



Missouri
Department of
Natural Resources

Use Attainability Analysis

for

WBID 3413 Horseshoe Creek

Submitted by
BWR

to

Missouri Department of Natural Resources
Water Protection Program

Date received: June 29, 2007

Field Data Sheets for Recreational Use Stream Surveys

WBID 3413
SITE 3

Data Sheet A - Water Body Identification

I. Water Body Information (For water body being surveyed)

Water Body Name (from USGS 7.5' quad):	Horseshoe Creek
Missouri Water Body Identification (WBID) Number:	3413
8-digit HUC: 10 300 161	County: Lafayette
Upstream Legal Description (from Table H):	Mouth
Downstream Legal Description (from Table H):	10,48N, 29W
Number of sites evaluated	5
List all sites numbers, listed consequently upstream to downstream:	5, 4, 3, 2, 1

Site Locations Map(s): Attach a map of entire segment with assessment sites clearly labeled. Mark any other items that may be of interest.

II. Subsegmentation (fill this section out only in cases where subsegmentation is being proposed)

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Upstream Coordinates:		Downstream Coordinates:	
UTM X	Y	UTM X	Y
HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)			
Global Positioning System (GPS)		Interpolation	
Static Mode		Topographic Map or DRG	
Dynamic Mode (Kinematic)		Aerial Photograph or DOQQ	
Precise Positioning Service		Satellite Imagery	
Signal Averaging		Interpolation Other	
Real Time Differential Processing			
HORIZONTAL ACCURACY ESTIMATE			
GPS Data Quality		Interpolation Data Quality	
FOM	± _____ Meters	Source Map Scale: 1:24,000 1:100,000 Other	
EPE	± _____ Feet or ± _____ Meters	_____	
PDOP		± _____ Feet or ± _____ Meters	

III. Discharger Facility Information (list all permitted dischargers on the stream)

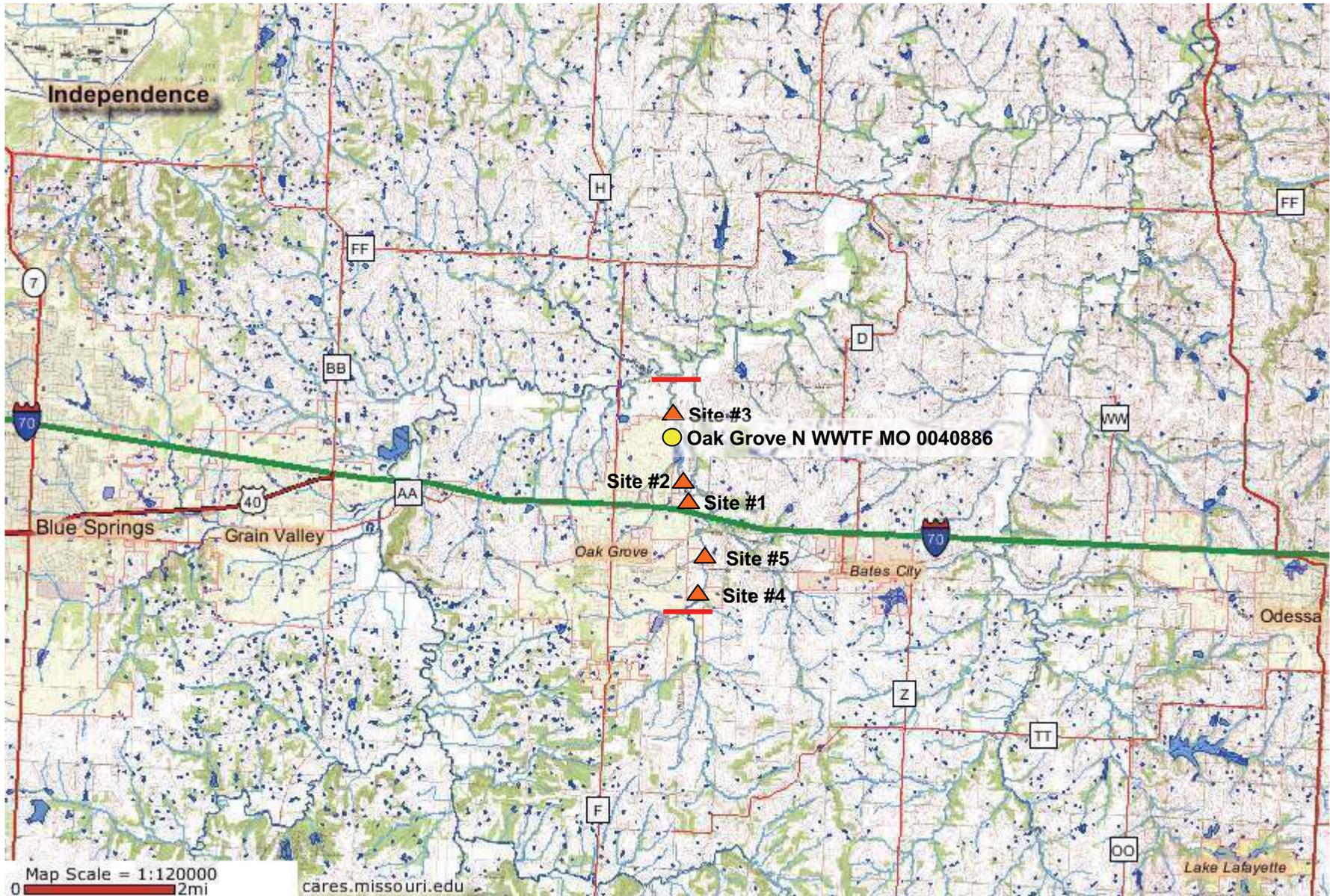
Discharger Facility Name(s):	Dak Grove N WWTF
Discharger Permit Number(s):	MO 0040886

IV. UAA Surveyor (please print legibly)

Name of Surveyor	Alan Mitchell	Telephone Number:	(816) 363-2696
Organization/Employer:	BWR		
Position:	Env. Engineer		

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Alan Mitchell Date: May 24, 2007



Horseshoe Creek
WBID #3413



WBID# 3413
 Site# 1

Field Data Sheets for Recreational Use Stream Surveys
Data Sheet B - Site Characterization
 (must be completed for each site)

Date & Time: <u>10:00am 5/24/2007</u>	Site Location Description (e.g., road crossing): <u>SOUTH OF BRIDGE CROSSING @ CAMBELL RD. (3rd ST)</u>
Personnel (Data Collectors): <u>Alan Mitchell Alex Bartlett</u>	Facility Name: <u>OAK FARM N. WWTF</u>
Current Weather Conditions: <u>Rainy</u>	Permit Number: <u>1100040880</u>
Weather Conditions for Past 10 days: <u>Dry</u>	
Drought Conditions?: No drought <input checked="" type="checkbox"/> ; Phase I <input type="checkbox"/> ; Phase II <input type="checkbox"/> ; Phase III <input type="checkbox"/> ; Phase IV <input type="checkbox"/> ; Unknown <input type="checkbox"/>	

Site Locations:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)	
Site GPS Coordinates: UTM X: <u>94.11086°W</u>	Y: <u>39.01828°N</u>
HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)	
Global Positioning System (GPS)	Interpolation
Static Mode	Topographic Map or DRG
Dynamic Mode (Kinematic)	Aerial Photograph or DOQQ
Precise Positioning Service	Satellite Imagery
Signal Averaging	Interpolation Other
Real Time Differential Processing	
HORIZONTAL ACCURACY ESTIMATE	
GPS Data Quality	Interpolation Data Quality
FOM ± _____ Meters	Source Map Scale: 1:24,000 1:100,000 Other _____
EPE ± <u>15</u> Feet or ± _____ Meters	± _____ Feet or ± _____ Meters
PDOP	

Photos:

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
<u>81-82</u>		<u>79-80</u>			

Uses Observed*: (Uses actually observed at time of survey.)

<input type="checkbox"/> Swimming	<input type="checkbox"/> Skin diving	<input type="checkbox"/> SCUBA diving	<input type="checkbox"/> Tubing	<input type="checkbox"/> Water skiing
<input type="checkbox"/> Wind surfing	<input type="checkbox"/> Kayaking	<input type="checkbox"/> Boating	<input type="checkbox"/> Wading	<input type="checkbox"/> Rafting
<input type="checkbox"/> Hunting	<input type="checkbox"/> Trapping	<input type="checkbox"/> Fishing	<input checked="" type="checkbox"/> None of the above	<input type="checkbox"/> Other:

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use *Data Sheet D- Recreational Use Interview* when conducting interviews.)

Surrounding Conditions*: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

<input type="checkbox"/> City/county parks	<input type="checkbox"/> Playgrounds	<input type="checkbox"/> MDC conservation lands	<input type="checkbox"/> Urban areas	<input type="checkbox"/> Campgrounds
<input type="checkbox"/> Boating accesses	<input type="checkbox"/> State parks	<input type="checkbox"/> National forests	<input type="checkbox"/> Nature trails	<input type="checkbox"/> Stairs/walkway
<input type="checkbox"/> No trespass sign	<input type="checkbox"/> Fence	<input type="checkbox"/> Steep slopes	<input checked="" type="checkbox"/> None of the above	<input type="checkbox"/> Other:

Comments:

Indications of Human Use*: (attach photos)

<input type="checkbox"/> Roads	<input type="checkbox"/> Rope swings	<input type="checkbox"/> Foot paths/prints	<input type="checkbox"/> Dock/platform	<input type="checkbox"/> Livestock Watering	<input type="checkbox"/> RV / ATV Tracks
<input type="checkbox"/> Camping Sites	<input type="checkbox"/> Fire pit/ring	<input type="checkbox"/> NPDES Discharge	<input type="checkbox"/> Fishing Tackle	<input type="checkbox"/> Other:	

Comments: Cast off water heaters, TVs, etc.

