Missouri
Department of
Natural Resources

Use Attainability Analysis

for

WBID 0115 Bear Creek

Submitted by
MEC Water Resources

To
Missouri Department of Natural Resources
Water Protection Program

On
October 17, 2008

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet A – Water Body Identification

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

Water Body Name (from USGS 7.5' quad):	Bear Cr.
Missouri Water Body Identification (WBID) Number:	0115
8-digit HUC:	07110005
County(ies), Listed Upstream to Downstream:	Adair, ~~Shelby~~ Macon, Shelby
Upstream Legal Description (from Table H):	8, 61N, 14W
Downstream Legal Description (from Table H):	Mouth
Number of sites evaluated:	22
List all site numbers, consecutively upstream to downstream: Site 01, Site 02, Site 03, Site 04, Site 05, Site 06, Site 07, Site 08, Site 09, Site 10, Site 11 Site 12, Site 13, Site 14, Site 15, Site 16, Site 17, Site 18, Site 19, Site 20, Site 21, Site 22	
Include a Site Location Map(s). The map must include all requirements detailed in the *Missouri Recreational Use Attainability Analyses: Water Body Survey and Assessment Protocol* (Section IV.D.8.a).	

II. Facility Information (list all permitted discharges to this water body segment)

Facility Name(s) and Permit Number(s):

Buck Subdivision WWTF / Kirksville WWTF

MO 0107557 / MO 0049506

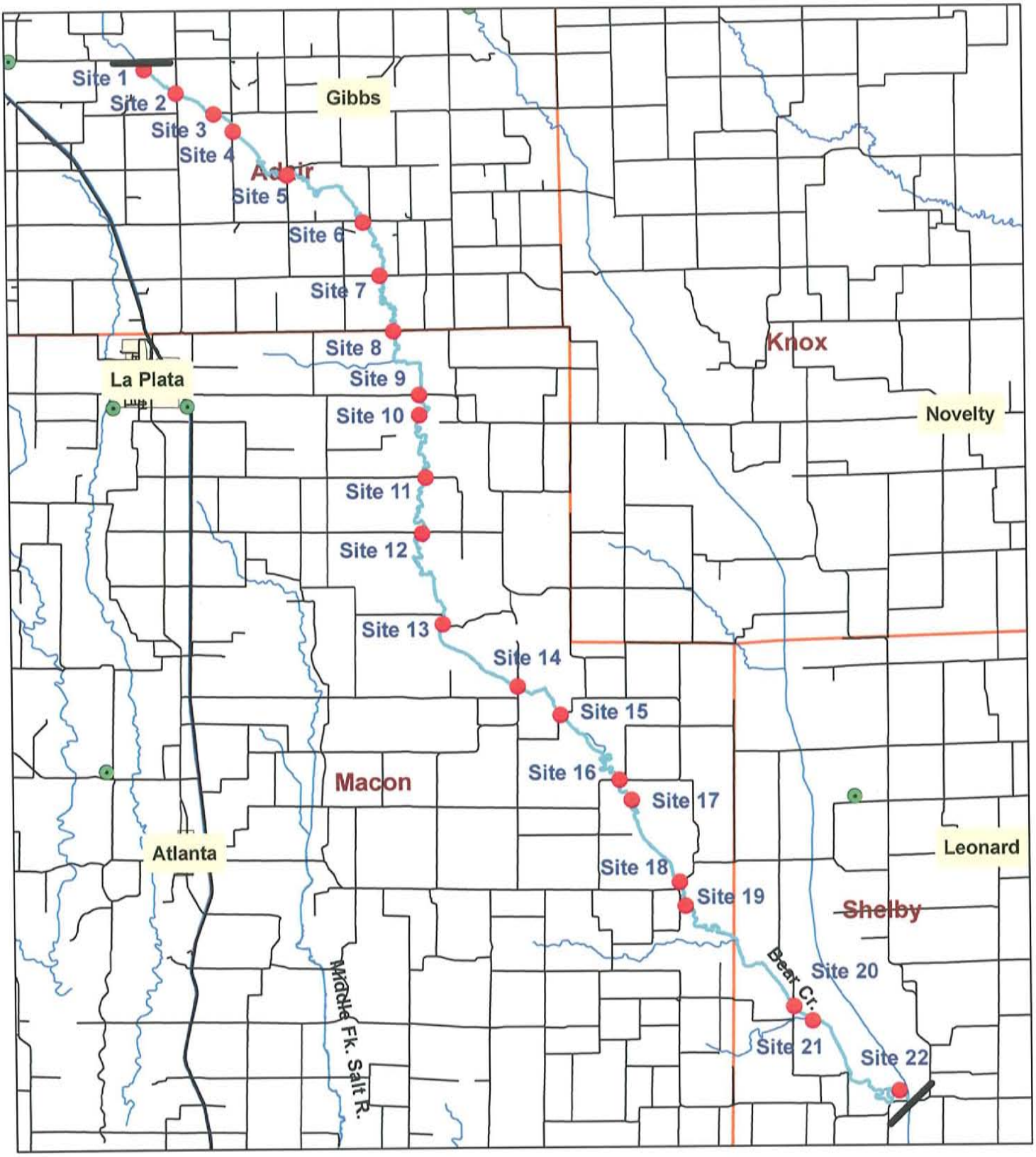
III. UAA Surveyor (please **PRINT** legibly)

