

## Appendix B: Physical, Biological and Chemical Data Reports

The data reports in Appendix B detail the following parameters:

- Reach Level Assessment
- Channel Modification---none identified/not included
- Impacted Buffer
- Stream Crossing---none identified/not included
- Trash and Debris
- Utility Impacts
- Storm Water Outfalls---none identified/not included
- Erosion
- Miscellaneous
- Biological and Chemical Data
- Site Sketch
- Weather Reports

Chemical & Biological Parameters Definitions<sup>1</sup>:

- **Biochemical Oxygen Demand – 5 days (BOD<sub>5</sub>):** “BOD<sub>5</sub> is a measure of the amount of oxygen used by aerobic (oxygen-consuming) bacteria as they break down organic wastes over five days.” **Dissolved Oxygen (DO):** DO is the amount of available oxygen (O<sub>2</sub>) in the water.
- ***E. coli*:** “While not all strains of *E. coli* are pathogenic themselves, they occur with other intestinal tract pathogens that may be dangerous to human health. We test for *E. coli* as an indicator of fecal contamination.”
- **Nitrate:** “Nitrogen occurs in water as nitrate (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), and ammonia (NH<sub>4</sub>). It enters the water from human and animal waste, decomposing organic matter, and runoff of fertilizer from lawns and crops.”
- **Orthophosphate:** “Orthophosphates are on form of phosphates. Orthophosphates are dissolved in the water (mostly inorganic) and are readily available for plant uptake. Thus, the orthophosphate concentration is useful as an indicator of *current* potential for algae blooms and eutrophication.”
- **pH:** pH is measure of the hydrogen ion concentration in the water. pH is affected by natural processes and by man and affects the aquatic organisms during reproduction.
- **Pollution Tolerance Index (PTI):** This is the Hoosier Riverwatch biological rating system based on macroninvertebrate sampling. The PTI score is indicative of the overall health of the stream over time. Refer to the Biological Monitoring field sheet for the framework of the scoring system.

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<sup>1</sup> Volunteer Stream Monitoring Training Manual, Hoosier Riverwatch. March 2004. Indiana Department of Natural Resources, Division of Fish and Wildlife. Available at: <<http://www.in.gov/dnr/riverwatch/>>

- **Turbidity:** “Turbidity is the relative clarity of the water and is measured by shining a light through the water column. Turbid water is more cloudy, and is caused by suspended matter including clay, silt, organic and inorganic matter, and algae.”

Parameter	Typical Range	Indiana Average	State Water Quality Standard
Dissolved Oxygen*	5.4 – 14.2 mg/L	9.8 mg/L	Avg > 5 mg/L, not <4 mg/L
E. Coli	133 – 1,157 colonies/100 ml	645 colonies/100 ml	<235 colonies/100 ml (single sample) AND <125 colonies/100 ml (Geometric mean of 5 samples equally spaced over 30 days)
pH**	7.2 – 8.8	8.0	6 - 9
BOD <sub>5</sub>	0 – 6.3 mg/L	1.5 mg/L	-
Total Phosphate***	0 – 0.85 mg/L	0.05 mg/L	-
Nitrate (NO <sub>3</sub> )	0 – 36.08 mg/L	12.32 mg/L	-
Turbidity	0 – 173 NTU	36 NTU	-

\* Dissolved oxygen can be expressed as % saturation, which accounts for the effects of water temperature. Values closer to 100% saturation are considered ideal.

\*\* “Due to the state’s limestone geology, Indiana surface waters will typically have a pH that is relatively basic (> 7).”

\*\*\* “We generally expect orthophosphate values to be less than total phosphate, since orthophosphate is but one component of total phosphate.”

**Figure 1:** Chemical Parameter Values and Standards. (Source: Volunteer Stream Monitoring Training Manual, Hoosier Riverwatch. March 2004. Indiana Department of Natural Resources, Division of Fish and Wildlife. Available at: <<http://www.in.gov/dnr/riverwatch/>>.)

# Biological and Chemical Data Summary

		PTI Rating*	Dissolved Oxygen (mg/L)	% Saturation	Water Temp (degrees C)	pH	E. coli (colonies /100 mL)	BOD5 (mg/L)	Orthophos -phate (mg/L)	Total Phosphate (mg/L)	Nitrate (NO3- mg/L)	Nitrite (NO2- mg/L)	Turbidity (NTU)
<b>Jackson Creek</b>													
JC1	07/30/05	6	12	155	28	8.5	100	0	0	NA	2.2	0	<15
JC1-S1	07/27/05	1	9	110	23	8.5	600	0	0.1	NA	2.2	0	<15
JC2	07/28/05	19	9	107	22	8.5	350	0	0	NA	8.8	0	<15
JC2-S1	08/17/05	16	8	94	20	8.5	250	1	0	NA	2.2	0	<15
JC3	07/29/05	18	9	99	18.5	8.5	100	1	0	NA	2.2	0	<15
JC3-S1	08/17/05	15	10	117	22	7.5	350	2	0	NA	2.2	0	<15
JC4	07/29/05	17	12	140	23	8.5	150	2	0	NA	2.2	0	<15
JC4-S1	08/19/05	8	7	90	23.5	7.5	1000	2	0	NA	2.2	0	28
JC5	07/29/05	21	12	140	23	8.5	50	3	0	NA	2.2	0	<15
JC5-S1	08/19/05	7	9	110	22.8	8	2250	4	0	NA	2.2	0	20

