesis about the water quality at your sampling site.

The water quality will be poor because the site is located near industrial sites.

Activity 2: Weather and Wind

- Record weather conditions at the start of sampling and every hour afterwards.

Temperature conversions: $^{\circ}\text{C} = 0.556 \times (^{\circ}\text{F} - 32)$ $^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32$

Time	Air Temperature ° F	Air Temperature ° C
10:50 AM	70°F	21 °C

Cloud cover: (*check one*)

- Clear (0-25%) Partly cloudy (25-50%)
 Mostly cloudy (50-75%) Overcast (75-100%)

Precipitation: (*check one*)

- None
 Rain
 Snow
 Rain and snow
 Other, please specify: _____

Duration of precipitation:

- Under 1 hour
 1-3 hours
 Over 3 hours

2. Wind

Record wind direction: Southwest

(Remember: winds are named for the direction the wind is coming **from**)

Describe the river water: (*check one*)

- Choppy
- Rippled
- Calm
- Virtually flat

Beaufort Force #: 3

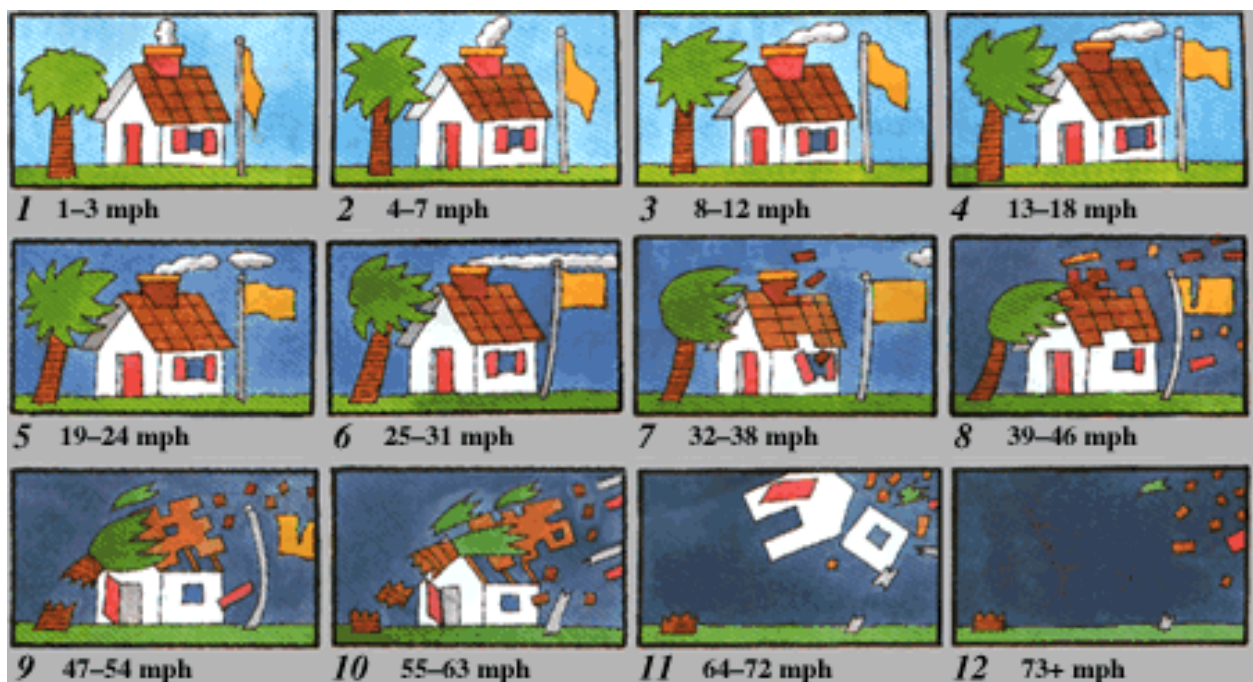
Describe any sudden changes in the wind or weather.

Drizzled rain for a few minutes, and then stopped.

Describe the weather conditions for the last three days. How could these recent conditions impact the data you collect today?

No data recorded.

The Beaufort Scale “Effects on Land.” Note the chimney smoke and flag for lower wind conditions.



Activity 3: The Environment at the Sampling Site

1. Using the list below, describe the land at and around your site.
 Estimated % urban/residential: 10
 Estimated % forested: 15
 Estimated % beach: 10
 Estimated % marsh: 5
 Estimated % industrial/commercial: 25
 Estimated % recreational: 35
 Estimated % vacant land: 0
 Estimated % other, please specify:

2. Shoreline appearance (*check all that apply*):
 - Beach area
 - Marsh
 - Covered with vegetation
 - Muddy
 - Pier
 - Debris
 - Bulkheading (wooden timbers or metal plates that hold the shore in place)
 - Pipe entering river
 - Riprap (large rocks piled up along the shore)
 - Other, please specify: bridges

3. What is the water depth at the sampling location? 6 inches near shore, ~20 feet mid-river

4. River *bottom* is predominantly: (*check one*)
 - Sandy
 - Muddy
 - Unable to determine
 - Rocky
 - Weedy

5. What percent of the river *bottom* is covered with vegetation? (*check one*)
 - 0-25%
 - 25-50%
 - Unable to determine
 - 50-75%
 - 75-100%

6. What percent of the river *surface* is covered with vegetation? (*check one*)
 - 0-25%
 - 25-50%
 - 50-75%
 - 75-100%

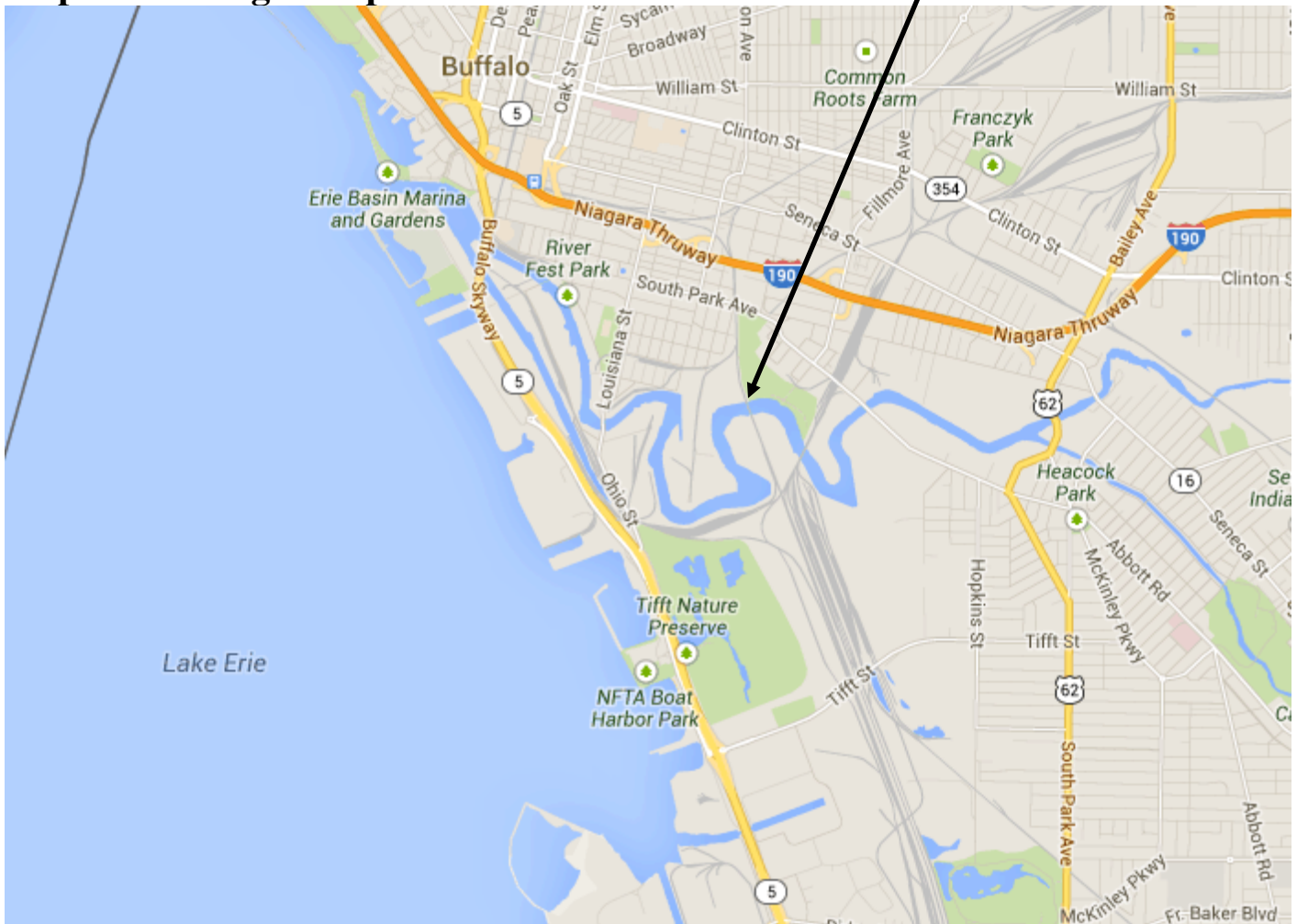
Describe three ways in which the environment at your sampling site can impact water quality either positively or negatively.

People in park littering
 Industrial pollution
 Ship traffic on river

Activity 4: Sketch a Map of the Sampling Site

Include a compass rose (N, S, E, W) and rough scale. Indicate specific locations where you sampled. Label landmarks, waterways and other notable features. If possible, take pictures and video of the sites and activities from several angles.

Map from Google Maps



Activity 5: Water Temperature

Describe Location #1: (check all that apply)

- Direct sun Flowing water Water covered with plants
 Shade Still water Pipe entering river

Additional description:

Overcast, otherwise location would've been in direct sun.

Location was very close to shore.

	Time	Water Depth	Reading 1	Reading 2	Average
Location #1	10:55 AM	15.25 cm (6 in.)	66.5° F	° F	° F
			19.5° C	° C	° C
			° F	° F	° F
			° C	° C	° C
			° F	° F	° F
			° C	° C	° C

Describe Location #2: (check all that apply)

No data recorded.

Describe Location #3: (check all that apply)

No data recorded.