Name of Surveyor: Renee Martin	Telephone Number: 573-443-4100
Organization/Employer: MEC Water Resources / AE Solutions	

Please verify that you have completed all sections of all data sheets, checked all applicable boxes, provided a map (that includes all requirments listed in the *Missouri Recreational Use Attainability Analysies: Water Body Survey and Assessment Protocol*) and that this form is complete.

Signed: Renee Martin **Date:** 10/14/08

SRW 10-15-08



Bear Creek
WBID 0115
Adair County

Meters
0 1,7003,400 6,800 10,200

N
W E
S

WBID # 115

Site # 1

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10.1.08 0940	Location Description (e.g., road crossing): 300m dns of HWY kk crossing
Stream Name: Bear Creek	
Current Weather Conditions: 60°F, Sunny	Facility Name(s): Burk Subdivision WWTF Kirksville WWTF
Weather Conditions for Past 10 days: 0.6in/rainfall	Permit Number(s): MO 0107557 MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☑, Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)				
Site 01	Easting (UTM X): 543507	Northing (UTM Y): 4439835	Horizontal Accuracy: (EPE / FOM / PDOP) 6.1	Meters
Site 11	Easting (UTM X): 543640	Northing (UTM Y): 4439754	Horizontal Accuracy: (EPE / FOM / PDOP) 5.9	Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
115-01-001	Up Stream	115-01-002	Dn Stream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☑ None of the above	☐ 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.)

N/A

JRA

Stream Name & WBID # Bear Creek #115 Date of Survey 10.1.08

Site # 1

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☑ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☑ Fence	☐ No trespass sign	☑ Steep slopes	☑ Other: pasture

Comments:

Riparian ~ 10m

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☑ None of the above	Comments / Other:			

N/A

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

5 % Cobble	5 % Gravel	10 % Sand	15 % Silt	65 % Mud/Clay	0 % Bedrock

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

Few aq. grasses + plants

Algal growth uncommon

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☑ None	☐ Other:
Color:	☐ Clear	☑ Green	☐ Gray	☐ Milky	☐ Other:
Bottom Deposit:	☐ Sludge	☐ Solids	☑ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☑ None	☐ Other:

*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 affect another use.

Stream Name & WBID # Bear Creek #115 Date of Survey 10.1.08

Site # 1

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
	N/A				

Comments: (Please record any additional comments here.)

N/A

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

Printed Names of Personnel Collecting Data: Tim Altnether, Jonathan Witte

Surveyor's Signature: [signature] Date of Survey: 10.1.08

Organization: MEC Water Resources Position: WQ Scientist

SRW 10-15-08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 1

Estimated Channel Incision: 0.00 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01 UTM X: 543507 UTM Y: 4439835 +/- 6.1 (meters)

11 UTM X: 543640 UTM Y: 4439754 +/- 5.9 (meters)

Average Stream Width: 5.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 150 (meters)
(20x average stream width)

Field Staff: TA, JW

Dissolved Oxygen

Date: 10/1/2008 Time: 9:40

Dissolved Oxygen: 8.83 (mg/L)

Dissolved Oxygen: 86.9 (% sat)

Specific Cond: 430.8 (µS/cm)