**\*PTI: Pollution Tolerance Index**

- >23    **Excellent**
- 17-22    **Good**
- 11-16    **Fair**
- <10    **Poor**

# Erosion Data Summary

		Process	Bank of Concern	<u>Bank Length</u>		<u>Bank Height</u>		<u>Bank Angle</u>		Top Width	Wetted Width
				Left	Right	Left	Right	Left	Right		
<b>Jackson Creek</b>											
JC1	07/30/05	widening	meander bend, straights,	na	100	na	1-2.5	na	45-85	47	18.5
JC2	07/28/05	widening, bank scour, channelization	meander bend, straights,	200	200	3	4	90	90	35	28.33
JC3	07/29/05	downcutting, widening, sed. deposition, bank scour	straights, left bank	100	na	2'8" - 4"	na	35-40	na	48-51	32
JC4	07/29/05	downcutting, widening,	meander bend, left bank	50	na	2	na	60	na	50	15.83
JC5	07/29/05	downcutting, widening, bank scour	meander bend, both sides	125	75	~10	5	45-70	65	36.5	19.83
		Land Ownership	Land Cover	Threat to Infrastructure	<u>Riparian Width</u>		Erosion Severity	Site Access			
					Left	Right					
JC1	07/30/05	Private	Forest, Developed right bank	no	< 25 ft.	>100 ft.	1	5			
JC2	07/28/05	Private	Developed both sides	yes	< 25 ft.	> 100 ft.	4	4			
JC3	07/29/05	Public	Forest	no	> 100 ft.	25-50 ft.	3	4			
JC4	07/29/05	Public	Forest	yes	< 25 ft.	25-50 ft.	4	3			
JC5	07/29/05	Private	Field/Ag, Developed	no	< 25 ft.	>100 ft.	3	2			

# Impacted Buffer Data Summary

		Impacted Bank	Reason Inadequate	Land Use		Land Cover		Invasive Plants	Stream Shade	Wetlands	Restoration Candidate
				Left Bank	Right Bank	Left Bank	Right Bank				
<b>Jackson Creek</b>											
JC1	07/30/05	Left	too narrow	private	na	paved, turf/lawn,	na	Unknown	Partial	unknown	na
JC2	07/28/05	Left	lack of veg., too narrow, all turf up to stream	private	na	turf/lawn	na	Unknown	Partial	unknown	na
JC3	07/29/05	Right	too narrow	na	private	na	turf/lawn, shrub/scrub, trees	Unknown	Partial	unknown	na
JC4	07/29/05	Both	lack of veg., too narrow	road	private	paved, shrub/scrub,	turf/lawn, shrub/scrub,	Unknown	Partial	unknown	na
JC5	07/29/05	Left	too narrow, mobile home overhang	private	na	ground, turf/lawn,	na	Unknown	Partial	unknown	na
<b>*Restoration Candidate Note: unknown restoration sites are most likely NOT candidates</b>											

# Miscellaneous Data Summary

		Description	Restoration
<b>Jackson Creek</b>			
JC4	07/29/05	A utility pole and support wires are very close on the left bank.	
JC4	07/29/05	ATV/vehicle trail on right bank. A person drove their ATV into the stream apparently to wash off the tires. It also looked like he may have been purposely crushing something in the stream?	

# Reach Level Assessment

Jackson Creek		Latitude	Longitude	Land Use	Dominant Substrate	Water Clarity	Aquatic Plants		Wildlife	Stream Shading	Channel Dynamics
							Attached	Floating			
JC1	7/30/05 3:15 PM	39° 09.244	86° 29.894	commercial, forested urban/residential	Bed Rock	Clear	lots	none	Fish, Deer (observed by resident)	Mostly shaded (>75% coverage)	widening
JC1-S1	7/27/05 4:00 PM	39° 09.244	86° 29.894	NA							
JC2	7/28/05 12:20 PM	39° 08.728	86° 29.923	suburban/residential forested	Cobble (2.5-10)	Clear	none	none	Fish, Butterflies	Halfway (>50%)	downcutting
JC2-S1	8/17/05 8:30 AM	39° 08.728	86° 29.923	NA							
JC3	7/29/05 8:30 AM	39° 06.813	86° 31.077	suburban/residential forested	Bed Rock	Clear	some	none	Fish	Mostly shaded (>75% coverage)	downcutting, widening, sediment deposition
JC3-S1	8/17/05 10:50 AM	39° 06.813	86° 31.077	NA							
JC4	7/29/05 12:00 PM	39° 06.446	86° 31.405	suburban/residential forested,	Gravel (0.1-2.5)	Clear	some	none	Fish, Snails	Halfway (>50%)	widening
JC4-S1	8/19/05 8:50 AM	39° 06.446	86° 31.405	NA							
JC5	7/29/05 1:30 PM	39° 06.028	86° 32.296	commercial, pasture, road	Gravel (0.1-2.5)	Clear	none	none	Snails	Halfway (>50%)	downcutting, widening bank scour
JC5-S1	8/19/05 10:20 AM	39° 06.028	86° 32.296	NA							