Pollution Tolerance Index

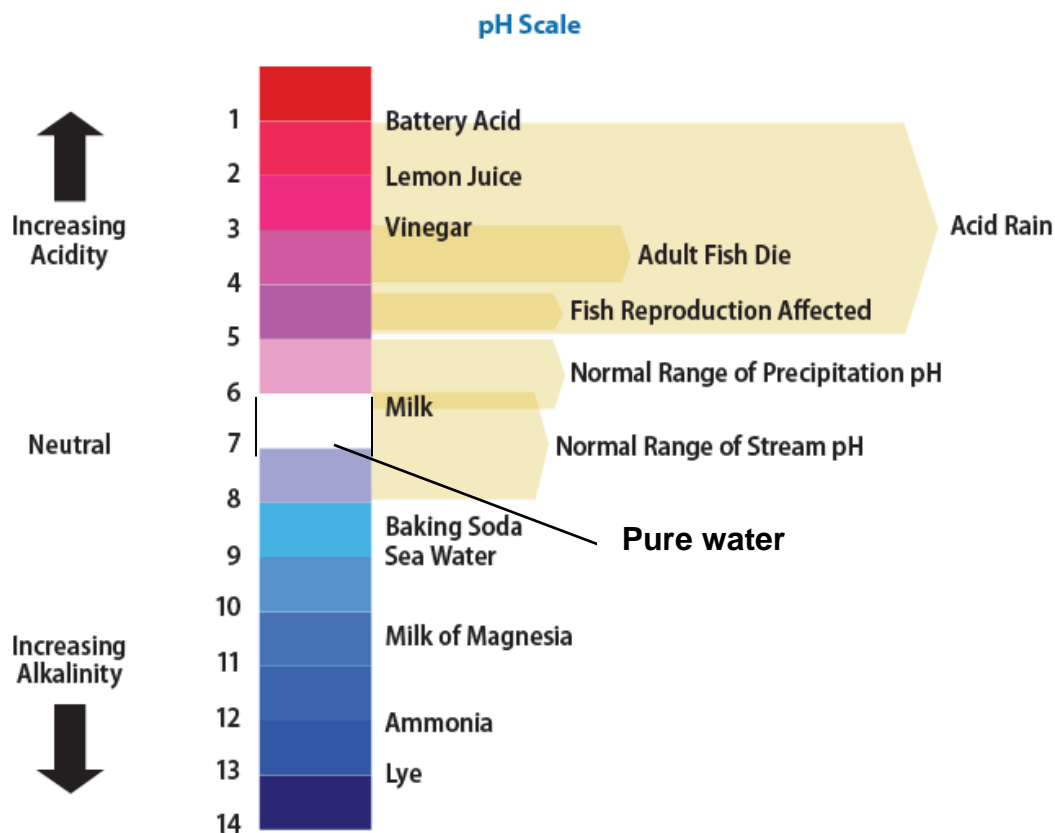
1. Place a check next to each macroinvertebrate group present in your sample. For example, whether you found one mayfly or 50 mayflies, place one check next to the mayfly line in Group 1.
2. Complete the chart for all of the macroinvertebrate groups.
3. Calculate the group scores using the multipliers provided.
4. Total all of the group scores for your Total Score.
5. Compare your Total Score with the Water Quality Assessment Chart scores and record the relative water quality rating for your stream sample.

Group 1 Macroinvertebrates: Very Intolerant	Group 2 Macroinvertebrates: Intolerant	Group 3 Macroinvertebrates: Tolerant	Group 4 Macroinvertebrates: Very Tolerant
_____ Stoneflies _____ Mayflies _____ Caddisflies _____ Dobsonflies	_____ Dragonflies <u> X </u> Scuds _____ Craneflies	_____ Midges _____ Leeches	_____ Pouch Snails _____ Aquatic Worms
# of checks _____ X 4 Group Score = _____	# of checks <u> 1 </u> X 3 Group Score = <u> 3 </u>	# of checks _____ X 2 Group Score = _____	# of checks _____ X 1 Group Score = _____
Total Score = <u> 3 </u> Your Water Quality Assessment: Potentially poor water quality		Water Quality Assessment Chart: ≤ 23 Potentially Excellent Water Quality 17-22 Potentially Good Water Quality 11-16 Potentially Fair Water Quality ≥ 10 Potentially Poor Water Quality	

Adapted from Project WET, 2011

Activity 7: Chemical Analysis

1. pH



Source: Recreated from Environment Canada. 2008. The pH scale. www.ec.gc.ca/eau-water/default.asp?lang=En&n=FD30C16-1.

Location	Time	pH
Shore	11:11 AM	7.5
Shore	11:15 AM	8

What is the average pH of the water at your site? Is it within the healthy range (6.5 - 8.2)?

Average = 7.75, within the healthy range

2. DISSOLVED OXYGEN:

Time	Temperature °C	DO ppm	% Saturation (see chart)
11:17 AM	20 *C	4.5	48

Did DO levels change throughout the day? What would cause it to change? (Hint: Compare these results with the data obtained in Activity 2: Wind and Weather.)

No data recorded.

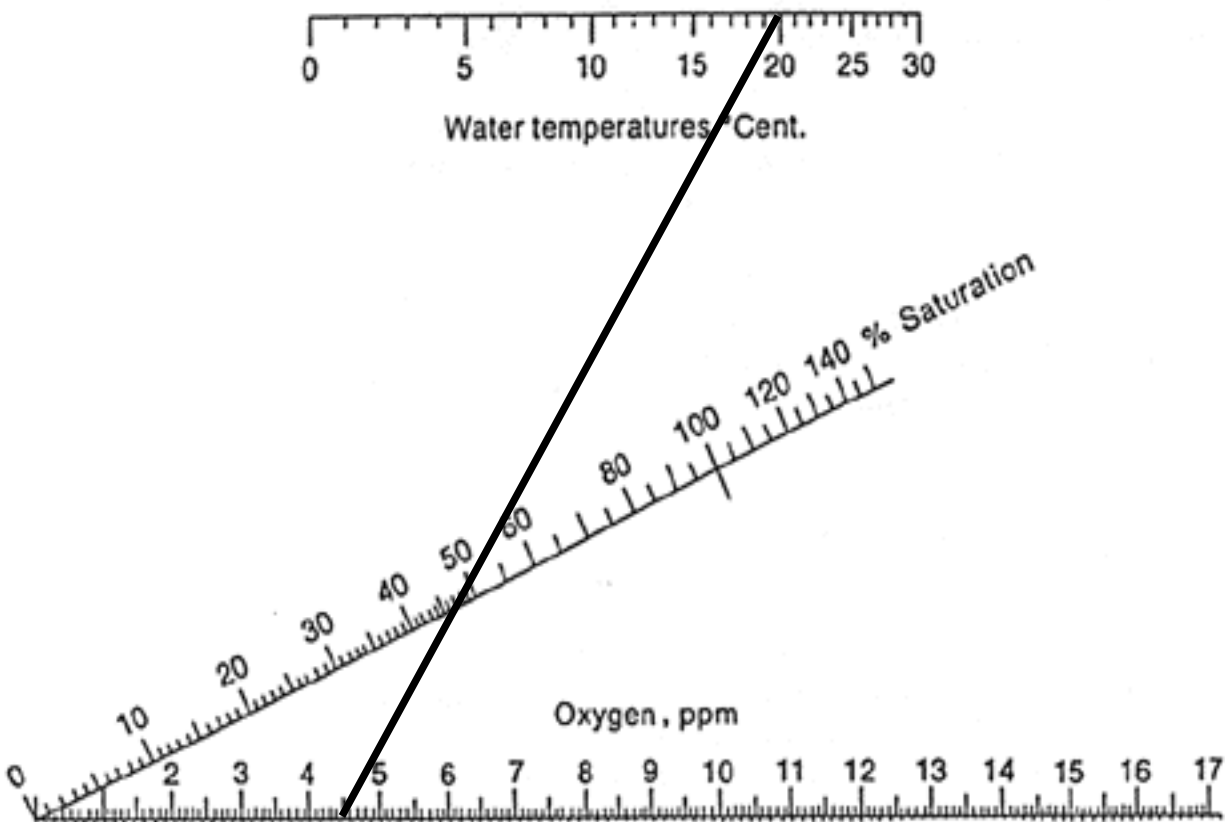
Based on the % saturation value, how would you describe the health of the water?

Potentially poor water quality.

Determining percent saturation: Percent **saturation** is a measure of how much dissolved oxygen is in the water and available for use by aquatic organisms.

Pair up the measured ppm of DO with the water temperature ($^{\circ}$ C). Draw a straight line between the two values. The percent saturation is the value where your drawn line intercepts the angled saturation scale. Waterways with a saturation value of 90% or greater are generally considered healthy.

Dissolved Oxygen - % Saturation



<http://www.waterontheweb.org/under/waterquality/oxygen.html>

A Day in the Life of the Buffalo River Data Results 2013

Participant: St. Lutheran's Homeschool Organization

Sampling Site: Cazenovia Park
25 Cazenovia Street Buffalo, NY 14220

Date of Sampling: Friday, October 4th, 2013

Waterway: Cazenovia Creek

GPS Coordinates: 42.845529, -78.806064

Latitude: +42° 50' 43.90"

Longitude: -78° 48' 21.83"

Activity 1: Currents

1	2	3	4	5	6
Time (HH:MM am/pm)	Distance in 60 sec. (cm)	Speed (cm / sec)	Knots (cm / sec) / 51.44	Direction (East/West)	Ebb, Flood, Slack
10:15 AM	228.6	3.81	.019	West	Ebb
10:40 AM	144	2.4	.046	West	Ebb
11:08 AM	393	6.5	.127	West	ebb
11:11 AM	121	2.03	.039	West	Ebb
11:30 AM	0	0	0	West	Slack
12:20 PM	167	2.79	.054	West	Ebb
12:35 PM	117	1.95	.038	West	Ebb

Does the current appear to be different mid-river than it is near the shoreline area?

Yes – stronger and faster mid-river

Is there anything about the river or shoreline that may cause the current near shore to flow in a different direction than mid-river? (pier, etc)

Bridge, plants, rocks

Is your sampling site located upstream or downstream from old industrial sites?

upstream

Is there any evidence of cleanup efforts at your site?

No

Activity 2: Weather and Wind

- Record weather conditions at the start of sampling and every hour afterwards.

Temperature conversions: $^{\circ}\text{C} = 0.556 \times (^{\circ}\text{F} - 32)$ $^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32$

Time	Air Temperature $^{\circ}\text{F}$	Air Temperature $^{\circ}\text{C}$
10:12 AM	72	22
10:30 AM	73	23
11:03 AM	73	23
11:28 AM	75	24
12:18 PM	77	25
12:34 PM	74	23

Cloud cover: (*check one*)

- Clear (0-25%) Partly cloudy (25-50%)
 Mostly cloudy (50-75%) Overcast (75-100%)

Precipitation:

- None
 Rain
 Snow
 Rain and snow
 Other, please specify: _____

Duration of precipitation:

- Under 1 hour
 1-3 hours
 Over 3 hours

2. Wind

Record wind direction: changed throughout the day:

south

southwest

southeast

west

Describe the river water: (*check one*)

- Choppy
 Rippled
 Calm
 Virtually flat

Beaufort Force #: varied between #1, #2, and #3 throughout the day

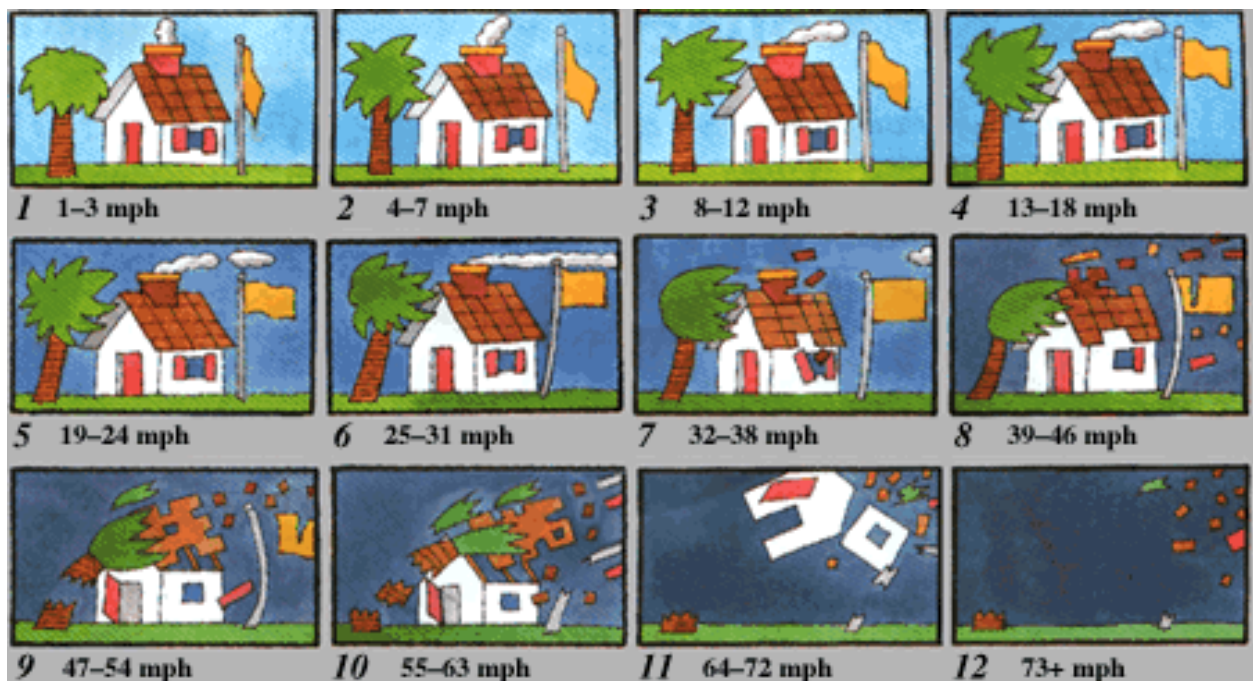
Describe any sudden changes in the wind or weather.