10 Channel Feature

RUN: 30

RIFFLE: 0

POOL: 70

• Page Two – Data Sheet B for WBID # 3413 :
Stream Morphology: SITE 1

Upstream View's Physical Dimensions: Is there any water present at this view? Yes No

If so, is there an obvious current? Yes No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN					
POOL					

Downstream View's Physical Dimensions: Is there any water present at this view? Yes No

If so, is there an obvious current? Yes No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN					
POOL					

Substrate*: (These values should add up to 100%.)

% Cobble	% Gravel	% Sand	% Silt	100 % Mud/Clay	% Bedrock
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Aquatic Vegetation*: (Note amount of vegetation or algal growth at the assessment site)

algae

Water Characteristics*: (Mark all that apply.)

Odor:	<input type="checkbox"/> Sewage	<input type="checkbox"/> Musky	<input type="checkbox"/> Chemical	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:
Color:	<input type="checkbox"/> Clear	<input type="checkbox"/> Green	<input checked="" type="checkbox"/> Gray	<input type="checkbox"/> Milky	<input type="checkbox"/> Other:
Bottom Deposit:	<input type="checkbox"/> Sludge	<input type="checkbox"/> Solids	<input type="checkbox"/> Fine sediments	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:
Surface Deposit:	<input type="checkbox"/> Oil	<input type="checkbox"/> Scum	<input type="checkbox"/> Foam	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:

Comments: Please attach any additional comments () to this form.

*This information is not to be used solely for removal of a recreational use designation but rather is to provide a more comprehensive understanding of water conditions. Consequently, this information is not intended to directly influence a decision on the recreation use analysis but may point to conditions that need further analysis or that effect another use.

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Surveyor's Signature: [Signature] Date of Survey: May 24, 2007

Organization: BAE, Inc. Position: Env. Engr

Data Sheet C - Cross-Sectional Depth Measurements (for estimation of median depth)

WBID # 3413

Site # 1

	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
Transect A	1	wetted width	<0.1		
	2	5.0 m	0.1	1	Channel Feature:
	3		0.1	2	RUN 100
	4	measurements	0.1	3	
	5	0.5 m	0.1	4	Dissolved Oxygen:
	6	apart	0.1	5	
	7		<0.1	6	7.07 ppm
	8		<0.1	7	80.1 %
	9		<0.1	8	21.3 °C
	10		<0.1	9	
Transect B	1	wetted width	0.2		
	2	8.0 m	0.1	12	Channel Feature:
	3		0.1	13	RIFLE 10%
	4	measurements	<0.1	14	POOL 90%
	5	0.8 m	<0.1	15	Dissolved Oxygen:
	6	apart	<0.1	16	
	7		<0.1	17	7.23 ppm
	8		<0.1	18	82.0 %
	9		<0.1	19	21.3 °C
	10		<0.1	20	
Transect C	1	wetted width	0.4		
	2	6.0 m	0.5	23	Channel Feature:
	3		0.5	24	100 100%
	4	measurements	0.5	25	
	5	0.6 m	0.5	26	Dissolved Oxygen:
	6	apart	0.5		
	7		0.5		7.00 ppm
	8		0.4		79.1 %
	9		0.3	n	21.3 °C
	10		0.2		

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.
 If there is an even number of entries, the median depth corresponds to the arithmetic average of the two depth values surrounding the middle rank.

I, the undersigned, hereby affirm to the best of my knowledge, that all information reported on this UAA datasheet is true and accurate.

Signed: Neil D. Mitchell Date: May 24, 2007

Organization: EAE, Inc. Position: Environmental Engineer

Data Sheet C - Cross-Sectional Depth Measurements (for estimation of median depth)

WBID # 3413

Site # 1

Transect	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth	
D	wetted width	0.1		1	Channel Feature:	
	6.0 m	0.5		2		P.O.O.L 100%
		0.7		3		
	measurements	0.8		4	Dissolved Oxygen	
	0.6 m	0.8		5		
	apart	0.8		6	7.20	ppm
		0.8		7	81.4	
		0.6		8	21.3	
		0.5		9		
		0.2		10		
E	wetted width	<0.1		11	Channel Feature:	
	3.0 m	0.2		12		RUN 70%
		0.2		13	P.O.O.L 30%	
	measurements	0.2		14	Dissolved Oxygen:	
	2. m	0.2		15		7.40
	apart	0.3		16	83.6	%
		0.2		17	21.3	°C
		0.2		18		
		0.1		19		
		<0.1		20		
			21			
F	wetted width	<0.1		22	Channel Feature:	
	4.0 m	<0.1		23		RUN 60
		0.1		24	P.O.O.L 40	
	measurements	0.1		25	Dissolved Oxygen:	
	1 m	0.1		26		7.14
	apart	<0.1			80.6	%
		<0.1			21.3	°C
		<0.1				
		<0.1				
		<0.1				
	<0.1					

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.
 If there is an even number of entries, the median depth corresponds to the arithmetic average of the two depth values surrounding the middle rank.

I, the undersigned, hereby affirm to the best of my knowledge, that all information reported on this UAA datasheet is true and accurate.

Signed: Alex W. Mitchell

Date: May 24, 2007

Organization: EAE, Inc.

Position: Environmental Engineer

Data Sheet C - Cross-Sectional Depth Measurements (for estimation of median depth)

WBID # 3413

Site # 1

Transsect	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
G	wetted width	0.1			
	5.0 m	0.2		1	Channel Feature:
		0.3		2	POOL 100%
	measurements	0.4		3	
	0.5 m	0.4		4	Dissolved Oxygen
	apart	0.5		5	
		0.5		6	6.92 ppm
		0.4		7	78.0 %
		0.2		8	21.3 °C
		<0.1		9	
H	wetted width	<0.1		11	
	6.0 m	0.4		12	Channel Feature:
		0.4		13	POOL 80%
	measurements	0.4		14	RUN 20%
	6.0 m	0.6		15	Dissolved Oxygen:
	apart	0.5		16	
		0.6		17	6.95 ppm
		0.5		18	78.5 %
		0.4		19	21.3 °C
		<0.1		20	
I	wetted width	<0.1		22	
	4.0 m	0.1		23	Channel Feature:
		0.1		24	RUN 100%
	measurements	0.1		25	
	0.4 m	0.1		26	Dissolved Oxygen:
	apart	0.1		.	
		0.1		.	7.09 ppm
		0.1		.	80.1 %
		0.1		n	21.4 °C
		<0.1			

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.
 If there is an even number of entries, the median depth corresponds to the arithmetic average of the two depth values surrounding the middle rank.

I, the undersigned, hereby affirm to the best of my knowledge, that all information reported on this UAA datasheet is true and accurate.

Signed: Paul W. Mitchell

Date: May 24, 2007

Organization: EAE, Inc.

Position: Environmental Engineer

Data Sheet C - Cross-Sectional Depth Measurements (for estimation of median depth)

WBID # 3413

Site # 1

Transect	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
J	wetted width	<0.1		1	Channel Feature:
	<u>6.0 m</u>	0.2		2	
		0.2		3	
	measurements	0.3		4	Dissolved Oxygen:
	<u>0.6 m</u>	0.4		5	
	apart	0.5		6	<u>6.78</u> ppm
		0.5		7	<u>78.1</u> %
		0.5		8	<u>21.4</u> °C
		0.4		9	
		0.2		10	
			11		
K	wetted width	<0.1		12	Channel Feature:
	<u>6.0 m</u>	<0.1		13	
		0.3		14	RUN 50%
	measurements	0.5		15	Dissolved Oxygen:
	<u>0.6 m</u>	0.6		16	
	apart	0.6		17	<u>6.94</u> ppm
		0.6		18	<u>78.4</u> %
		0.1		19	<u>21.4</u> °C
		0.1		20	
		0.1		21	
			22		
L	wetted width			23	Channel Feature:
	<u> </u> m			24	
				25	
	measurements			26	Dissolved Oxygen:
	<u> </u> m				
	apart				<u> </u> ppm
					<u> </u> %
				n	

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.
 If there is an even number of entries, the median depth corresponds to the arithmetic average of the two depth values surrounding the middle rank.

I, the undersigned, hereby affirm to the best of my knowledge, that all information reported on this UAA datasheet is true and accurate.

Signed: Alan J. Mitchell

Date: May 24, 2007

Organization: EAE, Inc.