	Site Access	In-Stream Habitat	Vegetative Protection		Erosion		Floodplain Connection	Floodplain Vegetation	Vegetated Buffer Width		Floodplain Habitat	Floodplain Encroachment
			Left Bank	Right Bank	Left Bank	Right Bank			Left Bank	Right Bank		
JC1	5	17	6	9	8	5	20	11	3	10	5	5
JC1-S1	na	0	0	0	0	0	0	0	0	0	0	0
JC2	3	18	1	10	3	7	20	5	1	10	5	10
JC2-S1	na	0	0	0	0	0	0	0	0	0	0	0
JC3	4	3	10	10	5	5	20	13	10	8	11	10
JC3-S1	na	0	0	0	0	0	0	0	0	0	0	0
JC4	5	18	6	6	3	8	20	5	4	4	13	6
JC4-S1	na	0	0	0	0	0	0	0	0	0	0	0
JC5	4	17	6	8	4	7	20	10	1	10	5	13
JC5-S1	na	0	0	0	0	0	0	0	0	0	0	0

# Trash and Debris Data Summary

		Type	Material	Source	Location	Amount of Trash (pick-up truck loads)	Land Ownership	Restoration	Clean-up Equipment	Clean-up Needs	Clean-up Potential
<b>Jackson Creek</b>											
JC1	07/30/05	Ind., Com.,	plastic,	unknown,	stream, both banks	0	private	stream clean-up,	undet.	volunteers, local	3
JC2	07/28/05	Com.	plastic,	unknown	stream, right bank	0	private	stream clean-up,	trash bags	volunteers, local	5
JC3	07/29/05	Res.	plastic, metal	flooding	stream, both banks	0	public, private	stream clean-up	trash bags	volunteers	5
JC4	07/29/05	Res.	plastic,	unknown,	stream, both banks	0	public	stream clean-up	trash bags	volunteers	5
JC5	07/29/05	Ind., Com.,	plastic,	unknown,	stream, riparian, both banks	0	private	stream clean-up	trash bags	volunteers, local	4
<i>bulk items would require more effort to remove</i>											

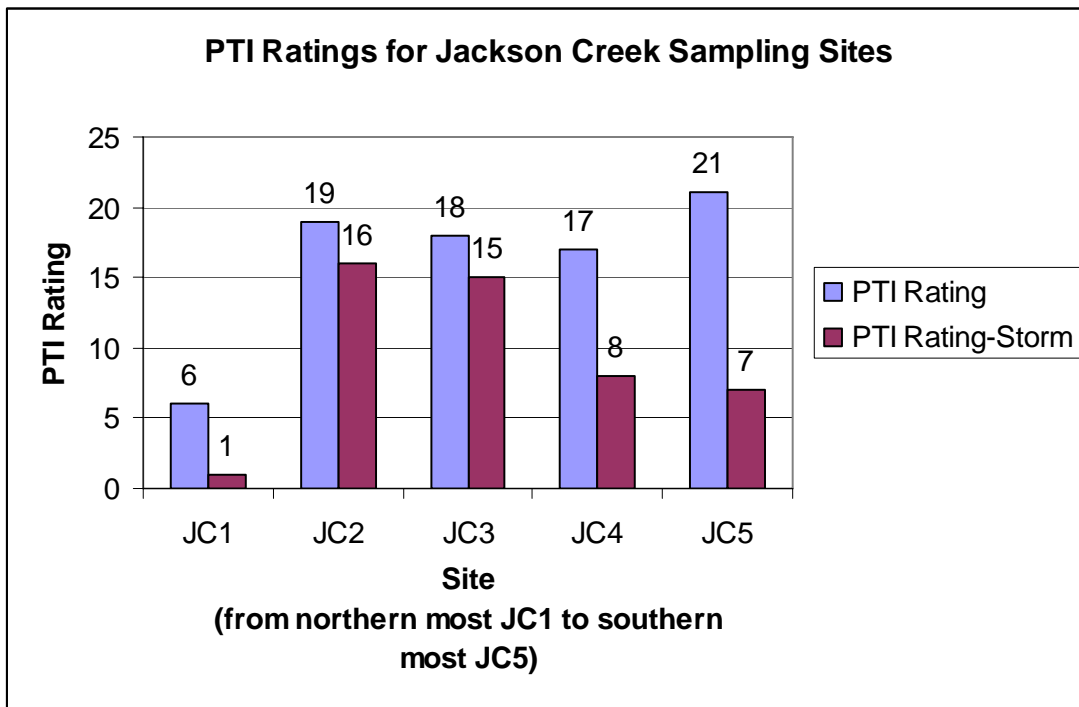
# Utility Impacts Data Summary

		Utility Impact	Type	Material	Location	Fish Barrier	Diameter	Length Exposed	Condition	Color	Discharge Odor	Deposit	Restoration	Water Drop
<b>Jackson Creek</b>														
JC5	07/29/05	unsure,	fully enclosed	corrugated metal	stream bottom	no	12	~1	ok	none	none	none	undet.	0