Rained around noon, but rain stopped.

Describe the weather conditions for the last three days. How could these recent conditions impact the data you collect today?

Rain in the last three days, but also sunny.

The Beaufort Scale “Effects on Land.” Note the chimney smoke and flag for lower wind conditions.



Activity 3: The Environment at the Sampling Site

Using your sampling site as the mid-point, complete a physical survey of your site extending approximately 200 feet up and down river.

1. Using the list below, describe the land at and around your site.
 Estimated % urban/residential: 15
 Estimated% forested: 20
 Estimated % beach: 0
 Estimated % marsh: 10
 Estimated % industrial/commercial: 0
 Estimated % recreational: 50
 Estimated % vacant land: 0
 Estimated % other, please specify: 5 – bridge, road

2. Shoreline appearance (*check all that apply*):
 - Beach area
 - Marsh
 - Covered with vegetation
 - Muddy
 - Pier
 - Debris
 - Bulkheading (wooden timbers or metal plates that hold the shore in place)
 - Pipe entering river
 - Riprap (large rocks piled up along the shore)
 - Other, please specify: _____

3. What is the water depth at the sampling location? 15.5 inches

4. River *bottom* is predominantly:
 - Sandy
 - Muddy
 - Unable to determine
 - Rocky
 - Weedy

5. What percent of the river *bottom* is covered with vegetation? (*check one*)
 - 0-25%
 - 25-50%
 - Unable to determine
 - 50-75%
 - 75-100%

6. What percent of the river *surface* is covered with vegetation? (*check one*)
 - 0-25%
 - 25-50%
 - 50-75%
 - 75-100%

Describe three ways in which the environment at your sampling site can impact water quality either positively or negatively.

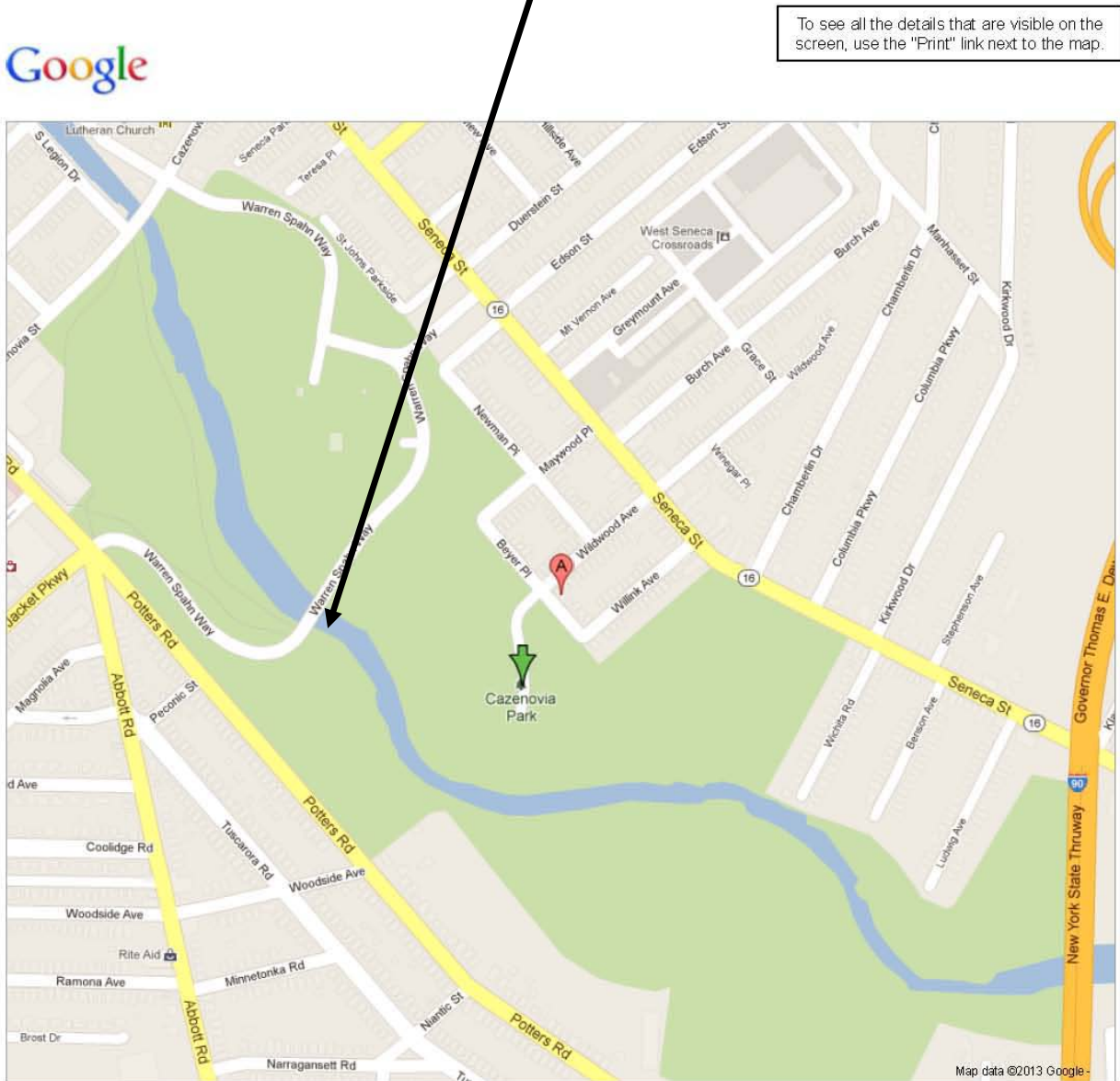
Trees along river help stabilize river banks.
 Littering from people using the park
 Car pollution

Activity 4: Sketch a Map of the Sampling Site

Include a compass rose (N, S, E, W) and rough scale. Indicate specific locations where you sampled. Label landmarks, waterways and other notable features. If possible, take pictures and video of the sites and activities from several angles.

42.84479,-78.802575 - Google Maps

<http://maps.google.com/>



Activity 5: Water Temperature

Describe Location #1: (check all that apply)

- Direct sun Flowing water Water covered with plants
 Shade Still water Pipe entering river

Additional description:

	Time	Water Depth (cm)	Reading 1	Reading 2	Average
Location #1	10:08 AM	19.05	62° F	° F	° F
			16° C	° C	° C
	10:34 AM	3.81	63° F	° F	° F
			17° C	° C	° C
	11:07 AM	24.13	61° F	° F	° F
			16° C	° C	° C

Describe Location #2: (check all that apply)

- Direct sun Flowing water Water covered with plants
 Shade Still water Pipe entering river

Additional description:

Under bridge

	Time	Water Depth (cm)	Reading 1	Reading 2	Average
Location #2	11:30 AM	71.12	° F	° F	° F
			° C	° C	° C
	12:17 PM	9.14	° F	° F	° F
			° C	° C	° C
			° F	° F	° F
			° C	° C	° C

Describe Location #3: (check all that apply)

- Direct sun Flowing water Water covered with plants
 Shade Still water Pipe entering river

Additional description:

Location #3

Time	Water Depth (cm)	Reading 1	Reading 2	Average
12:14 PM	81.28	60° F	° F	° F
		15° C	° C	° C
12:19 PM	71.12	59° F	° F	° F
		13° C	° C	° C
12:25 PM	43.18	60° F	° F	° F
		15° C	° C	° C

Activity 6: Bioassessment

Type of Equipment used:

Seine net

Dip net

Other, please specify: _____

Species	Deformity
Scud	-
Diving water beetle	-
Mayfly	-
Damselfly	-
Leech	-
Crayfish	-
Snails	-
Water penny	

Other Species:

Cooper's Hawk

Mallard duck

Great Blue Heron

Belted Kingfisher

Pollution Tolerance Index

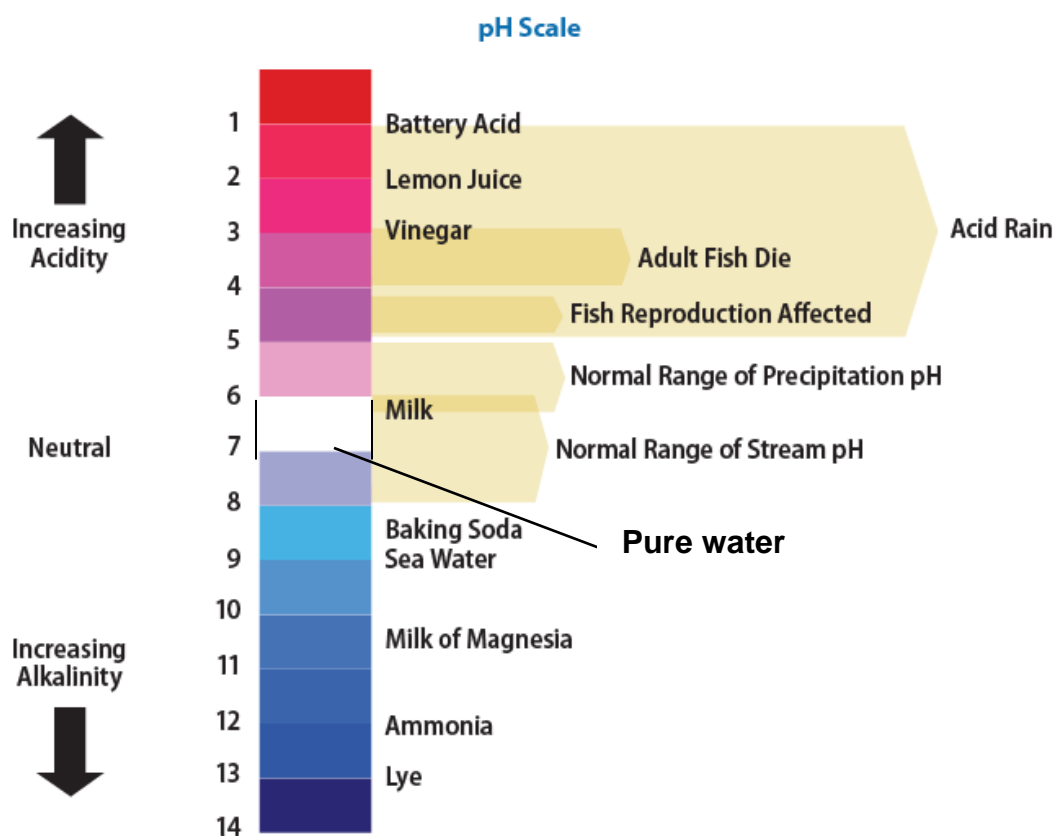
1. Place a check next to each macroinvertebrate group present in your sample. For example, whether you found one mayfly or 50 mayflies, place one check next to the mayfly line in Group 1.
2. Complete the chart for all of the macroinvertebrate groups.
3. Calculate the group scores using the multipliers provided.
4. Total all of the group scores for your Total Score.
5. Compare your Total Score with the Water Quality Assessment Chart scores and record the relative water quality rating for your stream sample.