Position: Environmental Engineer

February 5, 2007

WBID# 3413
 Site# SITE 2

Field Data Sheets for Recreational Use Stream Surveys
Data Sheet B - Site Characterization
 (must be completed for each site)

Date & Time: <u>7:15 am 5/24/2007</u>	Site Location Description (e.g., road crossing): <u>NORTH OF BRIDGE CROSSING @ CAMPBELL RD. (3RD ST)</u>
Personnel (Data Collectors): <u>Alvin Mitchell Alex Bartlett</u>	Facility Name: <u>OAK GROVE N. WWTF</u>
Current Weather Conditions: <u>Rainy</u>	Permit Number: <u>MD004088U</u>
Weather Conditions for Past 10 days: <u>Dry</u>	
Drought Conditions?: No drought <input checked="" type="checkbox"/> ; Phase I <input type="checkbox"/> ; Phase II <input type="checkbox"/> ; Phase III <input type="checkbox"/> ; Phase IV <input type="checkbox"/> ; Unknown <input type="checkbox"/>	

Site Locations:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)	
Site GPS Coordinates: UTM X:	Y:
HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)	
Global Positioning System (GPS)	
Static Mode	Interpolation
Dynamic Mode (Kinematic)	Topographic Map or DRG
Precise Positioning Service	Aerial Photograph or DOQQ
Signal Averaging	Satellite Imagery
Real Time Differential Processing	Interpolation Other
HORIZONTAL ACCURACY ESTIMATE	
GPS Data Quality	
FOM	± _____ Meters
EPE	± <u>15</u> Feet or ± _____ Meters
PDOP	
Interpolation Data Quality	
Source Map Scale: 1:24,000 1:100,000 Other _____	
± _____ Feet or ± _____ Meters	

Photos:

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

Uses Observed*: (Uses actually observed at time of survey.)

<input type="checkbox"/> Swimming	<input type="checkbox"/> Skin diving	<input type="checkbox"/> SCUBA diving	<input type="checkbox"/> Tubing	<input type="checkbox"/> Water skiing
<input type="checkbox"/> Wind surfing	<input type="checkbox"/> Kayaking	<input type="checkbox"/> Boating	<input type="checkbox"/> Wading	<input type="checkbox"/> Rafting
<input type="checkbox"/> Hunting	<input type="checkbox"/> Trapping	<input type="checkbox"/> Fishing	<input checked="" type="checkbox"/> None of the above	<input type="checkbox"/> Other:

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D- Recreational Use Interview when conducting interviews.)

Surrounding Conditions*: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

<input type="checkbox"/> City/county parks	<input type="checkbox"/> Playgrounds	<input type="checkbox"/> MDC conservation lands	<input type="checkbox"/> Urban areas	<input type="checkbox"/> Campgrounds
<input type="checkbox"/> Boating accesses	<input type="checkbox"/> State parks	<input type="checkbox"/> National forests	<input type="checkbox"/> Nature trails	<input type="checkbox"/> Stairs/walkway
<input type="checkbox"/> No trespass sign	<input type="checkbox"/> Fence	<input type="checkbox"/> Steep slopes	<input checked="" type="checkbox"/> None of the above	<input type="checkbox"/> Other:

Comments:

Indications of Human Use*: (attach photos)

<input type="checkbox"/> Roads	<input type="checkbox"/> Rope swings	<input type="checkbox"/> Foot paths/prints	<input type="checkbox"/> Dock/platform	<input type="checkbox"/> Livestock Watering	<input type="checkbox"/> RV / ATV Tracks
<input type="checkbox"/> Camping Sites	<input type="checkbox"/> Fire pit/ring	<input type="checkbox"/> NPDES Discharge	<input type="checkbox"/> Fishing Tackle	<input type="checkbox"/> Other:	

Comments: Trash and tires, glass, east-off

% Channel Feature

RUN: 25%
RIFFLE: 0
POOL: 75%

* Page Two - Data Sheet B for WBID # 3413 : 2
Stream Morphology:

Upstream View's Physical Dimensions: Is there any water present at this view? Yes No

If so, is there an obvious current? Yes No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN					
POOL					

Downstream View's Physical Dimensions: Is there any water present at this view? Yes No

If so, is there an obvious current? Yes No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN					
POOL					

Substrate*: (These values should add up to 100%.)

% Cobble	% Gravel	% Sand	% Silt	<u>100</u> % Mud/Clay	% Bedrock
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Aquatic Vegetation*: (Note amount of vegetation or algal growth at the assessment site)

None

Water Characteristics*: (Mark all that apply.)

Odor:	<input type="checkbox"/> Sewage	<input type="checkbox"/> Musky	<input type="checkbox"/> Chemical	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:
Color:	<input type="checkbox"/> Clear	<input type="checkbox"/> Green	<input checked="" type="checkbox"/> Gray	<input type="checkbox"/> Milky	<input type="checkbox"/> Other:
Bottom Deposit:	<input type="checkbox"/> Sludge	<input type="checkbox"/> Solids	<input type="checkbox"/> Fine sediments	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:
Surface Deposit:	<input type="checkbox"/> Oil	<input type="checkbox"/> Scum	<input type="checkbox"/> Foam	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:

Comments: Please attach any additional comments () to this form.

*This information is not to be used solely for removal of a recreational use designation but rather is to provide a more comprehensive understanding of water conditions. Consequently, this information is not intended to directly influence a decision on the recreation use analysis but may point to conditions that need further analysis or that effect another use.

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Surveyor's Signature: [Signature] Date of Survey: May 24, 2007

Organization: EAC, Inc. Position: Envr Engr

Data Sheet C - Cross-Sectional Depth Measurements (for estimation of median depth)

WBID # 3413

Site # 2

	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
Transect A	1 wetted width	<0.1		1	Channel Feature:
	2 5.0 m	0.1		2	RUN 100%
	3	0.2		3	POOL 70%
	4 measurements	0.3		4	Dissolved Oxygen
	5 0.5 m	0.3		5	
	6 apart	0.3		6	6.05 ppm
	7	0.2		7	7.9 %
	8	0.2		8	21.0 °C
	9	0.2		9	
	10	0.1		10	
Transect B	1 wetted width	<0.1		11	
	2 2.0 m	<0.1		12	Channel Feature:
	3	<0.1		13	RUN 30%
	4 measurements	<0.1		14	POOL 70%
	5 0.6 m	<0.1		15	Dissolved Oxygen:
	6 apart	<0.1		16	
	7	<0.1		17	6.06 ppm
	8	<0.1		18	6.9 %
	9	<0.1		19	20.8 °C
	10	<0.1		20	
Transect C	1 wetted width	<0.1		21	
	2 6.0 m	0.1		22	Channel Feature:
	3	0.3		23	POOL 80
	4 measurements	0.3		24	RUN 20%
	5 0.6 m	0.3		25	Dissolved Oxygen
	6 apart	0.3		26	
	7	0.2			6.10 ppm
	8	0.2			6.9 %
	9	0.1		n	21.0 °C
	10	<0.1			

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.
 If there is an even number of entries, the median depth corresponds to the arithmetic average of the two depth values surrounding the middle rank.

I, the undersigned, hereby affirm to the best of my knowledge, that all information reported on this UAA datasheet is true and accurate.

Signed: M. W. Mitchell

Date: May 24, 2007

Organization: EAE, Inc.

Position: Environmental Engineer

Data Sheet C - Cross-Sectional Depth Measurements (for estimation of median depth)

WBID # 3413

Site # 2

	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
Transect D	wetted width	<0.1		1	Channel Feature:
	<u>6.0 m</u>	0.1		2	POOL 100%
		0.2		3	
	measurements	0.3		4	Dissolved Oxygen:
	<u>0.6 m</u>	0.4		5	
	apart	0.5		6	6.02 ppm
		0.5		7	67.6 %
		0.2		8	21.0 °C
		0.2		9	
		0.1		10	
Transect E	wetted width	0.1		11	
	<u>7.0 m</u>	0.3		12	Channel Feature:
		0.4		13	POOL 100%
	measurements	0.5		14	
	<u>0.7 m</u>	0.5		15	Dissolved Oxygen:
	apart	0.6		16	
		0.6		17	6.01 ppm
		0.5		18	67.4 %
		0.4		19	21.1 °C
		0.1		20	
Transect F	wetted width	0.1		21	
	<u>5.0 m</u>	0.1		22	Channel Feature:
		<0.1		23	POOL 100%
	measurements	0.1		24	
	<u>0.5 m</u>	0.1		25	Dissolved Oxygen:
	apart	0.2		26	
		0.3		.	6.72 ppm
		0.2		.	75.6 %
		0.2		n	21.1 °C
		<0.1			

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.
 If there is an even number of entries, the median depth corresponds to the arithmetic average of the two depth values surrounding the middle rank.

I, the undersigned, hereby affirm to the best of my knowledge, that all information reported on this UAA datasheet is true and accurate.

Signed: Alex W. Mitchell

Date: May 24, 2007

Organization: EAE, Inc.

Position: Environmental Engineer

Data Sheet C - Cross-Sectional Depth Measurements (for estimation of median depth)

WBID # 3413

Site # 2

Transect	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
Transect G	1 wetted width	<0.1		1	Channel Feature:
	2 4.0 m	<0.1		2	Run 10%
	3	0.1		3	90%
	4 measurements	0.2		4	Dissolved Oxygen:
	5 0.4 m	0.4		5	
	6 apart	0.4		6	6.72 ppm
	7	0.3		7	75.5 %
	8	0.3		8	21.1 °C
	9	0.2		9	
	10	0.1		10	
Transect H	1 wetted width	<0.1		11	
	2 4.0 m	0.2		12	Channel Feature:
	3	0.3		13	Pool 100%
	4 measurements	0.5		14	
	5 0.4 m	0.6		15	Dissolved Oxygen:
	6 apart	0.6		16	
	7	0.4		17	6.79 ppm
	8	0.3		18	72.4 %
	9	0.2		19	21.4 °C
	10	<0.1		20	
Transect I	1 wetted width			21	
	2 _____ m			22	
	3			23	Channel Feature:
	4			24	
	5 measurements			25	
	6 _____ m			26	Dissolved Oxygen:
	7 apart			.	
	8			.	ppm
	9			.	%
	10			n	

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.
 If there is an even number of entries, the median depth corresponds to the arithmetic average of the two depth values surrounding the middle rank.