**Notes:** May be a barrier to fish, unsure. Found across the entire width of the stream.

Macroinvertebrate species count-Jackson Creek

	JC1	JC1-S1	JC2	JC2-S1	JC3	JC3-S1	JC4	JC4-S1	JC5	JC5-S1
<b>Intolerant Species</b>										
Stonefly Nymph										
Mayfly Nymph										
Caddisfly Larvae			2	10	4	1		2	4	
Dobsonfly Larvae										
Riffle Beetle			3	2	5	4	9		11	
Water Penny					1					
Right-handed Snail							20	6	21	11
<b>Moderately Intolerant</b>										
Damselfly Larvae										
Dragonfly Larvae										
Sowbug	5		13	5					4	1
Scud										
Cranefly Larvae			2			1	2			
Clams/Mussels										
Crayfish										
<b>Fairly Tolerant</b>										
Midges			2	15	6	7	6		11	
Blackfly Larvae									1	
Planaria	33		1	2	1		9		7	
Leech										
<b>Very Tolerant</b>										
Left-handed Snail						1				
Aquatic Worms	1	3	2	4	1	2	3			
Blood Midge					4		4			
Rat-tailed Maggot										



HRW: 974

Site Sketch

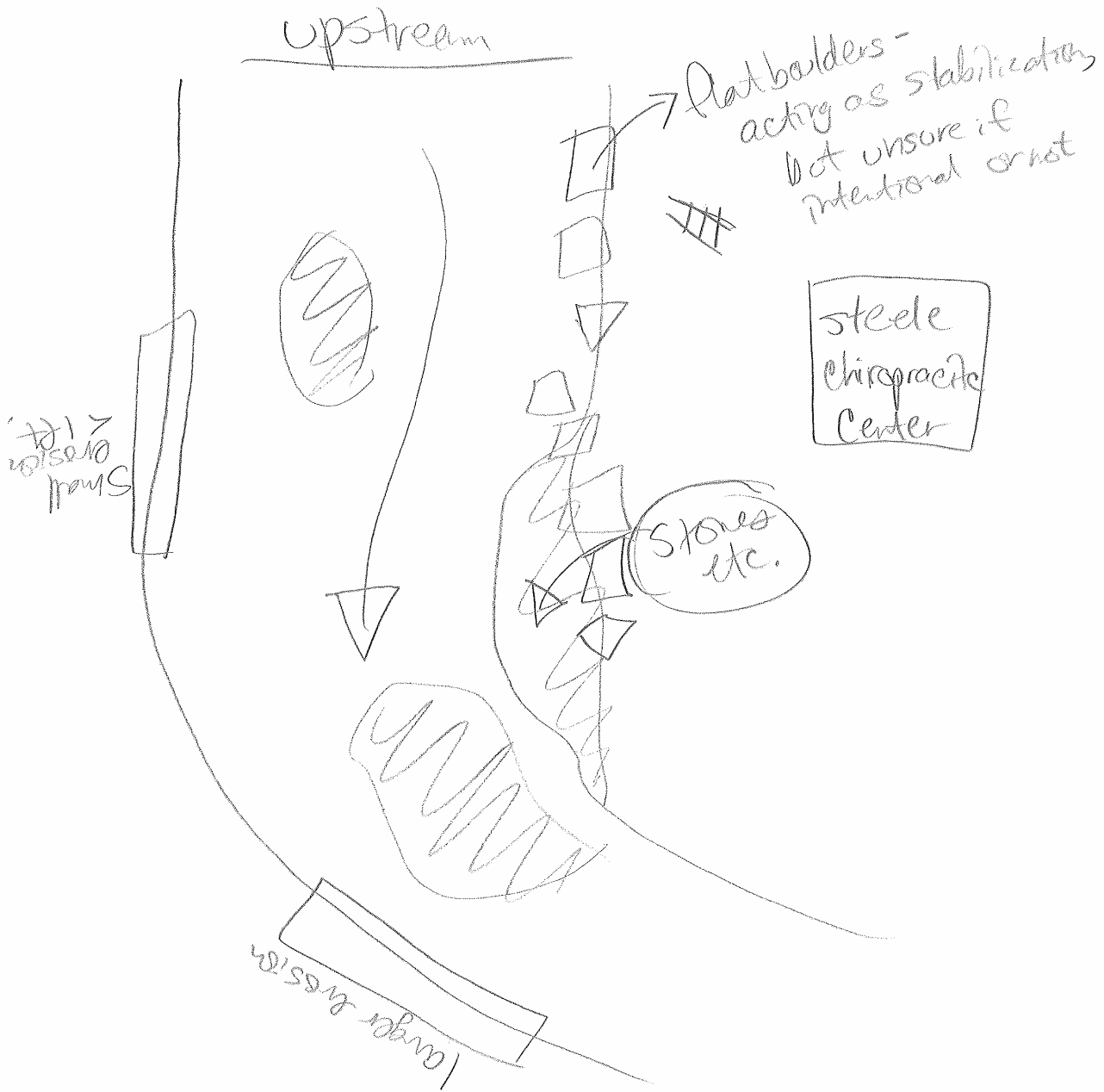
SS

WATERSHED/SUBSHED: Jackson Creek	DATE: 7/30/05	ASSESSED BY: EM/CG
SITE ID: JCI	TIME: 3:15 AM/PM	PHOTO ID: (Camera-Pic #) #
SS-	LAT 39° 09' 24" LONG 86° 29' 894"	LMK GPS: (Unit ID)