Group 1 Macroinvertebrates: Very Intolerant	Group 2 Macroinvertebrates: Intolerant	Group 3 Macroinvertebrates: Tolerant	Group 4 Macroinvertebrates: Very Tolerant
_____ Stoneflies <input checked="" type="checkbox"/> Mayflies _____ Caddisflies _____ Dobsonflies	<input checked="" type="checkbox"/> Dragonflies <input checked="" type="checkbox"/> Scuds _____ Craneflies	_____ Midges <input checked="" type="checkbox"/> Leeches	<input checked="" type="checkbox"/> Pouch Snails _____ Aquatic Worms
# of checks <input type="text" value="1"/> X 4 Group Score = <input type="text" value="4"/>	# of checks <input type="text" value="2"/> X 3 Group Score = <input type="text" value="6"/>	# of checks <input type="text" value="1"/> X 2 Group Score = <input type="text" value="2"/>	# of checks <input type="text" value="1"/> X 1 Group Score = <input type="text" value="1"/>
Total Score = <input type="text" value="13"/> Your Water Quality Assessment: Potentially fair water quality		Water Quality Assessment Chart: ≤ 23 Potentially Excellent Water Quality 17-22 Potentially Good Water Quality 11-16 Potentially Fair Water Quality ≥ 10 Potentially Poor Water Quality	

Adapted from Project WET, 2011

Activity 7: Chemical Analysis

1. pH



Source: Recreated from Environment Canada, 2008. The pH scale. www.ec.gc.ca/eau-water/default.asp?lang=En&n=FD30C16-1.

Location	Time	pH
	10:41 AM	6.5
		7.5

What is the average pH of the water at your site? Is it within the healthy range (6.5 - 8.2)?
Average = 7, yes it is within the healthy range.

2. DISSOLVED OXYGEN:

Time	Temperature °C	DO ppm	% Saturation (see chart)
		6	
		7	
		5	
		4	

A Day in the Life of the Buffalo River Data Results 2013

Participant: Maryvale Middle School

Sampling Site: Charles E. Burchfield Nature & Art Center
2001 Union Road West Seneca, NY 14224

Date of Sampling: Friday, October 4th, 2013

Waterway: Buffalo Creek

GPS Coordinates: 42.854653, -78.753847

Latitude: +42° 51' 16.75"

Longitude: -78° 45' 13.85"

Activity 1: Currents

1	2	3	4	5	6
Time (HH:MM am/pm)	Distance in 60 sec. (cm)	Speed (cm / sec)	Knots (cm / sec) / 51.44	Direction (East/West)	Ebb, Flood, Slack
11:30 AM	26.58	0.443	0.0086	West	Ebb
11:40 AM	36.75	0.61	0.012	West	Ebb

Does the current appear to be different mid-river than it is near the shoreline area?

No data recorded.

Is there anything about the river or shoreline that may cause the current near shore to flow in a different direction than mid-river? (pier, etc)

No data recorded.

Is your sampling site located upstream or downstream from old industrial sites?

Upstream

Is there any evidence of cleanup efforts at your site?

No data recorded.

Based on your location and the river's history, form a hypothesis about the water quality at your sampling site.

No data recorded.

Activity 2: Weather and Wind

1. Record weather conditions at the start of sampling and every hour afterwards.

Temperature conversions: $^{\circ}\text{C} = 0.556 \times (^{\circ}\text{F} - 32)$ $^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32$

Time	Air Temperature ° F	Air Temperature ° C
10:15 AM	68	20
11:00 AM	70	21

Cloud cover: (*check one*)

- Clear (0-25%) Partly cloudy (25-50%)
 Mostly cloudy (50-75%) Overcast (75-100%)

Precipitation: (*check one*)

- None
 Rain
 Snow
 Rain and snow
 Other, please specify: _____

Duration of precipitation:

- Under 1 hour
 1-3 hours
 Over 3 hours

2. Wind – No data recorded

Record wind direction: _____

(Remember: winds are named for the direction the wind is coming **from**)Describe the river water: (*check one*)

- Choppy
 Rippled
 Calm
 Virtually flat

Beaufort Force # _____ (*refer to the image below*)

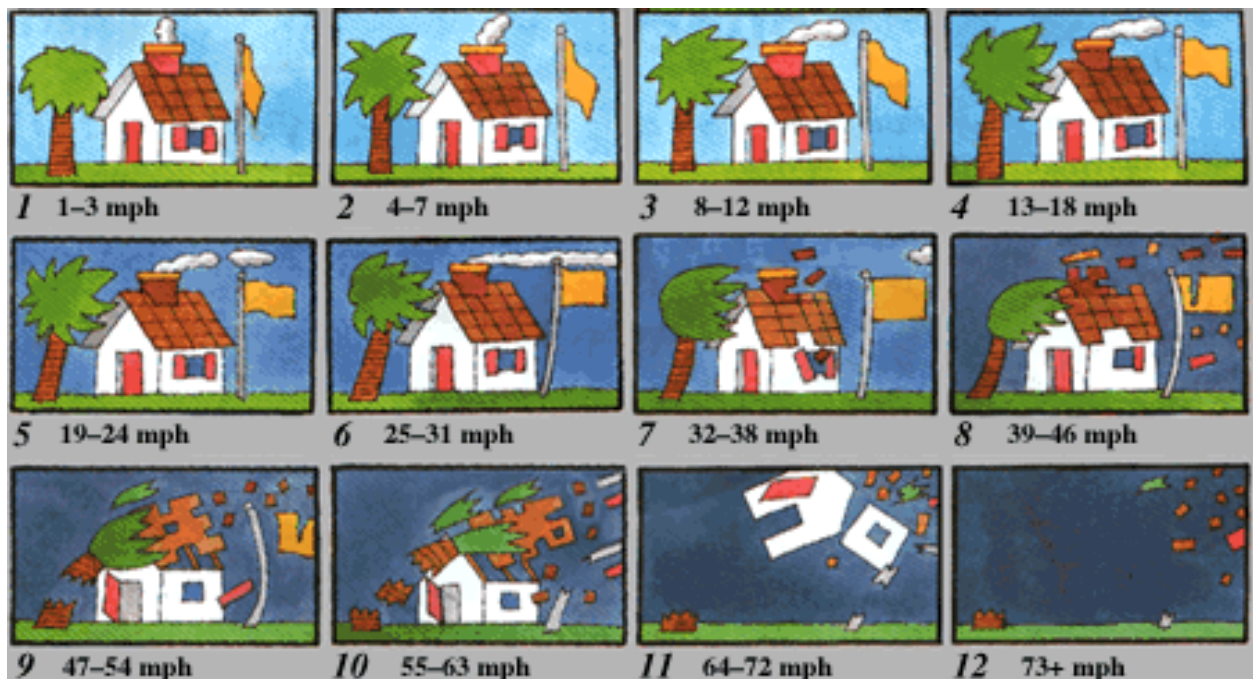
Describe any sudden changes in the wind or weather.

Rained briefly.

Describe the weather conditions for the last three days. How could these recent conditions impact the data you collect today?

No data recorded.

The Beaufort Scale “Effects on Land.” Note the chimney smoke and flag for lower wind conditions.



Activity 3: The Environment at the Sampling Site

Using your sampling site as the mid-point, complete a physical survey of your site extending approximately 200 feet up and down river.

1. Using the list below, describe the land at and around your site.
 Estimated % urban/residential: 25
 Estimated% forested: 25
 Estimated % beach:
 Estimated % marsh:
 Estimated % industrial/commercial:
 Estimated % recreational: 50
 Estimated % vacant land:
 Estimated % other, please specify:

2. Shoreline appearance (*check all that apply*):
 - Beach area
 - Marsh
 - Covered with vegetation
 - Muddy
 - Pier
 - Debris
 - Bulkheading (wooden timbers or metal plates that hold the shore in place)
 - Pipe entering river
 - Riprap (large rocks piled up along the shore)
 - Other, please specify: flat rocks

3. What is the water depth at the sampling location? 12 inches

4. River *bottom* is predominantly: (*check one*)

<input type="checkbox"/> Sandy	<input type="checkbox"/> Muddy	<input type="checkbox"/> Unable to determine
<input checked="" type="checkbox"/> Rocky	<input type="checkbox"/> Weedy	

5. What percent of the river *bottom* is covered with vegetation? (*check one*)

<input checked="" type="checkbox"/> 0-25%	<input type="checkbox"/> 25-50%	<input type="checkbox"/> Unable to determine
<input type="checkbox"/> 50-75%	<input type="checkbox"/> 75-100%	

6. What percent of the river *surface* is covered with vegetation? (*check one*)

<input checked="" type="checkbox"/> 0-25%	<input type="checkbox"/> 25-50%
<input type="checkbox"/> 50-75%	<input type="checkbox"/> 75-100%

Describe three ways in which the environment at your sampling site can impact water quality either positively or negatively.

Nearby road and bridge – car pollution
 forest – support riverbank structure
 Nearby residential area – runoff pollution

Activity 4: Sketch a Map of the Sampling Site

Include a compass rose (N, S, E, W) and rough scale. Indicate specific locations where you sampled. Label landmarks, waterways and other notable features. If possible, take pictures and video of the sites and activities from several angles.

Activity 5: Water Temperature

Describe Location #1: (check all that apply)

- Direct sun Flowing water Water covered with plants
 Shade Still water Pipe entering river

Additional description:

	Time	Water Depth (cm)	Reading 1	Reading 2	Average
Location #1	10:42 AM	30.48	68° F	68° F	68° F
			20° C	20° C	20° C
	10:47 AM	17.78	68° F	68° F	68° F
			20° C	20° C	20° C
			° F	° F	° F
			° C	° C	° C

Describe Location #2: (check all that apply) No data recorded.

- Direct sun Flowing water Water covered with plants
 Shade Still water Pipe entering river

Additional description:

	Time	Water Depth (cm)	Reading 1	Reading 2	Average
Location #2			° F	° F	° F
			° C	° C	° C
			° F	° F	° F
			° C	° C	° C
			° F	° F	° F
			° C	° C	° C

Describe Location #3: (check all that apply) No data recorded.

- Direct sun
- Shade
- Flowing water
- Still water
- Water covered with plants
- Pipe entering river

Additional description:

	Time	Water Depth (cm)	Reading 1	Reading 2	Average
Location #3			° F	° F	° F
			° C	° C	° C
			° F	° F	° F
			° C	° C	° C
			° F	° F	° F
			° C	° C	° C

Did the water temperature change with time of day? How?

No data recorded.

What effect did depth have on water temperature?

No data recorded.

Which unique environmental factors could influence water temperature at each location?

No data recorded.