Water Temperature: 14.5 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.39	0.13	0.33	0.10	0.49	0.10	0.56	0.14	0.70	0.46	0.47	0.09	0.53	0.14	0.62	0.36	0.61	0.10	0.63	0.15	0.27	0.31
2	0.78	0.17	0.66	0.15	0.98	0.40	1.12	0.00	1.40	0.14	0.94	0.12	1.06	0.10	1.24	0.45	1.22	0.23	1.26	0.15	0.54	0.38
3	1.17	0.05	0.99	0.21	1.47	0.34	1.68	0.05	2.10	0.11	1.41	0.15	1.59	0.20	1.86	0.46	1.83	0.25	1.89	0.21	0.81	0.49
4	1.56	0.10	1.32	0.27	1.96	0.24	2.24	0.11	2.80	0.11	1.88	0.20	2.12	0.26	2.48	0.43	2.44	0.27	2.52	0.22	1.08	0.59
5	1.95	0.05	1.65	0.30	2.45	0.20	2.80	0.21	3.50	0.13	2.35	0.20	2.65	0.18	3.10	0.31	3.05	0.21	3.15	0.22	1.35	0.52
6	2.34	0.10	1.98	0.27	2.94	0.14	3.36	0.21	4.20	0.14	2.82	0.17	3.18	0.16	3.72	0.25	3.66	0.31	3.78	0.19	1.62	0.60
7	2.73	0.11	2.31	0.25	3.43	0.11	3.92	0.23	4.90	0.12	3.29	0.15	3.71	0.14	4.34	0.20	4.27	0.29	4.41	0.19	1.89	0.58
8	3.12	0.15	2.64	0.18	3.92	0.09	4.48	0.29	5.60	0.11	3.76	0.10	4.24	0.26	4.96	0.20	4.88	0.18	5.04	0.20	2.16	0.54
9	3.51	0.20	2.97	0.11	4.41	0.11	5.04	0.12	6.30	0.14	4.23	0.08	4.77	0.15	5.58	0.32	5.49	0.14	5.67	0.23	2.43	0.39
Right Bank	3.90	0.00	3.30	0.00	4.90	0.00	5.60	0.00	7.00	0.00	4.70	0.00	5.30	0.00	6.20	0.00	6.10	0.00	6.30	0.00	2.70	0.00
Feature Type (riffle, run, or pool)	Riffle		Run		Run		Run		Run		Run		Run		Run		Run		Run		Run	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10/1/2008

WBID # 115

Site # 2

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10. 1. 08 1015	Location Description (e.g., road crossing): at Mockingbird Ln. crossing
Stream Name: Bear Creek	
Current Weather Conditions: 60° F, Sunny	Facility Name(s): Butk Subdivision WWTF Kirksville WWTF
Weather Conditions for Past 10 days: 0.6in /rainfall	Permit Number(s): MO 0107557 MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☑; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): 544545	Northing (UTM Y): 4439065	Horizontal Accuracy: (EPE / FOM / PDOP) 6.0 Meters
Site 11	Easting (UTM X): 544634	Northing (UTM Y): 4438939	Horizontal Accuracy: (EPE / FOM / PDOP) 5.9 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
115-02-003	Up Stream	115-02-004	Dn Stream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☑ None of the above	☐ 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.)

N/A

JRH

Stream Name & WBID # ~~N. Fk. S. Fabius River~~ Bear Creek 115 JW Date of Survey 10.1.08

Site # 2

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☐ No trespass sign	☑ Steep slopes	☑ Other: pasture

Comments: N/A

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☑ None of the above	Comments / Other: N/A			

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

5 % Cobble	0 % Gravel	5 % Sand	20 % Silt	70 % Mud/Clay	0 % Bedrock

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

grasses, periphyton not common

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☑ None	☐ Other:
Color:	☐ Clear	☐ Green	☐ Gray	☐ Milky	☑ Other: Brown
Bottom Deposit:	☐ Sludge	☐ Solids	☑ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☑ None	☐ Other:

*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 affect another use.

Stream Name & WBID # Bear Creek #115 Date of Survey 10.1.08

Site # 2

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		N/A			

Comments: (Please record any additional comments here.)

N/A

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

Printed Names of Personnel Collecting Data: Tim Altnether, Jonathan Witte

Surveyor's Signature: [signature] Date of Survey: 10.1.08

Organization: MEC Water Resources Position: WQ Scientist

SRW 10-15-08

JRH

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 2

Estimated Channel Incision: 0.00 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01 UTM X: 544545 UTM Y: 4439065 +/- 6.0 (meters)

11 UTM X: 544634 UTM Y: 4438939 +/- 5.9 (meters)

Average Stream Width: 7.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 150 (meters)
(20x average stream width)

Field Staff: TA, JW

Dissolved Oxygen

Date: 10/1/2008 Time: 10:15

Dissolved Oxygen: 7.48 (mg/L)

Dissolved Oxygen: 71.3 (% sat)

Specific Cond: 513 (µS/cm)