(NOTE: Be sure to include any outfalls and photograph locations.)

see JCI-S

N



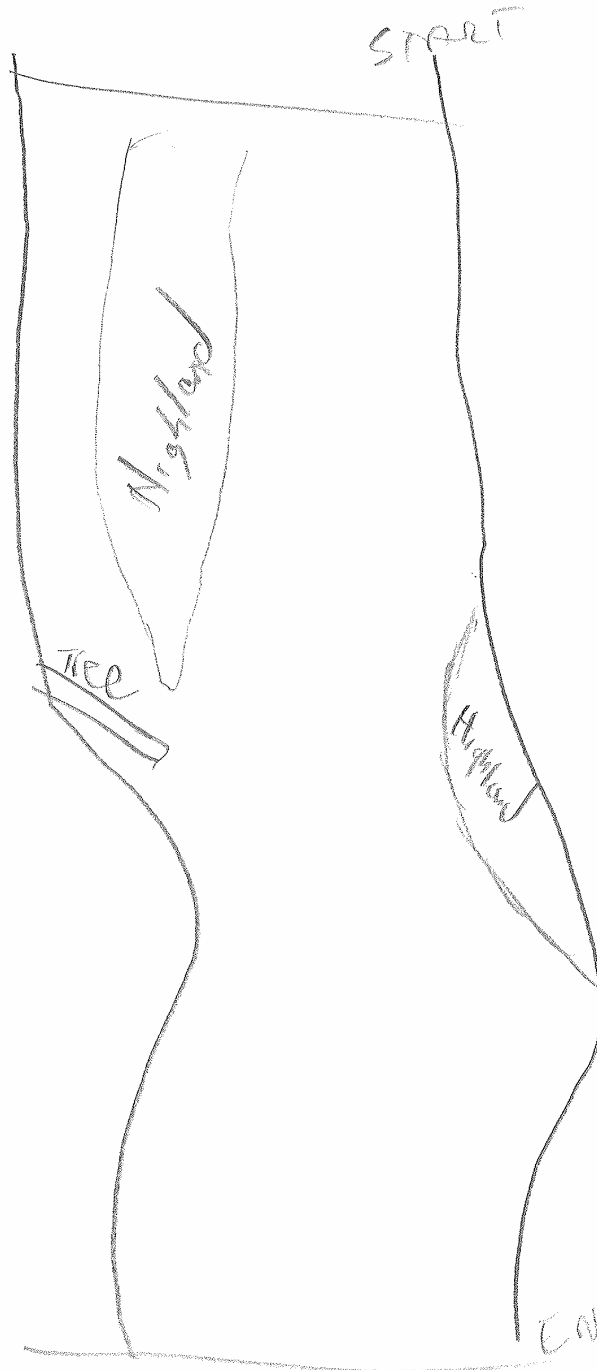
HRW: 970

Site Sketch

**SS**

WATERSHED/SUBSHED: JACKSON CREEK		DATE: 7/28/05	ASSESSED BY: EM/CG
SITE ID: JC2	TIME: 12:20 AM/PM	PHOTO ID: (Camera-Pic #)	/#
SS-_____	LAT 39° 08' 07.28" N	LONG 86° 29' 02.3" W	LMK _____ GPS: (Unit ID)

(NOTE: Be sure to include any outfalls and photograph locations.)