Activity 6: Bioassessment

Type of Equipment used:

Seine net

Dip net

Other, please specify: _____

Species	Deformity
Snails	
Golden Shiners (fish)	
Scud	
Water Strider	
Water Scorpion	
Dragonflies	
Damselflies	

Pollution Tolerance Index

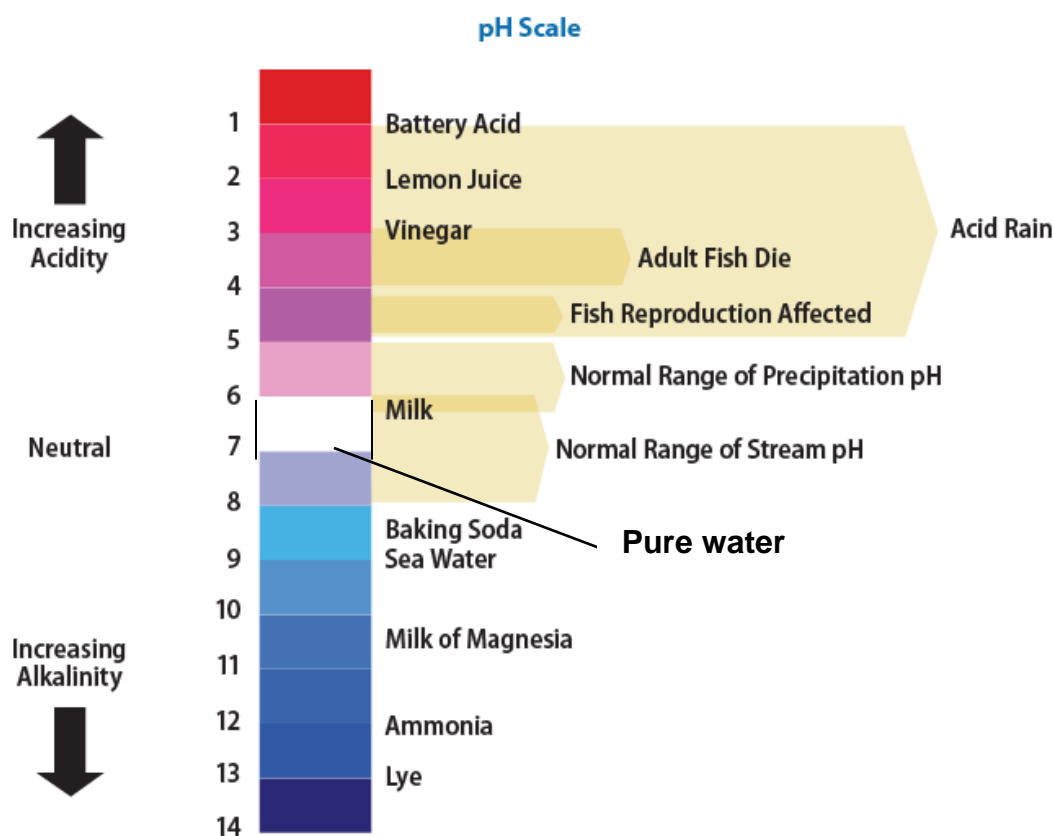
1. Place a check next to each macroinvertebrate group present in your sample. For example, whether you found one mayfly or 50 mayflies, place one check next to the mayfly line in Group 1.
2. Complete the chart for all of the macroinvertebrate groups.
3. Calculate the group scores using the multipliers provided.
4. Total all of the group scores for your Total Score.
5. Compare your Total Score with the Water Quality Assessment Chart scores and record the relative water quality rating for your stream sample.

Group 1 Macroinvertebrates: Very Intolerant	Group 2 Macroinvertebrates: Intolerant	Group 3 Macroinvertebrates: Tolerant	Group 4 Macroinvertebrates: Very Tolerant
_____ Stoneflies _____ Mayflies _____ Caddisflies _____ Dobsonflies	<input checked="" type="checkbox"/> Dragonflies <input checked="" type="checkbox"/> Scuds _____ Craneflies	_____ Midges _____ Leeches	<input checked="" type="checkbox"/> Pouch Snails _____ Aquatic Worms
# of checks _____ X 4 Group Score = _____	# of checks <u>2</u> X 3 Group Score = <u>6</u>	# of checks _____ X 2 Group Score = _____	# of checks <u>1</u> X 1 Group Score = <u>1</u>
Total Score = <u>7</u> Your Water Quality Assessment: Potentially Poor Water Quality		Water Quality Assessment Chart: ≤ 23 Potentially Excellent Water Quality 17-22 Potentially Good Water Quality 11-16 Potentially Fair Water Quality ≥ 10 Potentially Poor Water Quality	

Adapted from Project WET, 2011

Activity 7: Chemical Analysis

1. pH



Source: Recreated from Environment Canada, 2008. The pH scale. www.ec.gc.ca/eau-water/default.asp?lang=En&n=FD30C16-1.

Location	Time	pH
East side	10:57 AM	8
East side	10:57 AM	9
Leaf puddle	11:00 AM	8

What is the average pH of the water at your site? Is it within the healthy range (6.5 - 8.2)?

Average = 8.3, just outside the healthy range.

What could cause the pH of the river to change?

Fall leaves in water (decomposing)

pollution

acid rain

2. DISSOLVED OXYGEN:

Time	Temperature °C	DO ppm	% Saturation (see chart)
10:58 AM	20	4	43%
10:58 AM	20	2	20%
11:05 AM	20	0	0%

Did DO levels change throughout the day? What would cause it to change? (Hint: Compare these results with the data obtained in Activity 2: Wind and Weather.)

Yes, it changed.

Leaves taking up oxygen during decomposition in the water.

Based on the % saturation value, how would you describe the health of the water?

Potentially poor water quality

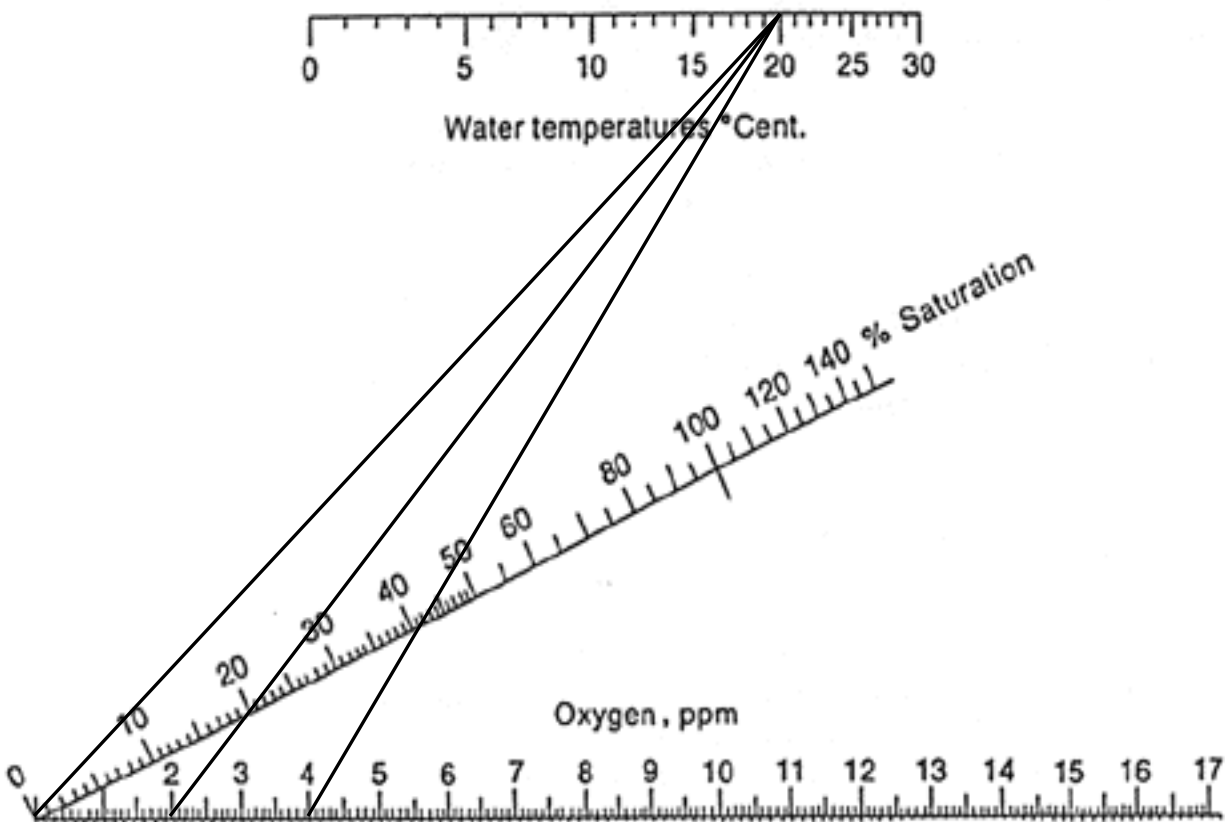
State a hypothesis to explain the % saturation results. (Hint: what environmental factors affect temperature and DO?)

No data recorded.

Determining percent saturation: Percent **saturation** is a measure of how much dissolved oxygen is in the water and available for use by aquatic organisms.

Pair up the measured ppm of DO with the water temperature (° C). Draw a straight line between the two values. The percent saturation is the value where your drawn line intercepts the angled saturation scale. Waterways with a saturation value of 90% or greater are generally considered healthy.

Dissolved Oxygen - % Saturation =



<http://www.waterontheweb.org/under/waterquality/oxygen.html>

A Day in the Life of the Buffalo River Data Results 2013

Participant: Southside Elementary School

Date of Sampling: Wednesday, October 16th, 2013

Sampling Site: Seneca Bluffs

Waterway: Buffalo Creek

GPS Coordinates: 42.864708, -78.819663

Latitude: +42° 51' 52.95"

Longitude: -78° 49' 10.79"

Activity 1: Currents**No data recorded.**

1	2	3	4	5	6
Time (HH:MM am/pm)	Distance in 60 sec. (cm)	Speed (cm / sec)	Knots (cm / sec) / 51.44	Direction (East/West)	Ebb, Flood, Slack

Does the current appear to be different mid-river than it is near the shoreline area?

Yes.

Is there anything about the river or shoreline that may cause the current near shore to flow in a different direction than mid-river? (pier, etc)

Sandy/muddy dunes.

Is your sampling site located upstream or downstream from old industrial sites?

Upstream

Is there any evidence of cleanup efforts at your site?

Yes – on the land around the site, there is evidence of prescribed burnings, invasive species removal and native tree plantings.

Based on your location and the river's history, form a hypothesis about the water quality at your sampling site.
Potentially fair water quality.

Activity 2: Weather and Wind

- Record weather conditions at the start of sampling and every hour afterwards.

Temperature conversions: $^{\circ}\text{C} = 0.556 \times (^{\circ}\text{F} - 32)$ $^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32$

Time	Air Temperature $^{\circ}\text{F}$	Air Temperature $^{\circ}\text{C}$
9:40 AM	74	23
10:20 AM	74	23
11:35 AM	72	22
12:15 PM	71	21

Cloud cover: (*check one*)

- Clear (0-25%) Partly cloudy (25-50%)
 Mostly cloudy (50-75%) Overcast (75-100%)

Precipitation: (*check one*)

- None
 Rain
 Snow
 Rain and snow
 Other, please specify:

Duration of precipitation:

- Under 1 hour
 1-3 hours
 Over 3 hours

2. Wind

Record wind direction: Southwest

(Remember: winds are named for the direction the wind is coming **from**)

Describe the river water: (*check one*)

- Choppy
- Rippled
- Calm
- Virtually flat

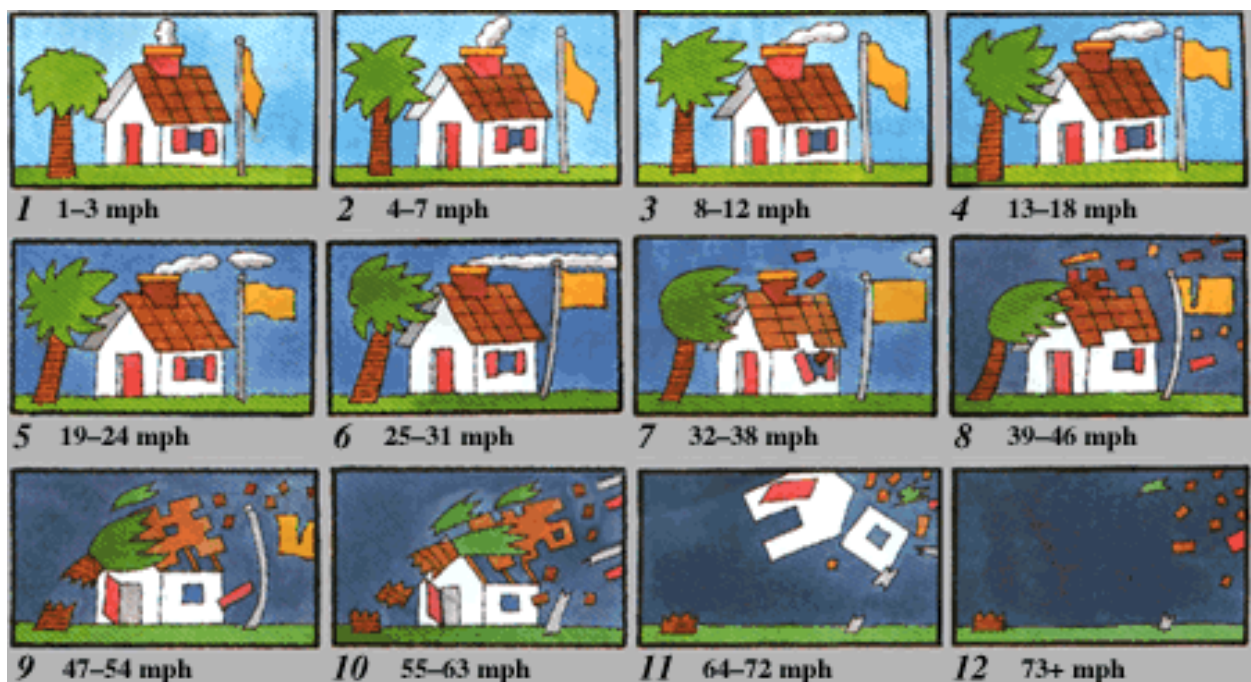
Beaufort Force #: 2

Describe any sudden changes in the wind or weather.