Water Temperature: 14.3 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.51	0.13	0.70	0.19	0.71	0.20	0.60	0.18	0.41	0.18	0.82	0.19	0.77	0.46	0.77	0.26	0.69	0.25	0.76	0.28	1.33	0.46
2	1.02	0.34	1.40	0.29	1.42	0.28	1.20	0.28	0.82	0.26	1.64	0.29	1.54	0.51	1.54	0.32	1.38	0.27	1.52	0.24	2.66	0.84
3	1.53	0.37	2.10	0.40	2.13	0.30	1.80	0.26	1.23	0.31	2.46	0.33	2.31	0.53	2.31	0.37	2.07	0.26	2.28	0.28	3.99	0.98
4	2.04	0.39	2.80	0.40	2.84	0.30	2.40	0.26	1.64	0.36	3.28	0.36	3.08	0.55	3.08	0.41	2.76	0.31	3.04	0.30	5.32	>1.00
5	2.55	0.38	3.50	0.41	3.55	0.32	3.00	0.27	2.05	0.38	4.10	0.46	3.85	0.58	3.85	0.42	3.45	0.48	3.80	0.38	6.65	0.68
6	3.06	0.38	4.20	0.39	4.26	0.30	3.60	0.27	2.46	0.42	4.92	0.55	4.62	0.57	4.62	0.43	4.14	0.36	4.56	0.40	7.98	0.64
7	3.57	0.34	4.90	0.34	4.97	0.30	4.20	0.29	2.87	0.41	5.74	0.61	5.39	0.52	5.39	0.50	4.83	0.34	5.32	0.34	9.31	0.51
8	4.08	0.30	5.60	0.28	5.68	0.28	4.80	0.20	3.28	0.41	6.56	0.51	6.16	0.54	6.16	0.50	5.52	0.28	6.08	0.28	10.64	0.28
9	4.59	0.25	6.30	0.20	6.39	0.24	5.40	0.11	3.69	0.40	7.38	0.39	6.93	0.41	6.93	0.47	6.21	0.17	6.84	0.31	11.97	0.20
Right Bank	5.10	0.00	7.00	0.00	7.10	0.00	6.00	0.00	4.10	0.00	8.20	0.00	7.70	0.00	7.70	0.00	6.90	0.00	7.60	0.00	13.30	0.00
Feature Type (riffle, run, or pool)	Run		Run		Run		Run		Run		Run		Run		Run		Run		Run		Pool	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10/1/2008

WBID # 115

Site # 3

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10. 1. 08 1120	Location Description (e.g., road crossing): ~~545710 E~~ ~~4438398 N~~ 432D road crossing
Stream Name: Bear Creek	
Current Weather Conditions: 65°F, Sunny	Facility Name(s): Burk Subdivision WWTF Kirksville WWTF
Weather Conditions for Past 10 days: 0.6in/rainfall	Permit Number(s): MO 0107557 MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☑; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): 545 710	Northing (UTM Y): 4438495	Horizontal Accuracy: (EPE / FOM / PDOP) 4.9 Meters
Site 11	Easting (UTM X): 545834	Northing (UTM Y): 4438398	Horizontal Accuracy: (EPE / FOM / PDOP) 5.4 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
115-03-005	Up Stream	115-03-006	Dn Stream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☑ None of the above	☐ 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.)

N/A

Stream Name & WBID # Bear Creek #115 Date of Survey 10.1.08

Site # 3

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☑ No trespass sign	☑ Steep slopes	☑ Other: pasture

Comments:

Riparian ~ 20m

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☑ None of the above	Comments / Other:			

N/A

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

0 % Cobble	5 % Gravel	65 % Sand	10 % Silt	20 % Mud/Clay	0 % Bedrock

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

Few aq. grasses + plants

Algal growth uncommon

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☑ None	☐ Other:
Color:	☑ Clear	☑ Green	☐ Gray	☐ Milky	☐ Other:
Bottom Deposit:	☐ Sludge	☐ Solids	☑ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☑ None	☐ Other:

*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 affect another use.

Stream Name & WBID # Bear Creek #115 Date of Survey 10.1.08

Site # 3

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		N/A			

Comments: (Please record any additional comments here.)