**N**

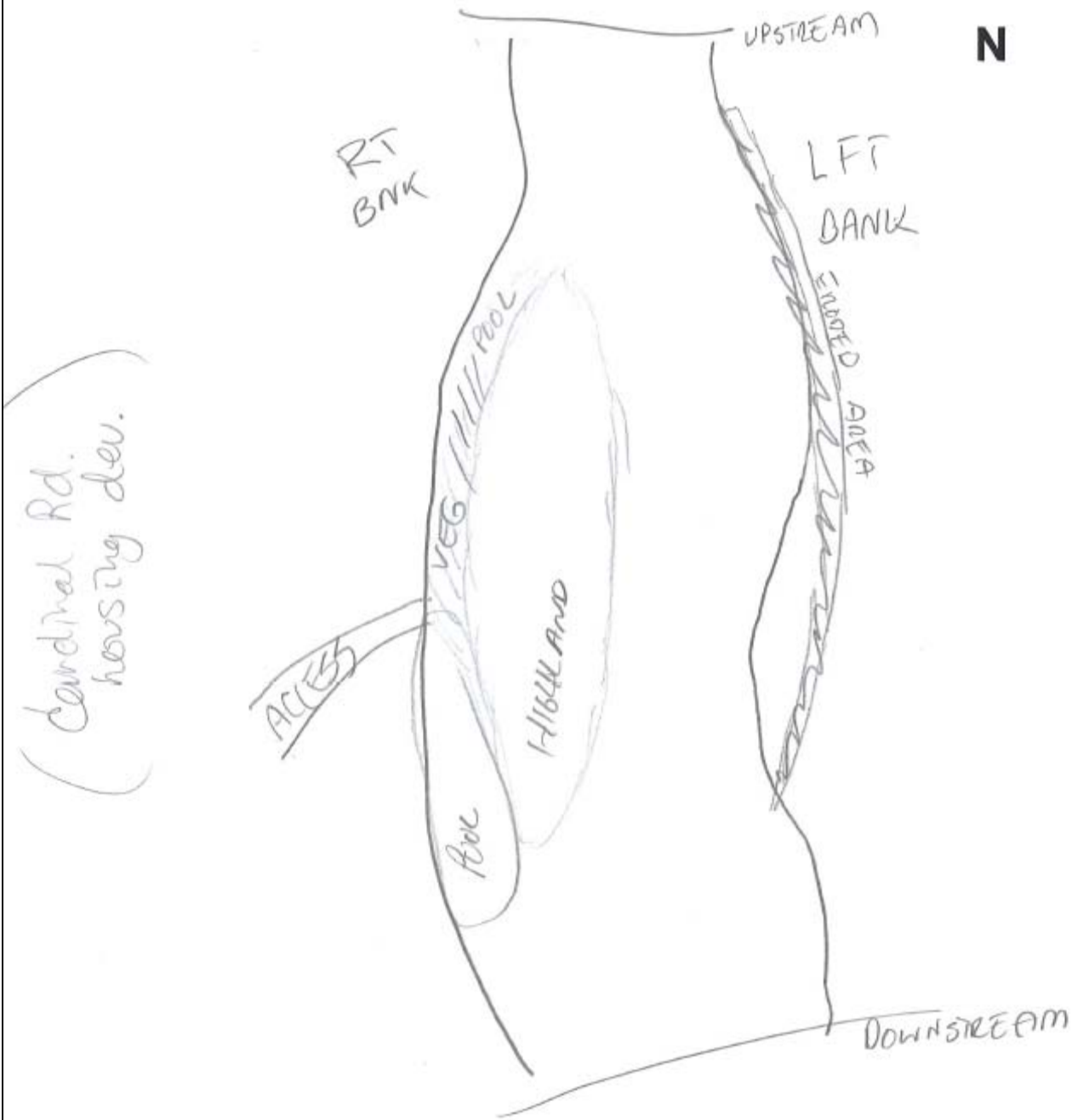
HRW: 971

Site Sketch

**SS**

WATERSHED/SUBSHED: Jackson creek		DATE: 7/29/05	ASSESSED BY: EM/CG
SITE ID: JC3	TIME: 8:30 AM/PM	PHOTO ID: (Camera-Pic #)	#
SS-1	LAT 29° 06' 813"	LONG 86° 31' 077"	LMK _____ GPS: (Unit ID)

(NOTE: Be sure to include any outfalls and photograph locations.)