Describe the weather conditions for the last three days. How could these recent conditions impact the data you collect today?

Heavy rainstorms the night before could add oxygen to the water or flush pollution into the river.

The Beaufort Scale “Effects on Land.” Note the chimney smoke and flag for lower wind conditions.



Activity 3: The Environment at the Sampling Site

1. Using the list below, describe the land at and around your site.
 Estimated % urban/residential: 20
 Estimated % forested: 20
 Estimated % beach: 5
 Estimated % marsh: 10
 Estimated % industrial/commercial: 10
 Estimated % recreational: 35
 Estimated % vacant land: 0
 Estimated % other, please specify:

2. Shoreline appearance (*check all that apply*):
 - Beach area
 - Marsh
 - Covered with vegetation
 - Muddy
 - Pier
 - Debris
 - Bulkheading (wooden timbers or metal plates that hold the shore in place)
 - Pipe entering river
 - Riprap (large rocks piled up along the shore)
 - Other, please specify:

3. What is the water depth at the sampling location? No data recorded

4. River *bottom* is predominantly: (*check one*)
 - Sandy
 - Muddy
 - Unable to determine
 - Rocky
 - Weedy

5. What percent of the river *bottom* is covered with vegetation? (*check one*)
 - 0-25%
 - 25-50%
 - Unable to determine
 - 50-75%
 - 75-100%

6. What percent of the river *surface* is covered with vegetation? (*check one*)
 - 0-25%
 - 25-50%
 - 50-75%
 - 75-100%

Describe three ways in which the environment at your sampling site can impact water quality either positively or negatively.

Cleanup/restoration efforts

Pollution from nearby industries and houses

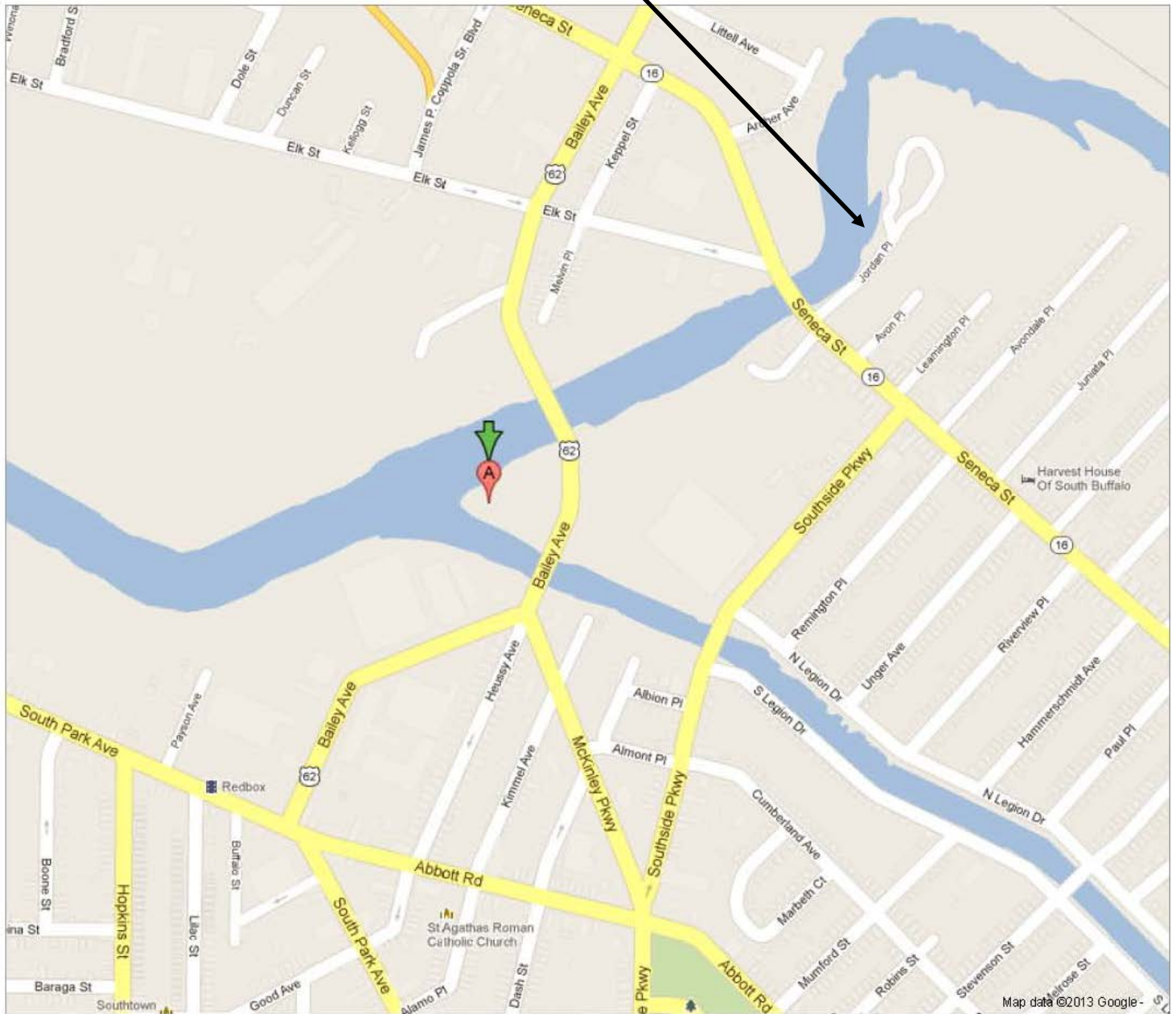
Littering

Activity 4: Sketch a Map of the Sampling Site

Include a compass rose (N, S, E, W) and rough scale. Indicate specific locations where you sampled. Label landmarks, waterways and other notable features. If possible, take pictures and video of the sites and activities from several angles.

Google Maps

Sampling Site



Activity 5: Water Temperature

Describe Location #1: (check all that apply)

Direct sun
 Shade

Flowing water
 Still water

Water covered with plants
 Pipe entering river

Additional description:
 Near shore

	Time	Water Depth	Reading 1	Reading 2	Average
Location #1	9:40 AM		61° F	° F	° F
			16° C	° C	° C
	10:20 AM		64° F	° F	° F
			18° C	° C	° C
	11:35 AM		64° F	° F	° F
			18° C	° C	° C
12:15 PM		66° F	° F	° F	
		19° C	° C	° C	

Describe Location #2: (check all that apply)

No data recorded.

Describe Location #3: (check all that apply)

No data recorded.

Did the water temperature change with time of day? How?

Yes – temperature increased over time.

What effect did depth have on water temperature?

No data recorded.

Which unique environmental factors could influence water temperature at each location?

Shallow depth and direct sun

No data recorded.

Pollution Tolerance Index

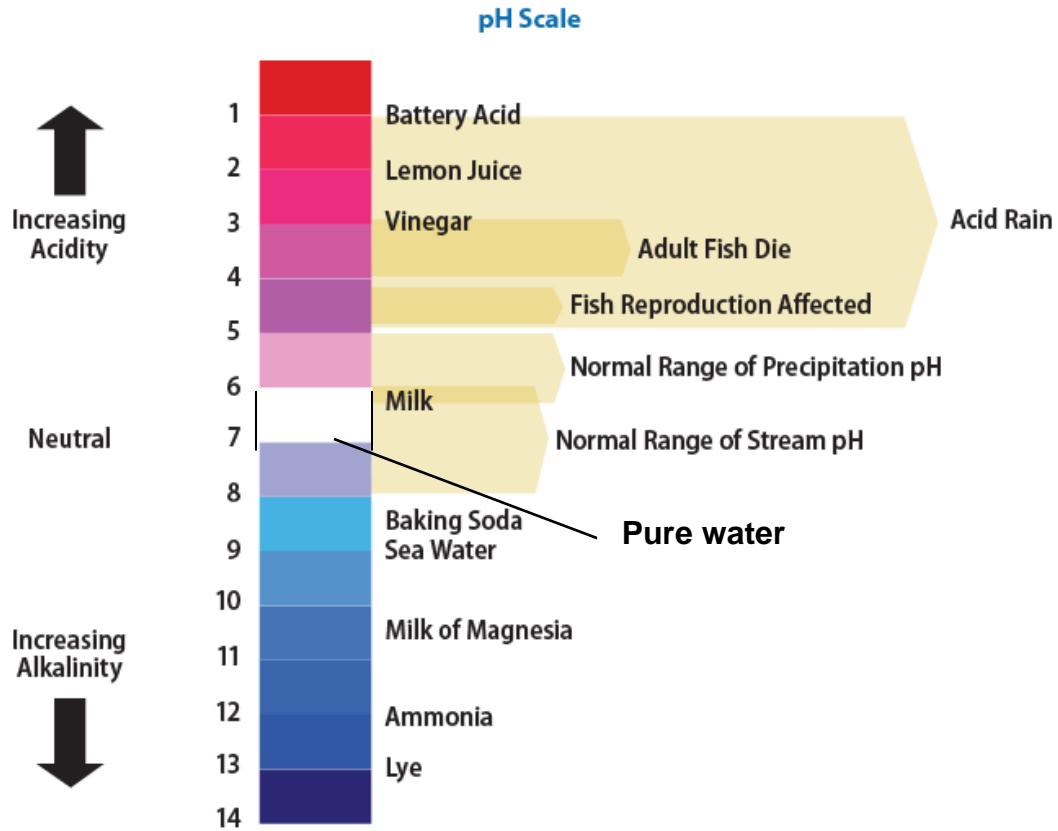
1. Place a check next to each macroinvertebrate group present in your sample. For example, whether you found one mayfly or 50 mayflies, place one check next to the mayfly line in Group 1.
2. Complete the chart for all of the macroinvertebrate groups.
3. Calculate the group scores using the multipliers provided.
4. Total all of the group scores for your Total Score.
5. Compare your Total Score with the Water Quality Assessment Chart scores and record the relative water quality rating for your stream sample.