Crossing at 432D road no longer exists.
Replaced by No trespass sign

JW

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

Printed Names of Personnel Collecting Data: Tim Altnether, Jonathan Witte

Surveyor's Signature: [illegible] Date of Survey: 10.1.08

Organization: MEC Water Resources Position: WQ Scientist

SRW 11-15-08

JRW

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 3

Estimated Channel Incision: 0.00 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01 UTM X: 545710 UTM Y: 4438495 +/- 4.9 (meters)

11 UTM X: 545834 UTM Y: 4438398 +/- 5.4 (meters)

Average Stream Width: 7.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 150 (meters)
(20x average stream width)

Field Staff: TA, JW

Dissolved Oxygen

Date: 10/1/2008 Time: 11:20

Dissolved Oxygen: 8.23 (mg/L)

Dissolved Oxygen: 81.2 (% sat)

Specific Cond: 557 (µS/cm)

Water Temperature: 14.9 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.73	0.25	0.73	0.28	0.55	0.12	0.48	0.17	0.40	0.19	0.74	0.46	0.77	0.18	0.65	0.37	0.76	>1.00	0.71	0.69	0.64	0.54
2	1.46	0.27	1.46	0.29	1.10	0.16	0.96	0.28	0.80	0.25	1.48	0.35	1.54	0.31	1.30	0.43	1.52	0.91	1.42	0.63	1.28	0.55
3	2.19	0.29	2.19	0.26	1.65	0.15	1.44	0.23	1.20	0.37	2.22	0.37	2.31	0.24	1.95	0.53	2.28	0.92	2.13	0.43	1.92	0.57
4	2.92	0.29	2.92	0.25	2.20	0.18	1.92	0.16	1.60	0.42	2.96	0.44	3.08	0.20	2.60	0.51	3.04	0.83	2.84	0.42	2.56	0.61
5	3.65	0.28	3.65	0.30	2.75	0.23	2.40	0.17	2.00	0.36	3.70	0.35	3.85	0.22	3.25	0.54	3.80	0.71	3.55	0.49	3.20	0.63
6	4.38	0.26	4.38	0.30	3.30	0.32	2.88	0.15	2.40	0.25	4.44	0.30	4.62	0.25	3.90	0.62	4.56	0.64	4.26	0.47	3.84	0.69
7	5.11	0.26	5.11	0.30	3.85	0.30	3.36	0.16	2.80	0.20	5.18	0.30	5.39	0.27	4.55	0.71	5.32	0.59	4.97	0.57	4.48	0.75
8	5.84	0.29	5.84	0.30	4.40	0.34	3.84	0.14	3.20	0.15	5.92	0.30	6.16	0.45	5.20	0.83	6.08	0.60	5.68	0.67	5.12	0.80
9	6.57	0.29	6.57	0.25	4.95	0.33	4.32	0.10	3.60	0.08	6.66	0.36	6.93	0.49	5.85	0.92	6.84	0.44	6.39	0.69	5.76	0.70
Right Bank	7.30	0.00	7.30	0.00	5.50	0.00	4.80	0.00	4.00	0.00	7.40	0.00	7.70	0.00	6.50	0.00	7.60	0.00	7.10	0.00	6.40	0.00
Feature Type (riffle, run, or pool)	Run		Run		Run		Run		Run		Run		Run		Pool		Pool		Pool		Pool	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10/1/2008

WBID # 115

Site # 4

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10.1.08 1055	Location Description (e.g., road crossing):
Stream Name: Bear Creek	at rd 344D crossing
Current Weather Conditions: 65°F, Sunny	Facility Name(s): Burk Subdivision WWTF Kirksville WWTF
Weather Conditions for Past 10 days: 0.6in/rainfall	Permit Number(s): MO 0107557 MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☑; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): 545939	Northing (UTM Y): 4438301	Horizontal Accuracy: (EPE / FOM / PDOP) 8.7 Meters
Site 11	Easting (UTM X): 546071	Northing (UTM Y): 4438193	Horizontal Accuracy: (EPE / FOM / PDOP) 5.0 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
115-04-007	Up Stream	115-04-008	Dn Stream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☑ Fishing	☑ None of the above	☐ 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.)

N/A

JCH

Stream Name & WBID # Bear Creek #115 Date of Survey 10.1.08

Site # 4

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☑ Fence	☑ No trespass sign	☑ Steep slopes	☑ Other: pasture

Comments:

Riparian ~ 10m

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☑ None of the above	Comments / Other:			

N/A

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

5 % Cobble	10 % Gravel	55 % Sand	10 % Silt	20 % Mud/Clay	0 % Bedrock

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

few aq. grasses, plants

Algal growth uncommon

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☑ None	☐ Other:
Color:	☑ Clear	☑ Green	☐ Gray	☐ Milky	☐ Other:
Bottom Deposit:	☐ Sludge	☑ Solids	☑ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☑ None	☐ Other:

*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 affect another use.