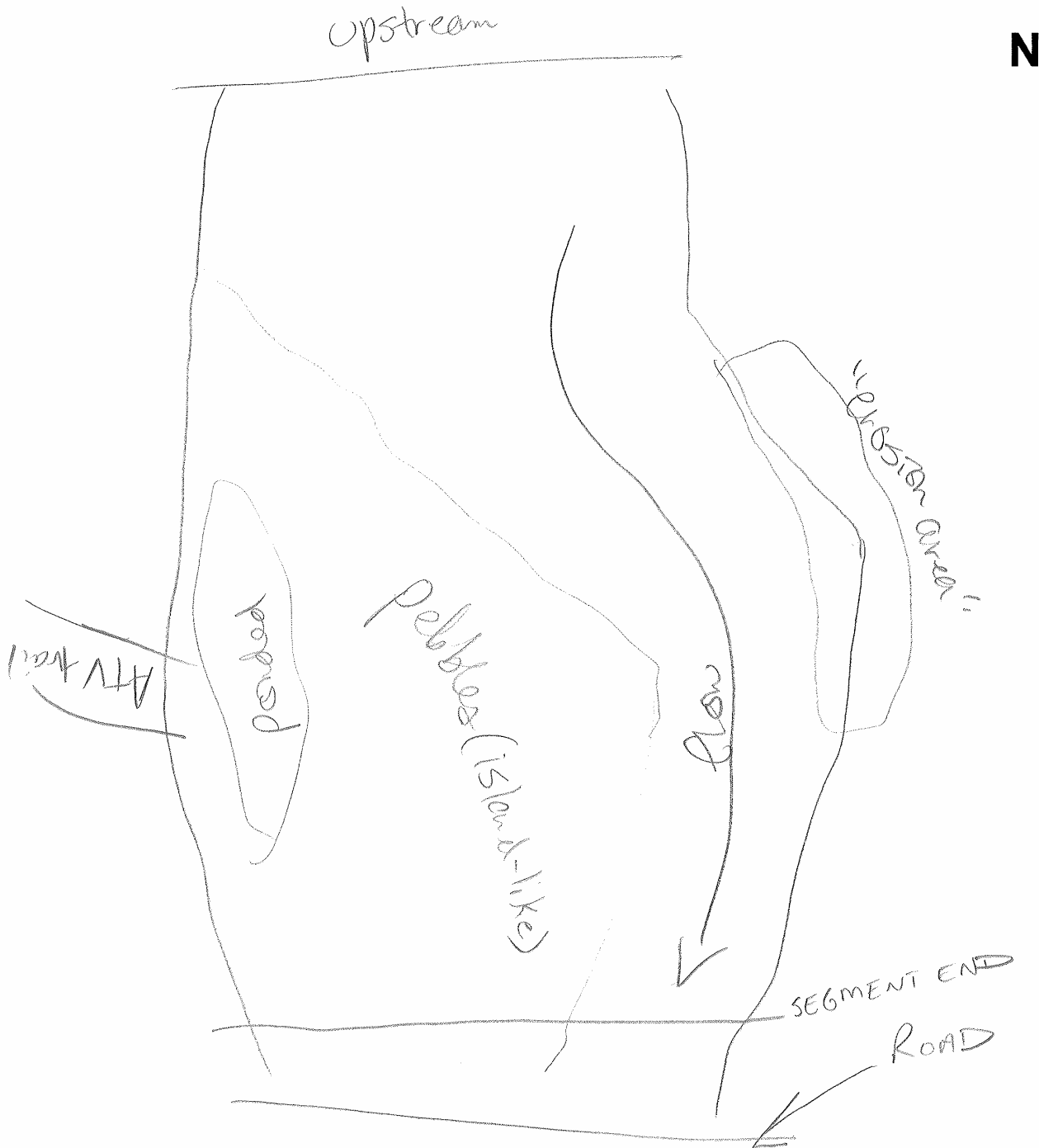
HRW:837

Site Sketch

**SS**

WATERSHED/SUBSHED: JACKSON CREEK	DATE: 7/29/05	ASSESSED BY: FM/CG
SITE ID: JC-4	TIME: 12:00 AM/PM	PHOTO ID: (Camera-Pic #) /#
SS- 1	LAT 39° 06' 44.6" LONG 086° 31' 40.5" LMK	GPS: (Unit ID)

(NOTE: Be sure to include any outfalls and photograph locations.)