Group 1 Macroinvertebrates: Very Intolerant	Group 2 Macroinvertebrates: Intolerant	Group 3 Macroinvertebrates: Tolerant	Group 4 Macroinvertebrates: Very Tolerant
____ Stoneflies ____ Mayflies ____ Caddisflies ____ Dobsonflies	____ Dragonflies ____ Scuds ____ Craneflies	____ Midges ____ Leeches	____ Pouch Snails ____ Aquatic Worms
# of checks ____ X 4 Group Score = ____	# of checks ____ X 3 Group Score = ____	# of checks ____ X 2 Group Score = ____	# of checks ____ X 1 Group Score = ____
Total Score = _____ Your Water Quality Assessment:		Water Quality Assessment Chart: ≤ 23 Potentially Excellent Water Quality 17-22 Potentially Good Water Quality 11-16 Potentially Fair Water Quality ≥ 10 Potentially Poor Water Quality	

Adapted from Project WET, 2011

Activity 7: Chemical Analysis

1. pH



Source: Recreated from Environment Canada. 2008. The pH scale. www.ec.gc.ca/eau-water/default.asp?lang=En&n=FD30C16-1.

Location	Time	pH
Shore	9:40 AM	7.5
Shore	10:20 AM	7.5
Shore	11:37 AM	7
Shore	12:12 PM	8

What is the average pH of the water at your site? Is it within the healthy range (6.5 - 8.2)?
 Average = 7.5, within the healthy range.

2. DISSOLVED OXYGEN:

Time	Temperature °C	DO ppm	% Saturation (see chart)
9:53 AM	13°C/61°F	8	75
10:36 AM	18°C/64°F	8	85
11:41 AM	19°C/66°F	6	64
12:23 PM	20°C/68°F	4	42

Did DO levels change throughout the day? What would cause it to change? (Hint: Compare these results with the data obtained in Activity 2: Wind and Weather.)

Yes.

Fish and other aquatic life using up the oxygen, decomposition, increased water temperature holds less oxygen.

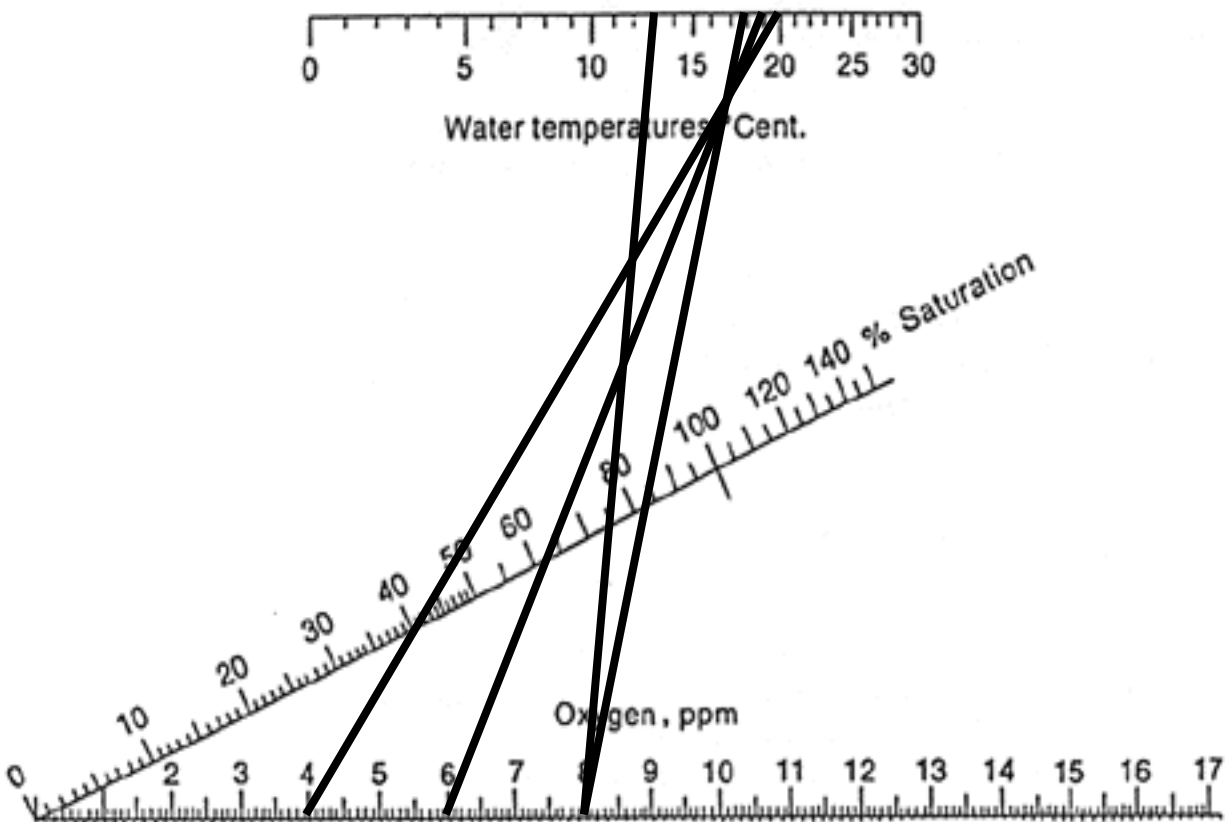
Based on the % saturation value, how would you describe the health of the water?

Potentially fair water quality based on the fact that 3 of the 4 readings fall within the 5-11 ppm healthy range for DO. However, percent saturation was low.

Determining percent saturation: Percent **saturation** is a measure of how much dissolved oxygen is in the water and available for use by aquatic organisms.

Pair up the measured ppm of DO with the water temperature ($^{\circ}$ C). Draw a straight line between the two values. The percent saturation is the value where your drawn line intercepts the angled saturation scale. Waterways with a saturation value of 90% or greater are generally considered healthy.

Dissolved Oxygen - % Saturation



<http://www.waterontheweb.org/under/waterquality/oxygen.html>

A Day in the Life of the Buffalo River Data Results 2013

Participant: Depew High School

Sampling Site: Stiglmeier Park - Losson Road, Cheektowaga, NY 14227

Date of Sampling: Friday, October 4th, 2013

Waterway: Cayuga Creek

GPS Coordinates: 42.893078, -78.731767

Latitude: +42° 53' 35.08" Longitude: -78° 43' 54.36"

Activity 1: Currents

1	2	3	4	5	6
Time (HH:MM am/pm)	Distance in 60 sec. (cm)	Speed (cm / sec)	Knots (cm / sec) / 51.44	Direction (East/West)	Ebb, Flood, Slack
10:36 AM	26			South	

Does the current appear to be different mid-river than it is near the shoreline area?

No data recorded.

Is there anything about the river or shoreline that may cause the current near shore to flow in a different direction than mid-river? (pier, etc)

No data recorded.

Is your sampling site located upstream or downstream from old industrial sites?

Upstream

Is there any evidence of cleanup efforts at your site?

No data recorded.

Based on your location and the river's history, form a hypothesis about the water quality at your sampling site.

There are a lot of animal footprints near the water, and many animals in the water. There is no garbage floating in the water. This may indicate that the water is a healthy environment for organisms.

Activity 2: Weather and Wind

- Record weather conditions at the start of sampling and every hour afterwards.

Temperature conversions: $^{\circ}\text{C} = 0.556 \times (^{\circ}\text{F} - 32)$ $^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32$

Time	Air Temperature $^{\circ}\text{F}$	Air Temperature $^{\circ}\text{C}$
11:00 AM	70	21

Cloud cover: (*check one*)

- Clear (0-25%) Partly cloudy (25-50%)
 Mostly cloudy (50-75%) Overcast (75-100%)

Precipitation: (*check one*)

- None
 Rain
 Snow
 Rain and snow
 Other, please specify: _____

Duration of precipitation:

- Under 1 hour
 1-3 hours
 Over 3 hours

2. Wind – No data recorded

Record wind direction: _____

(Remember: winds are named for the direction the wind is coming **from**)Describe the river water: (*check one*)

- Choppy
 Rippled
 Calm
 Virtually flat

Beaufort Force # _____ (*refer to the image below*) No data recorded.

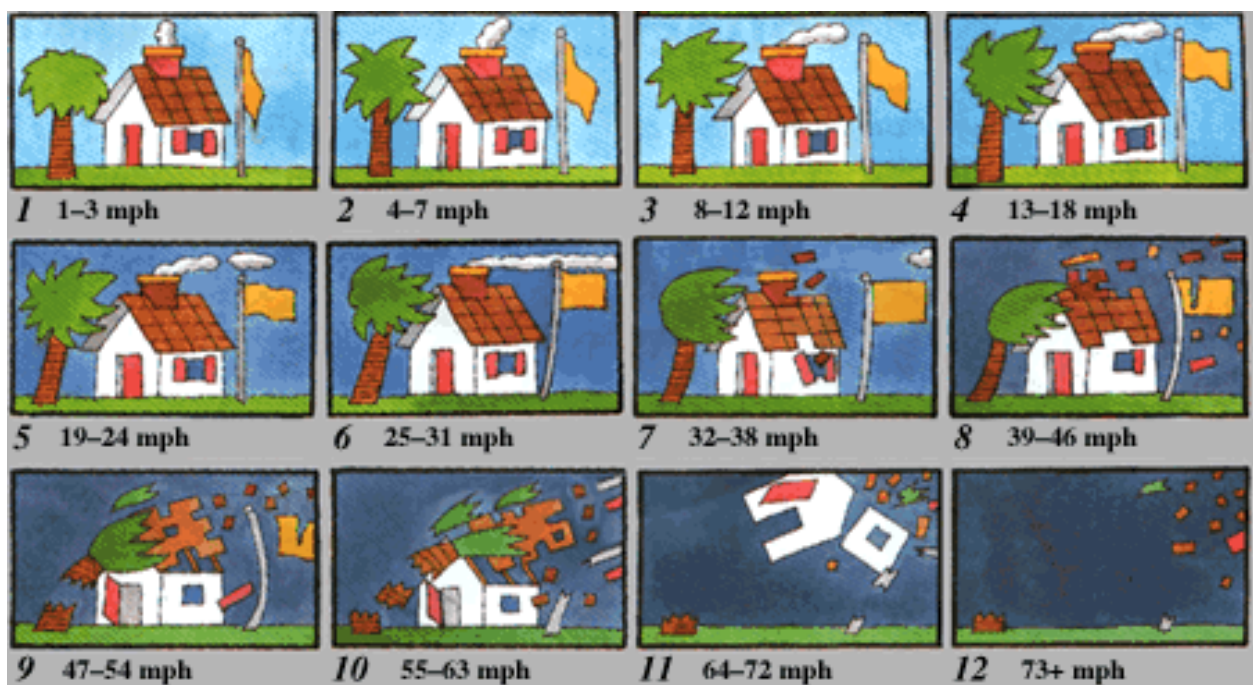
Describe any sudden changes in the wind or weather.

Rained briefly.

Describe the weather conditions for the last three days. How could these recent conditions impact the data you collect today?

No data recorded.

The Beaufort Scale “Effects on Land.” Note the chimney smoke and flag for lower wind conditions.



Activity 3: The Environment at the Sampling Site

Using your sampling site as the mid-point, complete a physical survey of your site extending approximately 200 feet up and down river.

1. Using the list below, describe the land at and around your site.
 Estimated % urban/residential:
 Estimated % forested: 75%
 Estimated % beach:
 Estimated % marsh:
 Estimated % industrial/commercial:
 Estimated % recreational:
 Estimated % vacant land:
 Estimated % other, please specify: 25% grass/rocks

2. Shoreline appearance (*check all that apply*):
 - Beach area
 - Marsh
 - Covered with vegetation
 - Muddy
 - Pier
 - Debris
 - Bulkheading (wooden timbers or metal plates that hold the shore in place)
 - Pipe entering river
 - Riprap (large rocks piled up along the shore)
 - Other, please specify: forested, rocky

3. What is the water depth at the sampling location? 5.03 inches

4. River *bottom* is predominantly: (*check one*)
 - Sandy
 - Rocky
 - Muddy
 - Weedy
 - Unable to determine

5. What percent of the river *bottom* is covered with vegetation? (*check one*)
 - 0-25%
 - 50-75%
 - 25-50%
 - 75-100%
 - Unable to determine

6. What percent of the river *surface* is covered with vegetation? (*check one*)
 - 0-25%
 - 50-75%
 - 25-50%
 - 75-100%

Describe three ways in which the environment at your sampling site can impact water quality either positively or negatively.