JCH

Stream Name & WBID # Bear Creek #115 Date of Survey 10.1.08

Site # 4

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		N/A			

Comments: (Please record any additional comments here.)

N/A

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

Printed Names of Personnel Collecting Data: Tim Altnether, Jonathan Witte

Surveyor's Signature: [signature] Date of Survey: 10.1.08

Organization: MEC Water Resources Position: WQ Scientist

SRW 10-15-08

JRW

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 4

Estimated Channel Incision: 0.00 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01	UTM X:	545939	UTM Y:	4438301	+/- 8.7 (meters)
11	UTM X:	546071	UTM Y:	4438193	+/- 5.0 (meters)

Average Stream Width: 6.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 150 (meters)
(20x average stream width)

Field Staff: TA, JW

Dissolved Oxygen

Date: 10/1/2008 Time: 10:55

Dissolved Oxygen: 7.90 (mg/L)

Dissolved Oxygen: 79.4 (% sat)

Specific Cond: 591 (µS/cm)

Water Temperature: 14.5 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.73	0.27	0.70	0.13	0.82	0.20	0.64	0.24	0.59	0.14	0.28	0.13	0.34	0.51	0.66	0.11	0.63	0.25	0.65	0.16	0.31	0.23
2	1.46	0.29	1.40	0.21	1.64	0.21	1.28	0.16	1.18	0.20	0.56	0.19	0.68	0.41	1.32	0.15	1.26	0.21	1.30	0.24	0.62	0.22
3	2.19	0.24	2.10	0.27	2.46	0.27	1.92	0.21	1.77	0.22	0.84	0.18	1.02	0.31	1.98	0.16	1.89	0.15	1.95	0.25	0.93	0.26
4	2.92	0.00	2.80	0.26	3.28	0.27	2.56	0.19	2.36	0.23	1.12	0.19	1.36	0.26	2.64	0.16	2.52	0.14	2.60	0.25	1.24	0.25
5	3.65	0.07	3.50	0.25	4.10	0.26	3.20	0.10	2.95	0.24	1.40	0.21	1.70	0.20	3.30	0.13	3.15	0.16	3.25	0.26	1.55	0.14
6	4.38	0.11	4.20	0.23	4.92	0.26	3.84	0.06	3.54	0.28	1.68	0.20	2.04	0.17	3.96	0.08	3.78	0.12	3.90	0.25	1.86	0.14
7	5.11	0.13	4.90	0.23	5.74	0.27	4.48	0.07	4.13	0.29	1.96	0.17	2.38	0.15	4.62	0.15	4.41	0.20	4.55	0.21	2.17	0.11
8	5.84	0.19	5.60	0.31	6.56	0.19	5.12	0.09	4.72	0.23	2.24	0.15	2.72	0.12	5.28	0.19	5.04	0.21	5.20	0.20	2.48	0.09
9	6.57	0.41	6.30	0.31	7.38	0.15	5.76	0.20	5.31	0.21	2.52	0.15	3.06	0.02	5.94	0.14	5.67	0.23	5.85	0.23	2.79	0.07
Right Bank	7.30	0.00	7.00	0.00	8.20	0.00	6.40	0.00	5.90	0.00	2.80	0.00	3.40	0.00	6.60	0.00	6.30	0.00	6.50	0.00	3.10	0.00
Feature Type (riffle, run, or pool)	Run		Run		Run		Run		Run		Run		Run		Run		Run		Run		Riffle	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10/1/2008

WBID # 115

Site # 5

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10.1.08 1215	Location Description (e.g., road crossing):
Stream Name: Bear Creek	at Banner Ln. Crossing
Current Weather Conditions: 70°F, Sunny	Facility Name(s): Burk Subdivision WWTF Kirksville WWTF
Weather Conditions for Past 10 days: 0.6in/rainfall	Permit Number(s): MO 0107557 MO 0049506

Official Drought Conditions at time of this survey (search DNR home page for "drought"):

No drought ☑; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): 547753	Northing (UTM Y): 4436689	Horizontal Accuracy: (EPE / FOM / PDOP) 8.3 Meters
Site 11	Easting (UTM X): 547928	Northing (UTM Y): 4436731	Horizontal Accuracy: (EPE / FOM / PDOP) 9.2 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
115-05-009	Up Stream	115-05-010	Dn Stream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☑ None of the above	☐ 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.)