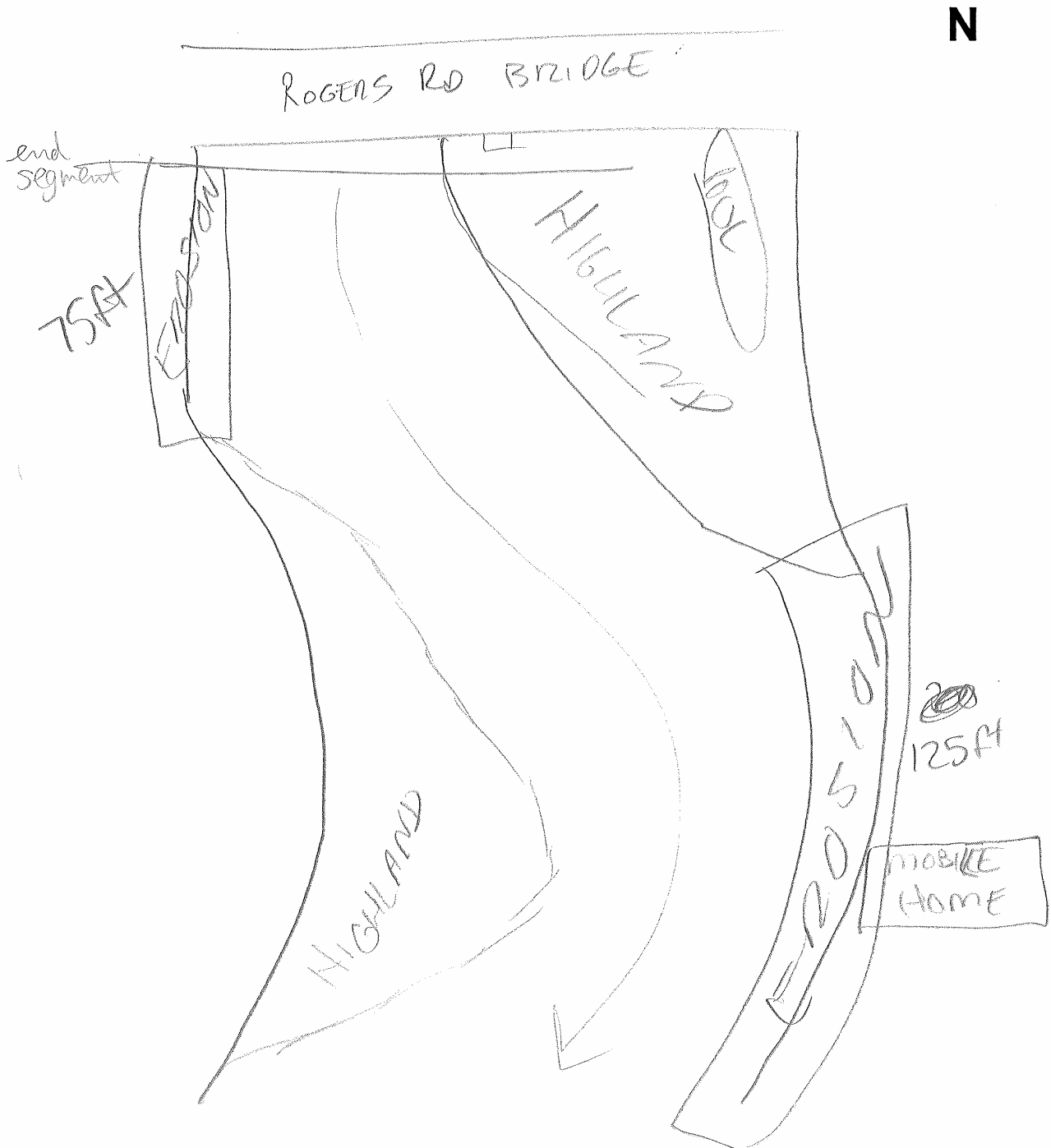
ARW: 972

Site Sketch

**SS**

WATERSHED/SUBSHED: JACKSON Creek	DATE: 7/29/05	ASSESSED BY: CML6'
SITE ID: JLS	TIME: 1:30 AM/PM	PHOTO ID: (Camera-Pic #) #
SS- _____	LAT 39° 06' .028" LONG 186° 32' .296"	LMK _____ GPS: (Unit ID)

(NOTE: Be sure to include any outfalls and photograph locations.)



## Weather Reports for Sampling Days-Jackson Creek

Sampling Dates
7/27/05 (storm)
7/28/05
7/29/05
7/30/05
8/17/05 (storm)
8/19/05 (storm)

Because full weather reports were not obtained on the sampling days, historical data was required and obtained from Weather Underground.<sup>2</sup> For additional sampling, full weather reports should be obtained on the actual sampling day from the National Weather Service, at <http://www.crh.noaa.gov/crh/>.

Date	Temperature (°F)			Dew Point (°F)			Humidity (%)			Sea Level Pressure (in)			Visibility (mi)			Wind (mph)		Gust Speed (mph)	Precipitation (in)	Events
	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	high	sum	
<b>July</b>																				
<a href="#">24</a>	91	80	69	79	72	68	100	83	68	30.11	30.07	29.97	8	4	2	13	0	-	0.01	
<a href="#">25</a>	93	85	77	79	78	75	96	78	57	30.00	29.97	29.89	10	8	3	9	6	-	0.00	
<a href="#">26</a>	91	82	72	79	75	68	94	78	65	29.92	29.89	29.78	10	8	2	18	6	30	0.45	Rain , Tstorm
<a href="#">27</a>	75	70	62	72	70	59	100	87	59	30.07	29.92	29.84	10	9	4	15	5	18	0.23	Rain
<a href="#">28</a>	79	68	57	64	58	54	97	72	45	30.12	30.08	30.07	10	10	10	9	5	-	0.01	
<a href="#">29</a>	82	68	55	65	57	56	100	76	49	30.19	30.14	30.10	10	9	4	9	0	-	0.01	
<a href="#">30</a>	86	72	57	69	59	57	100	78	49	30.26	30.21	30.17	10	7	2	10	0	-	0.00	

Date	Temperature (°F)			Dew Point (°F)			Humidity (%)			Sea Level Pressure (in)			Visibility (mi)			Wind (mph)		Gust Speed (mph)	Precipitation (in)	Events
	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	high	sum	
<b>August</b>																				
<a href="#">14</a>	82	76	69	73	67	66	96	86	65	30.07	29.96	29.90	10	8	2	10	8	17	0.07	Rain
<a href="#">15</a>	80	74	69	72	70	68	96	87	74	30.13	30.05	30.03	10	8	2	9	5	-	0.01	
<a href="#">16</a>	81	74	66	72	71	65	100	94	72	30.11	30.09	30.02	10	6	0	7	0	-	1.14	Fog , Rain
<a href="#">17</a>	84	72	60	70	63	61	100	87	56	30.10	30.09	29.92	10	4	0	12	0	-	0.01	Fog
<a href="#">18</a>	84	76	69	76	70	69	100	86	69	29.93	29.91	29.82	10	4	1	9	0	-	0.00	
<a href="#">19</a>	90	80	71	78	72	69	97	82	61	29.97	29.90	29.83	10	9	2	21	7	29	0.20	Rain , Tstorm
<a href="#">20</a>	89	81	72	79	72	71	97	84	61	30.02	29.96	29.94	10	9	1	13	3	24	0.42	Rain , Tstorm

<sup>2</sup> Weather Underground. Monroe County Indiana, weather history for this location. Available at: <http://www.wunderground.com/forecasts/BMG.html>.