Nearby road – car pollution

forest – support riverbank structure

invasive plant species – harm and change river habitat

Activity 4: Sketch a Map of the Sampling Site

Include a compass rose (N, S, E, W) and rough scale. Indicate specific locations where you sampled. Label landmarks, waterways and other notable features. If possible, take pictures and video of the sites and activities from several angles.

Activity 5: Water Temperature

Describe Location #1: (check all that apply)

- Direct sun Flowing water Water covered with plants
 Shade Still water Pipe entering river

Additional description:

	Time	Water Depth (cm)	Reading 1	Reading 2	Average
Location #1	11:00 AM		° F	° F	67.25° F
			° C	° C	19.58° C
			° F	° F	° F
			° C	° C	° C
			° F	° F	° F
			° C	° C	° C

Describe Location #2: (check all that apply) No data recorded.

- Direct sun Flowing water Water covered with plants
 Shade Still water Pipe entering river

Additional description:

	Time	Water Depth (cm)	Reading 1	Reading 2	Average
Location #2			° F	° F	° F
			° C	° C	° C
			° F	° F	° F
			° C	° C	° C
			° F	° F	° F
			° C	° C	° C

Describe Location #3: (check all that apply) No data recorded.

- | | | |
|-------------------------------------|--|--|
| <input type="checkbox"/> Direct sun | <input type="checkbox"/> Flowing water | <input type="checkbox"/> Water covered with plants |
| <input type="checkbox"/> Shade | <input type="checkbox"/> Still water | <input type="checkbox"/> Pipe entering river |

Additional description:

	Time	Water Depth (cm)	Reading 1	Reading 2	Average
Location #3			° F	° F	° F
			° C	° C	° C
			° F	° F	° F
			° C	° C	° C
			° F	° F	° F
			° C	° C	° C

Did the water temperature change with time of day? How?

No data recorded.

What effect did depth have on water temperature?

No data recorded.

Which unique environmental factors could influence water temperature at each location?

No data recorded.

Activity 6: Bioassessment

Type of Equipment used:

Seine net

Dip net

Other, please specify: _____

Species	Deformity
15 Mayflies	
100 Caddisflies	
12 Dobsonflies	
22 Scuds	
5 Water Pennies	

Pollution Tolerance Index

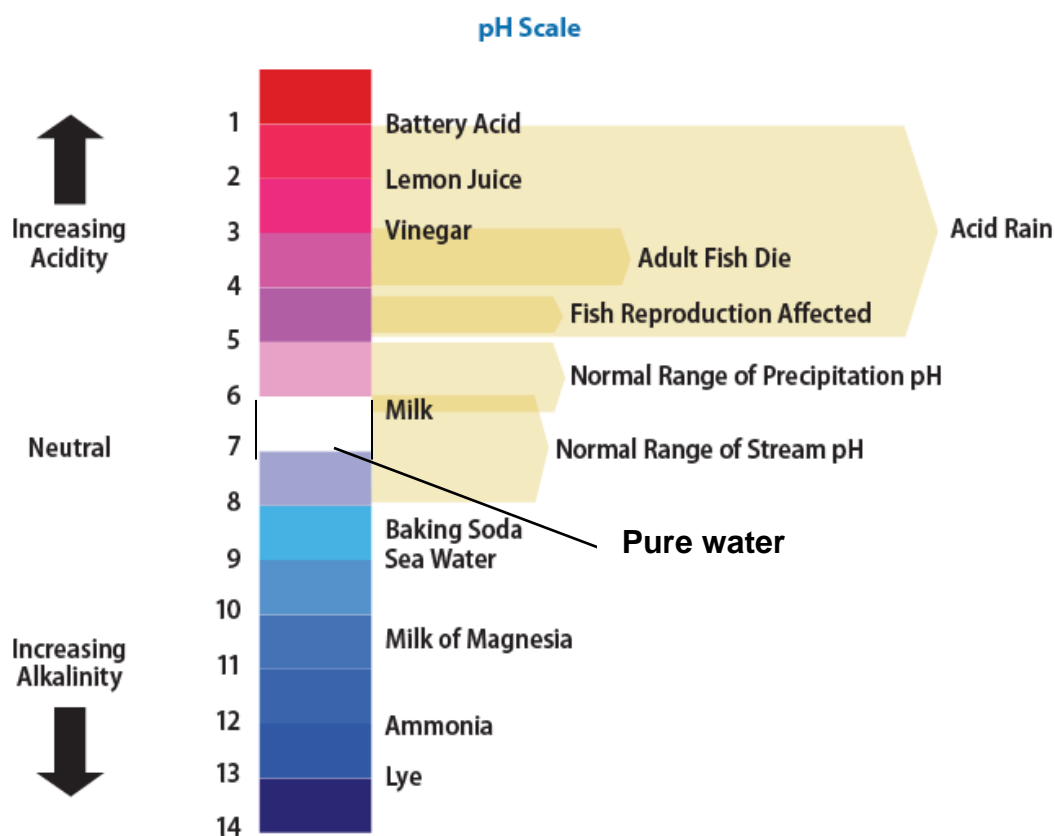
1. Place a check next to each macroinvertebrate group present in your sample. For example, whether you found one mayfly or 50 mayflies, place one check next to the mayfly line in Group 1.
2. Complete the chart for all of the macroinvertebrate groups.
3. Calculate the group scores using the multipliers provided.
4. Total all of the group scores for your Total Score.
5. Compare your Total Score with the Water Quality Assessment Chart scores and record the relative water quality rating for your stream sample.

Group 1 Macroinvertebrates: Very Intolerant	Group 2 Macroinvertebrates: Intolerant	Group 3 Macroinvertebrates: Tolerant	Group 4 Macroinvertebrates: Very Tolerant
_____ Stoneflies _____ Mayflies ___x___ Caddisflies ___x___ Dobsonflies	_____ Dragonflies ___x___ Scuds _____ Craneflies	_____ Midges _____ Leeches	_____ Pouch Snails _____ Aquatic Worms
# of checks ___2___ X 4 Group Score = ___8___	# of checks ___1_ X 3 Group Score = ___3___	# of checks _____ X 2 Group Score = _____	# of checks _____ X 1 Group Score = _____
Total Score = ___11___ Your Water Quality Assessment: Potentially Fair Water Quality		Water Quality Assessment Chart: ≤ 23 Potentially Excellent Water Quality 17-22 Potentially Good Water Quality 11-16 Potentially Fair Water Quality ≥ 10 Potentially Poor Water Quality	

Adapted from Project WET, 2011

Activity 7: Chemical Analysis

1. pH



Source: Recreated from Environment Canada, 2008. The pH scale. www.ec.gc.ca/eau-water/default.asp?lang=En&n=FD30C16-1.

Location	Time	pH
Cayuga Creek	10:30 AM	7

What is the average pH of the water at your site? Is it within the healthy range (6.5 - 8.2)?
Average pH = 7, within the healthy range

What could cause the pH of the river to change?
No data recorded.

2. DISSOLVED OXYGEN: No data recorded.

Time	Temperature °C	DO ppm	% Saturation (see chart)

Did DO levels change throughout the day? What would cause it to change? (Hint: Compare these results with the data obtained in Activity 2: Wind and Weather.)

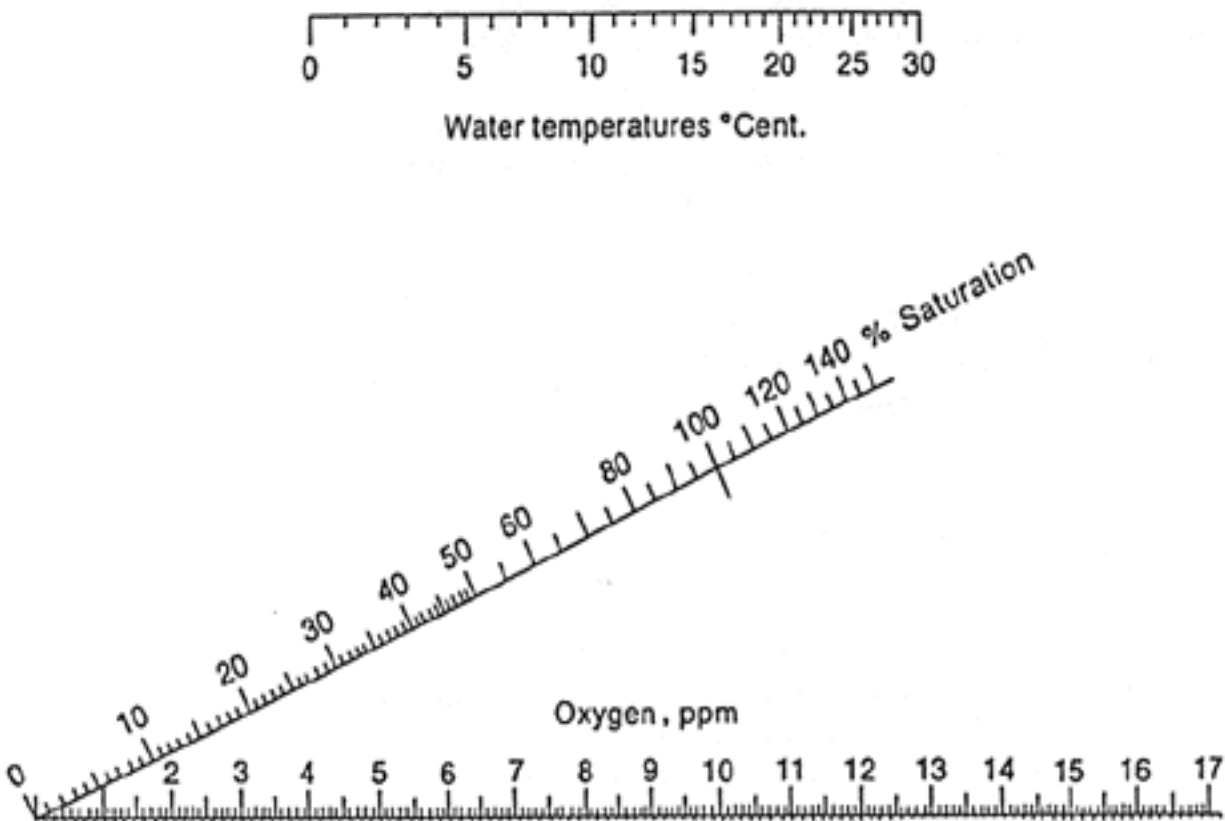
Based on the % saturation value, how would you describe the health of the water?

State a hypothesis to explain the % saturation results. (Hint: what environmental factors affect temperature and DO?)

Determining percent saturation: Percent **saturation** is a measure of how much dissolved oxygen is in the water and available for use by aquatic organisms.

Pair up the measured ppm of DO with the water temperature (° C). Draw a straight line between the two values. The percent saturation is the value where your drawn line intercepts the angled saturation scale. Waterways with a saturation value of 90% or greater are generally considered healthy.

Dissolved Oxygen - % Saturation = No data recorded.



<http://www.waterontheweb.org/under/waterquality/oxygen.html>

Other Notes:

“To maintain the health of our local fresh water resources, we can throw our garbage in trash bins so it won’t go in the water and we should recycle more.” ~ Depew High School student