I, the undersigned, hereby affirm to the best of my knowledge, that all information reported on this UAA datasheet is true and accurate.

Signed: Andrew Mitchell

Date: May 24, 2007

Organization: EAE, Inc.

Position: Environmental Engineer

Data Sheet C - Cross-Sectional Depth Measurements (for estimation of median depth)

39.01862°N
94.11010°W
±15FT
PHOTOS
75 & 76 Dn str

WBID # 3413 Site # 2

Transect	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
Transect J	wetted width	<0.1			
	5.0 m	0.1		1	Channel Feature:
		<0.1		2	POOL 100%
	measurements	<0.1		3	
	0.5 m	0.1		4	Dissolved Oxygen:
	apart	0.2		5	
		0.4		6	6.81 ppm
		0.4		7	76.1 %
		0.3		8	21.2 °C
		<0.1		9	
Transect K	wetted width	<0.1			
	1.5 m	<0.1		11	
		<0.1		12	Channel Feature:
	measurements	<0.1		13	RUN 100%
	1 m	0.1		14	
	apart	0.1		15	Dissolved Oxygen:
		<0.1		16	
		<0.1		17	7.08 ppm
		<0.1		18	80.1 %
		<0.1		19	20.2 °C
Transect I	wetted width	<0.1			
	5.0 m	0.2		22	
		0.3		23	Channel Feature:
	measurements	0.4		24	POOL 90%
	0.5 m	0.0		25	RUN 10%
	apart	0.5		26	Dissolved Oxygen:
		0.4			
		0.4			6.75 ppm
		0.1			76.5 %
		<0.1		n	21.2 °C

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.
 If there is an even number of entries, the median depth corresponds to the arithmetic average of the two depth values surrounding the middle rank.

I, the undersigned, hereby affirm to the best of my knowledge, that all information reported on this UAA datasheet is true and accurate.

Signed: David Mitchell Date: May 24, 2007

Organization: EAE, Inc. Position: Environmental Engineer

WBID# 3413
 Site# 3

Field Data Sheets for Recreational Use Stream Surveys
Data Sheet B - Site Characterization
 (must be completed for each site)

Date & Time:	Site Location Description (e.g., road crossing): <u>BRIDGE CROSSING @ GILLESPIE RD.</u>
Personnel (Data Collectors):	
Current Weather Conditions:	Facility Name: <u>Oak Grove N. V.M.T.F.</u>
Weather Conditions for Past 10 days:	Permit Number: <u>MO0040886</u>
Drought Conditions?: No drought <input type="checkbox"/> ; Phase I <input type="checkbox"/> ; Phase II <input type="checkbox"/> ; Phase III <input type="checkbox"/> ; Phase IV <input type="checkbox"/> ; Unknown <input type="checkbox"/>	

Site Locations:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)

Site GPS Coordinates: UTM X: 94.11740°W Y: 39.03334°N

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)		Interpolation	
Static Mode		Topographic Map or DRG	
Dynamic Mode (Kinematic)		Aerial Photograph or DOQQ	
Precise Positioning Service		Satellite Imagery	
Signal Averaging		Interpolation Other	
Real Time Differential Processing			

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality		Interpolation Data Quality	
FOM	± _____ Meters	Source Map Scale: 1:24,000 1:100,000 Other _____	
EPE	± <u>15</u> Feet or ± _____ Meters	± _____ Feet or ± _____ Meters	
PDOP			

Photos:

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
<u>71.072</u>		<u>73.074</u>			

Uses Observed*: (Uses actually observed at time of survey.)

<input type="checkbox"/> Swimming	<input type="checkbox"/> Skin diving	<input type="checkbox"/> SCUBA diving	<input type="checkbox"/> Tubing	<input type="checkbox"/> Water skiing
<input type="checkbox"/> Wind surfing	<input type="checkbox"/> Kayaking	<input type="checkbox"/> Boating	<input type="checkbox"/> Wading	<input type="checkbox"/> Rafting
<input type="checkbox"/> Hunting	<input type="checkbox"/> Trapping	<input type="checkbox"/> Fishing	<input checked="" type="checkbox"/> None of the above	<input type="checkbox"/> Other:

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D- Recreational Use Interview when conducting interviews.)

Surrounding Conditions*: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

<input type="checkbox"/> City/county parks	<input type="checkbox"/> Playgrounds	<input type="checkbox"/> MDC conservation lands	<input type="checkbox"/> Urban areas	<input type="checkbox"/> Campgrounds
<input type="checkbox"/> Boating accesses	<input type="checkbox"/> State parks	<input type="checkbox"/> National forests	<input type="checkbox"/> Nature trails	<input type="checkbox"/> Stairs/walkway
<input type="checkbox"/> No trespass sign	<input type="checkbox"/> Fence	<input type="checkbox"/> Steep slopes	<input checked="" type="checkbox"/> None of the above	<input type="checkbox"/> Other:

Comments:

Indications of Human Use*: (attach photos)

<input type="checkbox"/> Roads	<input type="checkbox"/> Rope swings	<input type="checkbox"/> Foot paths/prints	<input type="checkbox"/> Dock/platform	<input type="checkbox"/> Livestock Watering	<input type="checkbox"/> RV / ATV Tracks
<input type="checkbox"/> Camping Sites	<input type="checkbox"/> Fire pit/ring	<input type="checkbox"/> NPDES Discharge	<input type="checkbox"/> Fishing Tackle	<input type="checkbox"/> Other:	

Comments: lots of trash, tires, bedframe, bicycle, etc.

* Page Two – Data Sheet B for WBID # 3413 :

Stream Morphology:

SITE 3

POOL = 80
RUN = 20

Upstream View's Physical Dimensions: Is there any water present at this view? Yes No

If so, is there an obvious current? Yes No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN					
POOL					

Downstream View's Physical Dimensions: Is there any water present at this view? Yes No

If so, is there an obvious current? Yes No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN					
POOL					

Substrate*: (These values should add up to 100%.)

% Cobble	% Gravel	% Sand	% Silt	100	% Mud/Clay	% Bedrock
----------	----------	--------	--------	-----	------------	-----------

Aquatic Vegetation*: (Note amount of vegetation or algal growth at the assessment site)

None

Water Characteristics*: (Mark all that apply.)

Odor:	<input type="checkbox"/> Sewage	<input type="checkbox"/> Musky	<input type="checkbox"/> Chemical	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:
Color:	<input type="checkbox"/> Clear	<input type="checkbox"/> Green	<input checked="" type="checkbox"/> Gray	<input type="checkbox"/> Milky	<input type="checkbox"/> Other:
Bottom Deposit:	<input type="checkbox"/> Sludge	<input type="checkbox"/> Solids	<input type="checkbox"/> Fine sediments	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:
Surface Deposit:	<input type="checkbox"/> Oil	<input type="checkbox"/> Scum	<input type="checkbox"/> Foam	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:

Comments: Please attach any additional comments () to this form.

*This information is not to be used solely for removal of a recreational use designation but rather is to provide a more comprehensive understanding of water conditions. Consequently, this information is not intended to directly influence a decision on the recreation use analysis but may point to conditions that need further analysis or that effect another use.

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Surveyor's Signature: Alan H. Mitchell Date of Survey: May 24, 2007

Organization: BAE, Inc. Position: Env. Engr

Data Sheet C - Cross-Sectional Depth Measurements (for estimation of median depth)

WBID # _____

Site # 3

Transect	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
Transect A	wetted width	<		1	Channel Feature:
	4.0 m	0.2		2	
		0.3		3	
	measurements	0.3		4	Dissolved Oxygen:
	0.4 m	0.3		5	
	apart	0.2		6	3.16 ppm
		0.2		7	3.20 ppm
		0.2		8	
		0.2		9	2.09
		<0.1		10	
Transect B	wetted width	<0.1		11	
	1.0 m	<0.6		12	Channel Feature:
		0.2		13	RUN 100%
	measurements	0.2		14	
	m	0.2		15	Dissolved Oxygen:
	apart	0.2		16	
		0.2		17	5.73 ppm
		0.2		18	5.03 ppm
		0.2		19	21.0
		0.1		20	
Transect C	wetted width	<0.1		22	
	6.0 m	0.1		23	Channel Feature:
		0.3		24	RUN 100%
	measurements	0.2		25	
	0.2 m	0.4		26	Dissolved Oxygen:
	apart	0.7			
		0.3			7.82 ppm
		0.2			53.2 ppm
		0.1		n	21.0 °C
		<0.1			

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.
 If there is an even number of entries, the median depth corresponds to the arithmetic average of the two depth values surrounding the middle rank.

I, the undersigned, hereby affirm to the best of my knowledge, that all information reported on this UAA datasheet is true and accurate.

Signed: John D. Mitchell

Date: May 21, 2007

Organization: EAE, Inc.

Position: Env. Engnr

Data Sheet C - Cross-Sectional Depth Measurements (for estimation of median depth)

WBID # 3413 Site # 3

Transect	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
D	wetted width	<0.1		1	Channel Feature:
	<u>7.0 m</u>	0.2		2	TOOL 100%
		0.3		3	
	measurements	0.2		4	Dissolved Oxygen
	<u>0.7 m</u>	0.4		5	
	apart	0.6		6	4.95 ppm
		0.8		7	55.2 %
		0.8		8	21.0 °C
		0.3		9	
		0.1		10	
E	wetted width	<0.1		11	
	<u>3.0 m</u>	0.1		12	Channel Feature:
		0.2		13	POOL 50%
	measurements	0.2		14	RUN 50%
	<u>0.3 m</u>	0.2		15	Dissolved Oxygen:
	apart	<0.1		16	
		<0.1		17	5.03 ppm
		0.1		18	56.6 %
		0.1		19	20.9 °C
		<0.1		20	
F	wetted width	0.5		21	
	<u>7.0 m</u>	0.6		22	
		0.8		23	Channel Feature:
	measurements	71.0		24	POOL 100%
	<u>0.7 m</u>	71.0		25	
	apart	71.0		26	Dissolved Oxygen
		71.0			4.87 ppm
		0.9			54.2 %
		0.5		n	20.9 °C
		<0.1			

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.
 If there is an even number of entries, the median depth corresponds to the arithmetic average of the two depth values surrounding the middle rank.