N/A

JRH

Stream Name & WBID # Bear Creek #115 Date of Survey 10.L08

Site # 5

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☑ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☑ No trespass sign	☑ Steep slopes	☑ Other: prairie

Comments:

Riparian >50m north bank, ~20m on south bank

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☑ None of the above	Comments / Other: N/A			

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

0 % Cobble	0 % Gravel	50 % Sand	15 % Silt	35 % Mud/Clay	0 % Bedrock

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

Few aq. grasses, plants

Algal growth uncommon

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☑ None	☐ Other:
Color:	☐ Clear	☑ Green	☐ Gray	☐ Milky	☐ Other:
Bottom Deposit:	☐ Sludge	☐ Solids	☑ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☑ None	☐ Other:

*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 affect another use.

JCH

Stream Name & WBID # Bear Creek #115 Date of Survey 10.1.08

Site # 5

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		N/A			

Comments: (Please record any additional comments here.)

Gas pipeline runs across stream at end of reach.

JW

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

Printed Names of Personnel Collecting Data: Tim Altnether, Jonathan Witte

Surveyor's Signature: [signature] Date of Survey: 10.1.08

Organization: MEC Water Resources Position: WQ Scientist

SRW 11-15-08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 5

Estimated Channel Incision: 0.00 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01	UTM X:	547753	UTM Y:	4436689	+/- 8.3 (meters)
11	UTM X:	547928	UTM Y:	4436731	+/- 9.2 (meters)

Average Stream Width: 8.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 160 (meters)
(20x average stream width)

Field Staff: TA, JW

Dissolved Oxygen

Date: 10/1/2008 Time: 12:15

Dissolved Oxygen: 4.27 (mg/L)

Dissolved Oxygen: 43.0 (% sat)

Specific Cond: 668 (µS/cm)

Water Temperature: 15.3 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.82	0.82	0.76	>1.00	1.18	0.79	0.97	0.72	1.02	0.40	0.91	0.19	0.56	0.20	0.79	>1.00	1.02	0.88	0.71	0.19	0.68	0.60
2	1.64	>1.00	1.52	>1.00	2.36	>1.00	1.94	0.89	2.04	0.71	1.82	0.27	1.12	0.25	1.58	>1.00	2.04	>1.00	1.42	0.33	1.36	0.68
3	2.46	>1.00	2.28	>1.00	3.54	>1.00	2.91	>1.00	3.06	0.96	2.73	0.44	1.68	0.21	2.37	>1.00	3.06	>1.00	2.13	0.69	2.04	0.80
4	3.28	>1.00	3.04	>1.00	4.72	>1.00	3.88	>1.00	4.08	>1.00	3.64	0.69	2.24	0.29	3.16	>1.00	4.08	>1.00	2.84	0.84	2.72	0.76
5	4.10	>1.00	3.80	>1.00	5.90	>1.00	4.85	>1.00	5.10	>1.00	4.55	>1.00	2.80	0.21	3.95	0.80	5.10	>1.00	3.55	0.77	3.40	0.86
6	4.92	>1.00	4.56	>1.00	7.08	>1.00	5.82	>1.00	6.12	>1.00	5.46	>1.00	3.36	0.27	4.74	0.51	6.12	>1.00	4.26	0.74	4.08	0.89
7	5.74	>1.00	5.32	>1.00	8.26	>1.00	6.79	>1.00	7.14	>1.00	6.37	>1.00	3.92	0.19	5.53	0.32	7.14	>1.00	4.97	0.56	4.76	>1.00
8	6.56	>1.00	6.08	>1.00	9.44	0.97	7.76	0.81	8.16	0.77	7.28	0.68	4.48	0.16	6.32	0.18	8.16	>1.00	5.68	0.40	5.44	>1.00
9	7.38	0.73	6.84	0.90	10.62	0.66	8.73	0.61	9.18	0.34	8.19	0.29	5.04	0.09	7.11	0.10	9.18	0.74	6.39	0.36	6.12	0.99
Right Bank	8.20	0.00	7.60	0.00	11.80	0.00	9.70	0.00	10.20	0.00	9.10	0.00	5.60	0.00	7.90	0.00	10.20	0.00	7.10	0.00	6.80	0.00
Feature Type (riffle, run, or pool)	Pool		Pool		Pool		Pool		Pool		Pool		Run		Pool		Pool		Run		Pool	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10/1/2008

WBID # 0115

Site # 6

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10/06/08 14:46	Location Description (e.g., road crossing): Off of Route E
Stream Name: Bear Creek	
Current Weather Conditions: Pt. Cldy, Breezy, 75F	Facility Name(s): Buck Subdivision WWTF / Kirksville WWTF
Weather Conditions for Past 10 days: 0.6 in / 10 in	Permit Number(s): MO 0107557 / MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☒; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)				
Site 01	Easting (UTM X): 0550018	Northing (UTM Y): 4435218	Horizontal Accuracy: (EPE / FOM / PDOP)	18 ~~Meters~~ ft
Site 11	Easting (UTM X): 0550091	Northing (UTM Y): 4435092	Horizontal Accuracy: (EPE / FOM / PDOP)	28 ~~Meters~~ ft

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
0115-6-123	Up Stream	0115-6-124	Down Stream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☒ None of the above	☐ 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.)