I, the undersigned, hereby affirm to the best of my knowledge, that all information reported on this UAA datasheet is true and accurate.

Signed: Alan W. Mitchell Date: May 24, 2007

Organization: EAE, Inc Position: Env. Engr

Data Sheet C - Cross-Sectional Depth Measurements (for estimation of median depth)

WBID # 3413

Site # 3

Transect	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
Transect G	wetted width	<0.1			
	6.0 m	0.5		1	Channel Feature:
		0.8		2	POOL 100%
	measurements	1.0		3	
	0.6 m	1.0		4	Dissolved Oxygen:
	apart	0.8		5	
		0.7		6	4.90 ppm
		0.6		7	52.3 %
		0.3		8	20.9 °C
		<0.1		9	
Transect H	wetted width	<0.1			
	5.0 m	<0.1		12	Channel Feature:
		<0.1		13	POOL 100%
	measurements	0.1		14	
	0.5 m	0.3		15	Dissolved Oxygen:
	apart	0.5		16	
		0.6		17	4.80 ppm
		0.7		18	53.8 %
		0.4		19	20.9 °C
		0.1		20	
Transect I	wetted width	<0.1			
	3.0 m	<0.1		23	Channel Feature:
		0.1		24	POOL 100%
	measurements	0.2		25	
	0.3 m	0.3		26	Dissolved Oxygen:
	apart	0.4			
		0.5			4.76 ppm
		0.6			53.3 %
		0.2		n	20.9 °C
		<0.1			

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.
 If there is an even number of entries, the median depth corresponds to the arithmetic average of the two depth values surrounding the middle rank.

I, the undersigned, hereby affirm to the best of my knowledge, that all information reported on this UAA datasheet is true and accurate.

Signed: Shirley Mitchell Date: May 24, 2007
 Organization: EAE, Inc. Position: Env. Engr

Data Sheet C - Cross-Sectional Depth Measurements (for estimation of median depth)

WBID # 3413

Site # 3

Transsect	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
J	1 wetted width	<0.1		1	Channel Feature:
	2 4.0 m	<0.1		2	POOL 100%
	3	0.3		3	
	4 measurements	0.5		4	Dissolved Oxygen
	5 0.4 m	0.5		5	
	6 apart	0.4		6	5.00 ppm
	7	0.4		7	56.0 %
	8	0.3		8	21.0 °C
	9	0.2		9	
	10	<0.1		10	
K	1 wetted width	<0.1		11	
	2 4.0 m	0.3		12	Channel Feature:
	3	0.4		13	
	4 measurements	0.6		14	POOL 100%
	5 0.4 m	0.5		15	Dissolved Oxygen:
	6 apart	0.6		16	
	7	0.5		17	3.6 ppm
	8	0.4		18	56.0 %
	9	0.3		19	21.0 °C
	10	0.1		20	
L	1 wetted width			21	
	2 _____ m			22	
	3			23	Channel Feature:
	4			24	
	5 measurements			25	
	6 _____ m			26	Dissolved Oxygen
	7 apart				
	8				_____ ppm
	9				_____ %
	10			n	

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.

If there is an even number of entries, the median depth corresponds to the arithmetic average of the two depth values surrounding the middle rank.

I, the undersigned, hereby affirm to the best of my knowledge, that all information reported on this UAA datasheet is true and accurate.

Signed: Alan S. Mitchell

Date: May 24, 2007

Organization: EAE, Inc

Position: Env. Engr

February 5, 2007

WBID# 3413
 Site# 4

Field Data Sheets for Recreational Use Stream Surveys
Data Sheet B - Site Characterization
 (must be completed for each site)

Date & Time: <u>6/19/07 1030</u>	Site Location Description (e.g., road crossing): <u>BRIDGE CROSSING AT WHITE ROAD.</u>
Personnel (Data Collectors): <u>BARTLETT & LUNT</u>	
Current Weather Conditions: <u>SUNNY w 75°F</u>	Facility Name: <u>OAK GROVE WWTF</u>
Weather Conditions for Past 10 days: <u>FAIR/RAIN</u>	Permit Number: <u>MO0040886</u>
Drought Conditions?: No drought <input checked="" type="checkbox"/> ; Phase I <input type="checkbox"/> ; Phase II <input type="checkbox"/> ; Phase III <input type="checkbox"/> ; Phase IV <input type="checkbox"/> ; Unknown <input type="checkbox"/>	

Site Locations:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION IN METERS)	
Site GPS Coordinates: UTM X: <u>38.98443</u>	Y: <u>094.10768</u>
HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data)	
Global Positioning System (GPS)	Interpolation
Static Mode	Topographic Map or DRG
Dynamic Mode (Kinematic)	Aerial Photograph or DOQQ
Precise Positioning Service	Satellite Imagery
Signal Averaging	Interpolation Other
Real Time Differential Processing	
HORIZONTAL ACCURACY ESTIMATE	
GPS Data Quality	Interpolation Data Quality
FOM ± _____ Meters	Source Map Scale: 1:24,000 1:100,000 Other _____ ± _____ Feet or ± _____ Meters
EPE ± _____ Feet or ± _____ Meters	
PDOP	

Photos:

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
<u>3413-1,2</u>	<u>TRAN. J-K</u>	<u>3413-3,4</u>	<u>TRAN B-A</u>		

Uses Observed*: (Uses actually observed at time of survey.)

<input type="checkbox"/> Swimming	<input type="checkbox"/> Skin diving	<input type="checkbox"/> SCUBA diving	<input type="checkbox"/> Tubing	<input type="checkbox"/> Water skiing
<input type="checkbox"/> Wind surfing	<input type="checkbox"/> Kayaking	<input type="checkbox"/> Boating	<input type="checkbox"/> Wading	<input type="checkbox"/> Rafting
<input type="checkbox"/> Hunting	<input type="checkbox"/> Trapping	<input type="checkbox"/> Fishing	<input checked="" type="checkbox"/> None of the above	<input type="checkbox"/> Other:

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use *Data Sheet D- Recreational Use Interview* when conducting interviews.)

Surrounding Conditions*: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

<input type="checkbox"/> City/county parks	<input type="checkbox"/> Playgrounds	<input type="checkbox"/> MDC conservation lands	<input type="checkbox"/> Urban areas	<input type="checkbox"/> Campgrounds
<input type="checkbox"/> Boating accesses	<input type="checkbox"/> State parks	<input type="checkbox"/> National forests	<input type="checkbox"/> Nature trails	<input type="checkbox"/> Stairs/walkway
<input type="checkbox"/> No trespass sign	<input type="checkbox"/> Fence	<input checked="" type="checkbox"/> Steep slopes	<input type="checkbox"/> None of the above	<input type="checkbox"/> Other:

Comments:

Indications of Human Use*: (attach photos)

<input checked="" type="checkbox"/> Roads	<input type="checkbox"/> Rope swings	<input type="checkbox"/> Foot paths/prints	<input type="checkbox"/> Dock/platform	<input type="checkbox"/> Livestock Watering	<input type="checkbox"/> RV / ATV Tracks
<input type="checkbox"/> Camping Sites	<input type="checkbox"/> Fire pit/ring	<input type="checkbox"/> NPDES Discharge	<input type="checkbox"/> Fishing Tackle	<input type="checkbox"/> Other:	

Comments: WHITE RD.

CHANNEL FEATURE %
 RUN: 25 RIFFLE: _____
~~RIFFLE~~
 POOL: 75

* Page Two – Data Sheet B for WBID # 3413 :
 Stream Morphology: # 4

Upstream View's Physical Dimensions: Is there any water present at this view? Yes No
 If so, is there an obvious current? Yes No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN					
POOL					

Downstream View's Physical Dimensions: Is there any water present at this view? Yes No
 If so, is there an obvious current? Yes No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN					
POOL					

Substrate*: (These values should add up to 100%.)

<u>30</u> % Cobble	<u>50</u> % Gravel	% Sand	% Silt	% Mud/Clay	<u>20</u> % Bedrock
--------------------	--------------------	--------	--------	------------	---------------------

Aquatic Vegetation*: (Note amount of vegetation or algal growth at the assessment site)

ALGAL GROWTH OVER COBBLE SUBSTRATES IN SHALLOW AREAS; SOME
 MACROPHYTES PRESENT ALONG LEFT BANK (ARROWHEAD)

Water Characteristics*: (Mark all that apply.)

Odor:	<input type="checkbox"/> Sewage	<input type="checkbox"/> Musky	<input type="checkbox"/> Chemical	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:
Color:	<input checked="" type="checkbox"/> Clear	<input type="checkbox"/> Green	<input type="checkbox"/> Gray	<input type="checkbox"/> Milky	<input type="checkbox"/> Other:
Bottom Deposit:	<input type="checkbox"/> Sludge	<input checked="" type="checkbox"/> Solids	<input type="checkbox"/> Fine sediments	<input type="checkbox"/> None	<input type="checkbox"/> Other:
Surface Deposit:	<input type="checkbox"/> Oil	<input type="checkbox"/> Scum	<input type="checkbox"/> Foam	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:

Comments: Please attach any additional comments () to this form.

*This information is not to be used solely for removal of a recreational use designation but rather is to provide a more comprehensive understanding of water conditions. Consequently, this information is not intended to directly influence a decision on the recreation use analysis but may point to conditions that need further analysis or that effect another use.

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Surveyor's Signature: [Signature] Date of Survey: 6/19/07
 Organization: BWR CORP. Position: ENV. SCI.

Data Sheet C – Cross-Sectional Depth Measurements (for estimation of median depth)

3413 #4

TA

	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
1	WETTED WIDTH	< 0.1		1	CHANNEL FEATURE:
2	6.3	0.2		2	POOL
3		0.2		3	
4	MEASUREMENTS	0.3		4	DISSOLVED OXYGEN:
5	0.63 m	0.3		5	
6	APART	0.1		6	7.34 ppm
7		< 0.1		7	
8		< 0.1		8	
9		< 0.1		9	
10		< 0.1		10	
				11	
1	WETTED WIDTH	0.4		12	CHANNEL FEATURE:
2	4.5	0.3		13	POOL
3		0.4		14	
4	MEASUREMENTS	0.4		15	DISSOLVED OXYGEN:
5	0.45 m	0.3		16	
6	APART	0.3		17	7.23 ppm
7		0.4		18	
8		0.3		19	
9		0.3		20	
10		0.2		21	
				22	CHANNEL FEATURE:
1	WETTED WIDTH	< 0.1		23	RUN
2	1.0	< 0.1		24	
3		0.2		25	DISSOLVED OXYGEN:
4	MEASUREMENTS	0.2		26	
5	0.1 m	0.2		.	7.87 ppm
6	APART	0.1		.	
7		0.1		.	
8		< 0.1		n	
9		< 0.1			
10		< 0.1			

TB

TC

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.

If there is an even number of entries, the median depth corresponds to the arithmetic average of the two depth values surrounding the middle rank.

I, the undersigned, hereby affirm to the best of my knowledge, that all information reported on this UAA datasheet is true and accurate.

Signed: [Signature] Date: 6/19/07

Organization: BWR CORP. Position: ENV. SCI.

Data Sheet C – Cross-Sectional Depth Measurements (for estimation of median depth)

3413 #4

F_D

	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
1	WETTED WIDTH	0.1		1	CHANNEL FEATURE :
2	5.7	0.4		2	POOL
3		0.7		3	
4	MEASUREMENTS	0.6		4	DISSOLVED OXYGEN :
5	0.57 m	0.6		5	
6	APART	0.5		6	7.46
7		0.5		7	ppm
8		0.3		8	
9		0.2		9	
10		0.1		10	
				11	CHANNEL FEATURE :
1	WETTED WIDTH	<0.1		12	RUN
2	1.0	<0.1		13	
3		0.1		14	DISSOLVED OXYGEN :
4	MEASUREMENTS	0.1		15	
5	0.10 m	0.1		16	7.80
6	APART	0.1		17	ppm
7		0.1		18	
8		0.1		19	
9		<0.1		20	
10		<0.1		21	
				22	CHANNEL FEATURE :
1	WETTED WIDTH	<0.1		23	POOL
2	6.2	0.1		24	
3		0.3		25	
4	MEASUREMENTS	0.2		26	DISSOLVED OXYGEN :
5	0.62 m	0.2		.	
6	APART	0.2		.	7.17
7		0.3		.	ppm
8		0.3		n	
9		0.2			
10		0.2			

E

F

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.

If there is an even number of entries, the median depth corresponds to the arithmetic average of the two depth values surrounding the middle rank.

I, the undersigned, hereby affirm to the best of my knowledge, that all information reported on this UAA datasheet is true and accurate.

Signed: [Signature] Date: 6/19/07

Organization: BWR CORP. Position: ENV. SCI.

Data Sheet C – Cross-Sectional Depth Measurements (for estimation of median depth)

3413 #4

T_G

	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
1	WETTED WIDTH	0.1		1	CHANNEL FEATURE :
2	6.0	0.2		2	POOL
3		0.3		3	
4	MEASUREMENTS	0.3		4	DISSOLVED OXYGEN :
5	0.60 m	0.4		5	
6	APART	0.3		6	7.68 ppm
7		0.3		7	
8		0.2		8	
9		0.1		9	
10		0.1		10	
				11	
1	WETTED WIDTH	0.3		12	CHANNEL FEATURE :
2	5.6	0.2		13	POOL
3		0.4		14	
4	MEASUREMENTS	0.4		15	DISSOLVED OXYGEN :
5	0.56 m	0.4		16	
6	APART	0.4		17	7.64 ppm
7		0.4		18	
8		0.3		19	
9		0.2		20	
10		0.2		21	
				22	
1	WETTED WIDTH	<0.1		23	CHANNEL FEATURE :
2	2.3	0.1		24	RUN
3		0.1		25	
4		0.1		26	DISSOLVED OXYGEN :
5	MEASUREMENTS	0.2		.	
6	0.23 m	0.2		.	7.76 ppm
7	APART	0.2		.	
8		0.2		n	
9		0.2			
10		0.2			

T_H

T_I

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.

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Signed: [Signature] Date: 6/19/07

Organization: BWR CORP. Position: ENV. SCI.

Data Sheet C – Cross-Sectional Depth Measurements (for estimation of median depth)

3413 # 4

TJ

K

	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
1	WETTED WIDTH	0.1		1	CHANNEL FEATURE:
2	3.2	0.1		2	POOL
3		0.1		3	
4	MEASUREMENTS	0.2		4	DISSOLVED OXYGEN:
5	0.32 m	0.2		5	
6	APART	0.2		6	7.88 ppm
7		0.2		7	
8		0.2		8	
9		0.1		9	
10		0.1		10	
				11	
1	WETTED WIDTH	0.3		12	CHANNEL FEATURE:
2	3.0	0.4		13	POOL
3		0.4		14	
4	MEASUREMENTS	0.4		15	DISSOLVED OXYGEN:
5	0.30 m	0.3		16	
6	APART	0.3		17	7.85 ppm
7		0.2		18	
8		0.2		19	
9		0.1		20	
10		0.1		21	
				22	
				23	
				24	
				25	
				26	
				.	
				.	
				.	
				n	

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.

If there is an even number of entries, the median depth corresponds to the arithmetic average of the two depth values surrounding the middle rank.

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Signed: [Signature] Date: 6/19/07

Organization: BNR CORP. Position: ENV. SCI.

WBID# 3413

Site# 5

Field Data Sheets for Recreational Use Stream Surveys
Data Sheet B - Site Characterization
 (must be completed for each site)

Date & Time: <u>6/19/07 1145</u>	Site Location Description (e.g., road crossing): <u>BRIDGE CROSSING @ GOLDEN BELT RD.</u>
Personnel (Data Collectors): <u>BARTLETT & LUNT</u>	
Current Weather Conditions: <u>SUNNY w 75°</u>	Facility Name: <u>OAK GROVE WWTF</u>
Weather Conditions for Past 10 days: <u>FAIR/RAINY</u>	Permit Number: <u>MO0040886</u>
Drought Conditions?: No drought <input checked="" type="checkbox"/> ; Phase I <input type="checkbox"/> ; Phase II <input type="checkbox"/> ; Phase III <input type="checkbox"/> ; Phase IV <input type="checkbox"/> ; Unknown <input type="checkbox"/>	

Site Locations:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)	
Site GPS Coordinates: UTM X: <u>39.00622</u>	Y: <u>094.10641</u>
HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data)	
Global Positioning System (GPS)	Interpolation
Static Mode	Topographic Map or DRG
Dynamic Mode (Kinematic)	Aerial Photograph or DOQQ
Precise Positioning Service	Satellite Imagery
Signal Averaging	Interpolation Other
Real Time Differential Processing	
HORIZONTAL ACCURACY ESTIMATE	
GPS Data Quality	Interpolation Data Quality
FOM ± _____ Meters	Source Map Scale: 1:24,000 1:100,000 Other _____ ± _____ Feet or ± _____ Meters
EPE ± _____ Feet or ± _____ Meters	
PDOP	

Photos:

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
<u>3413-5,6</u>	<u>TRAN. J-K</u>	<u>3413-7,8</u>	<u>TRAN. B-A</u>		

Uses Observed*: (Uses actually observed at time of survey.)

<input type="checkbox"/> Swimming	<input type="checkbox"/> Skin diving	<input type="checkbox"/> SCUBA diving	<input type="checkbox"/> Tubing	<input type="checkbox"/> Water skiing
<input type="checkbox"/> Wind surfing	<input type="checkbox"/> Kayaking	<input type="checkbox"/> Boating	<input type="checkbox"/> Wading	<input type="checkbox"/> Rafting
<input type="checkbox"/> Hunting	<input type="checkbox"/> Trapping	<input type="checkbox"/> Fishing	<input checked="" type="checkbox"/> None of the above	<input type="checkbox"/> Other:

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use *Data Sheet D- Recreational Use Interview* when conducting interviews.)

Surrounding Conditions*: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

<input type="checkbox"/> City/county parks	<input type="checkbox"/> Playgrounds	<input type="checkbox"/> MDC conservation lands	<input type="checkbox"/> Urban areas	<input type="checkbox"/> Campgrounds
<input type="checkbox"/> Boating accesses	<input type="checkbox"/> State parks	<input type="checkbox"/> National forests	<input type="checkbox"/> Nature trails	<input type="checkbox"/> Stairs/walkway
<input type="checkbox"/> No trespass sign	<input type="checkbox"/> Fence	<input type="checkbox"/> Steep slopes	<input checked="" type="checkbox"/> None of the above	<input type="checkbox"/> Other:

Comments:

Indications of Human Use*: (attach photos)

<input checked="" type="checkbox"/> Roads	<input type="checkbox"/> Rope swings	<input type="checkbox"/> Foot paths/prints	<input type="checkbox"/> Dock/platform	<input type="checkbox"/> Livestock Watering	<input type="checkbox"/> RV / ATV Tracks
<input type="checkbox"/> Camping Sites	<input type="checkbox"/> Fire pit/ring	<input type="checkbox"/> NPDES Discharge	<input type="checkbox"/> Fishing Tackle	<input type="checkbox"/> Other:	

Comments:

GOLDEN BELT RD.

CHANNEL FEATURE %
 RUN: 30 RIFFLE: 5
~~RIFFLE~~
 POOL: 65

* Page Two - Data Sheet B for WBID # 3413 : # 5
 Stream Morphology:

Upstream View's Physical Dimensions: Is there any water present at this view? Yes No
 If so, is there an obvious current? Yes No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN					
POOL					

Downstream View's Physical Dimensions: Is there any water present at this view? Yes No
 If so, is there an obvious current? Yes No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN					
POOL					

Substrate*: (These values should add up to 100%.)

<u>60</u> % Cobble	<u>30</u> % Gravel	% Sand	<u>0</u> % Silt	% Mud/Clay	% Bedrock
--------------------	--------------------	--------	-----------------	------------	-----------

Aquatic Vegetation*: (Note amount of vegetation or algal growth at the assessment site)

ALGAL GROWTH ON COBBLE SUBSTRATE; MACROPHYTES PRESENT ON BANDS

Water Characteristics*: (Mark all that apply.)

Odor:	<input type="checkbox"/> Sewage	<input type="checkbox"/> Musky	<input type="checkbox"/> Chemical	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:
Color:	<input checked="" type="checkbox"/> Clear	<input type="checkbox"/> Green	<input type="checkbox"/> Gray	<input type="checkbox"/> Milky	<input type="checkbox"/> Other:
Bottom Deposit:	<input type="checkbox"/> Sludge	<input checked="" type="checkbox"/> Solids	<input type="checkbox"/> Fine sediments	<input type="checkbox"/> None	<input type="checkbox"/> Other:
Surface Deposit:	<input type="checkbox"/> Oil	<input type="checkbox"/> Scum	<input type="checkbox"/> Foam	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:

Comments: Please attach any additional comments () to this form.

*This information is not to be used solely for removal of a recreational use designation but rather is to provide a more comprehensive understanding of water conditions. Consequently, this information is not intended to directly influence a decision on the recreation use analysis but may point to conditions that need further analysis or that effect another use.

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Surveyor's Signature: [Signature] Date of Survey: 6/19/07
 Organization: BWR CORP. Position: ENV. SCI.

Data Sheet C – Cross-Sectional Depth Measurements (for estimation of median depth)

3413 #5

TA

	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
1	WETTED WIDTH	< 0.1		1	CHANNEL FEATURE:
2	4.0	< 0.1		2	POOL
3		0.3		3	
4	MEASUREMENTS	0.4		4	DISSOLVED OXYGEN:
5	0.40 m	0.5		5	
6	APART	0.5		6	7.26 ppm
7		0.3		7	
8		0.2		8	
9		0.1		9	
10		< 0.1		10	
				11	
1	WETTED WIDTH	< 0.1		12	CHANNEL FEATURE:
2	3.6	0.1		13	POOL
3		0.1		14	
4	MEASUREMENTS	0.1		15	DISSOLVED OXYGEN:
5	0.36 m	0.1		16	
6	APART	0.2		17	7.63 ppm
7		0.2		18	
8		0.3		19	
9		0.3		20	
10		0.3		21	
				22	CHANNEL FEATURE:
1	WETTED WIDTH	< 0.1		23	RUN
2	2.0	0.2		24	
3		0.3		25	DISSOLVED OXYGEN:
4	MEASUREMENTS	0.3		26	
5	0.20 m	0.3		.	7.52 ppm
6	APART	0.3		.	
7		0.2		.	
8		0.2		n	
9		0.1			
10		< 0.1			

TB

TC

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.

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I, the undersigned, hereby affirm to the best of my knowledge, that all information reported on this UAA datasheet is true and accurate.

Signed: [Signature]

Date: 6/19/07

Organization: BWR CORP.

Position: ENV. SCI.

Data Sheet C – Cross-Sectional Depth Measurements (for estimation of median depth)

3413 #5

D

	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
1	WETTED WIDTH	<0.1		1	CHANNEL FEATURE:
2	1.0	<0.1		2	RIDGE
3		<0.1		3	RIFFLE
4	MEASUREMENTS	<0.1		4	DISSOLVED OXYGEN:
5	0.10 m	<0.1		5	
6	APART	<0.1		6	8.37
7		<0.1		7	ppm
8		<0.1		8	
9		<0.1		9	
10		<0.1		10	
				11	CHANNEL FEATURE:
1	WETTED WIDTH	<0.1		12	POOL
2	7.6	0.2		13	
3		0.3		14	DISSOLVED OXYGEN:
4	MEASUREMENTS	0.5		15	
5	0.76 m	0.6		16	7.04
6	APART	0.4		17	ppm
7		0.3		18	
8		0.6		19	
9		0.3		20	
10		0.3		21	
				22	CHANNEL FEATURE:
1	WETTED WIDTH	<0.1		23	POOL
2	4.0	0.2		24	
3		0.3		25	
4	MEASUREMENTS	0.4		26	DISSOLVED OXYGEN:
5	0.40 m	0.4		.	
6	APART	0.4		.	7.14
7		0.5		.	ppm
8		0.5		n	
9		0.4			
10		0.2			

E

F

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.

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Signed: [Signature] Date: 6/9/07

Organization: BWR CORP. Position: ENV. SCI.

Data Sheet C – Cross-Sectional Depth Measurements (for estimation of median depth)

3413 # 5

T_G

	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
1	WETTED WIDTH	<0.1		1	CHANNEL FEATURE :
2	1.3	0.1		2	RUN
3		0.2		3	
4	MEASUREMENTS	0.2		4	DISSOLVED OXYGEN :
5	0.13 m	0.2		5	
6	APART	0.2		6	7.98 ppm
7		0.2		7	
8		0.2		8	
9		0.1		9	
10		<0.1		10	
				11	
1	WETTED WIDTH	<0.1		12	CHANNEL FEATURE :
2	2.2	<0.1		13	RUN
3		<0.1		14	
4	MEASUREMENTS	<0.1		15	DISSOLVED OXYGEN :
5	0.22 m	<0.1		16	
6	APART	<0.1		17	8.16 ppm
7		<0.1		18	
8		<0.1		19	
9		<0.1		20	
10		<0.1		21	
				22	
1	WETTED WIDTH	0.1		23	CHANNEL FEATURE :
2	5.5	0.2		24	POOL
3		0.3		25	
4		0.4		26	DISSOLVED OXYGEN :
5	MEASUREMENTS	0.4		.	
6	0.55 m	0.5		.	7.88 ppm
7	APART	0.4		.	
8		0.3		n	
9		0.1			
10		<0.1			

T_H

T_I

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.

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Signed: [Signature]

Date: 6/19/07

Organization: BWR CORP.

Position: ENV. SCI.

Data Sheet C – Cross-Sectional Depth Measurements (for estimation of median depth)

3413 #5

TJ

	Distance from Stream edge	Depth	Rank	Assigned Rank	Sorted depth
1	WETTED WIDTH	< 0.1		1	CHANNEL FEATURE:
2	4.0	0.2		2	POOL
3		0.4		3	
4	MEASUREMENTS	0.4		4	DISSOLVED OXYGEN:
5	0.40 m	0.4		5	
6	APART	0.6		6	7.97 ppm
7		0.6		7	
8		0.3		8	
9		0.2		9	
10		0.2		10	
				11	
1	WETTED WIDTH	< 0.1		12	CHANNEL FEATURE:
2	4.2	< 0.1		13	POOL
3		0.2		14	
4	MEASUREMENTS	0.3		15	DISSOLVED OXYGEN:
5	0.42 m	0.3		16	
6	APART	0.3		17	8.72 ppm
7		0.4		18	
8		0.4		19	
9		0.3		20	
10		0.1		21	
				22	
				23	
				24	
				25	
				26	
				.	
				.	
				.	
				n	

K

If there is an odd number of entries find middle rank $[(n+1)/2]$. The corresponding sorted value depth to the middle rank is the median depth.

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Signed: [Signature] Date: 6/19/07

Organization: BWR CORP. Position: ENV. SCI.



Downstream (Site #1) of Horseshoe Creek.



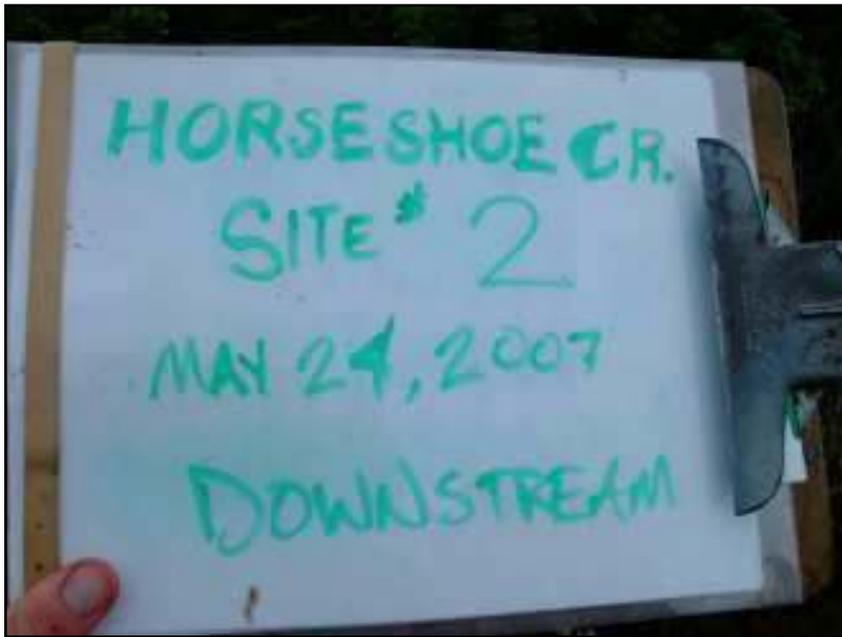
Downstream (Site #1) of Horseshoe Creek.



Upstream (Site #1) of Horseshoe Creek.



Upstream (Site #1) of Horseshoe Creek.



Downstream (Site #2) of Horseshoe Creek.



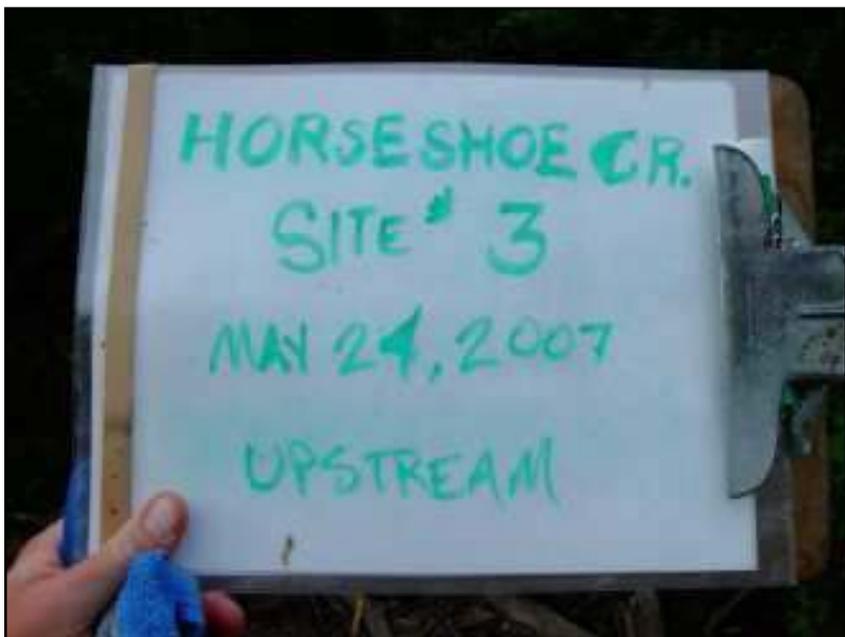
Downstream (Site #2) of Horseshoe Creek.



Upstream (Site #2) of Horseshoe Creek.



Upstream (Site #2) of Horseshoe Creek.



Upstream (Site #3) of Horseshoe Creek.



Upstream (Site #3) of Horseshoe Creek.



Downstream (Site #3) of Horseshoe Creek.



Downstream (Site #3) of Horseshoe Creek.



Upstream (Site 4) of Horseshoe Creek



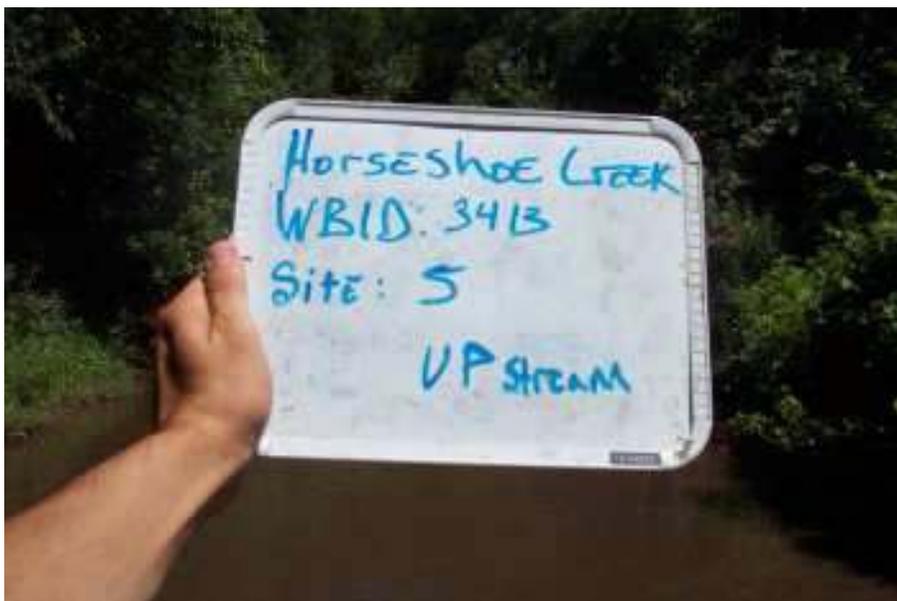
Upstream (Site 4) of Horseshoe Creek



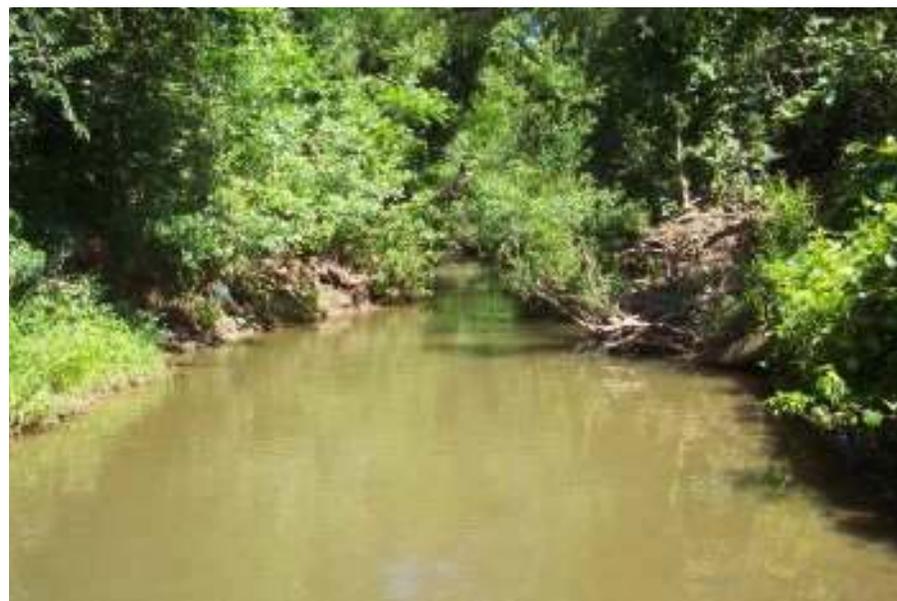
Downstream (Site 4) of Horseshoe Creek



Downstream (Site 4) of Horseshoe Creek



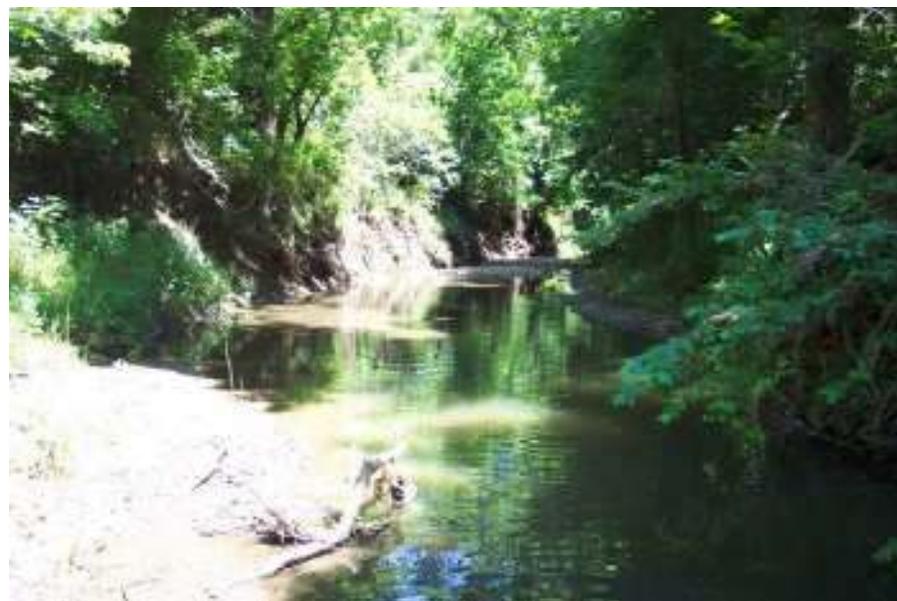
Upstream (Site 5) of Horseshoe Creek



Upstream (Site 5) of Horseshoe Creek



Downstream (Site 5) of Horseshoe Creek



Downstream (Site 5) of Horseshoe Creek