N/A

JRM

Stream Name & WBID # Bear Creek 0115 Date of Survey 10/06/08

Site # 6

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☒ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☐ No trespass sign	☒ Steep slopes	☒ Other: Pasture & Row Crop

Comments: private property

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☒ None of the above	Comments / Other: N/A			

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

— % Cobble	— % Gravel	~~10~~ 30 % Sand	10 % Silt	~~80~~ 30 % Mud/Clay	— % Bedrock
		50		40	

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

Uncommon algal growth

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☒ None	☐ Other:
Color:	☐ Clear	☐ Green	☐ Gray	☐ Milky	☒ Other: Brown
Bottom Deposit:	☐ Sludge	☐ Solids	☒ Fine sediments	☐ None	☒ Other: Woody debris
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☒ None	☐ Other:

*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 affect another use.

JRW

Stream Name & WBID # Bear Creek # 0115 Date of Survey 10/6/08

Site # 06

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)

N/A SRW

Comments: (Please record any additional comments here.)

N/A SRW

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

Printed Names of Personnel Collecting Data: Jennifer Hrabik, James VeVerka

Surveyor's Signature: Jennifer Hrabik Date of Survey: 10/6/08

Organization: AE Solutions Position: Environmental Specialist

SRW 10-15-08

JEH

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 6

Estimated Channel Incision: 0.00 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01	UTM X: 550018	UTM Y: 4435218	+/-	18	(ft)
11	UTM X: 550091	UTM Y: 4435092	+/-	28	(ft)

Average Stream Width: 9.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 180 (meters)
(20x average stream width)

Field Staff: JH, JV

Dissolved Oxygen

Date: 10.6.08 Time: 14:46

Dissolved Oxygen: 5.30 (mg/L)

Dissolved Oxygen: 56.1 (% sat)

Specific Cond: 696 (µS/cm)

Water Temperature: 18.1 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1.20	0.33	1.10	0.84	1.05	0.39	1.05	0.54	0.92	0.30	0.95	>1.00	0.80	>1.00	0.80	0.55	0.78	>1.00	0.89	0.90	0.90	0.49
2	2.40	>1.00	2.20	0.85	2.10	0.43	2.10	0.59	1.84	0.34	1.90	>1.00	1.60	>1.00	1.60	0.66	1.56	>1.00	1.78	>1.00	1.80	0.68
3	3.60	>1.00	3.30	0.99	3.15	0.72	3.15	0.65	2.76	0.56	2.85	>1.00	2.40	>1.00	2.40	0.85	2.34	>1.00	2.67	>1.00	2.70	0.48
4	4.80	>1.00	4.40	0.90	4.20	0.88	4.20	0.87	3.68	0.61	3.80	>1.00	3.20	>1.00	3.20	0.85	3.12	>1.00	3.56	>1.00	3.60	0.62
5	6.00	>1.00	5.50	0.92	5.25	0.97	5.25	>1.00	4.60	0.41	4.75	>1.00	4.00	>1.00	4.00	0.83	3.90	>1.00	4.45	>1.00	4.50	0.75
6	7.20	>1.00	6.60	0.87	6.30	>1.00	6.30	>1.00	5.52	0.68	5.70	>1.00	4.80	>1.00	4.80	0.66	4.68	>1.00	5.34	>1.00	5.40	0.77
7	8.40	>1.00	7.70	>1.00	7.35	>1.00	7.35	>1.00	6.44	0.99	6.65	>1.00	5.60	>1.00	5.60	0.59	5.46	>1.00	6.23	>1.00	6.30	0.81
8	9.60	>1.00	8.80	0.94	8.40	>1.00	8.40	>1.00	7.36	>1.00	7.60	0.58	6.40	>1.00	6.40	0.59	6.24	0.90	7.12	>1.00	7.20	0.71
9	10.80	>1.00	9.90	0.51	9.45	>1.00	9.45	0.83	8.28	>1.00	8.55	0.41	7.20	>1.00	7.20	0.48	7.02	0.64	8.01	>1.00	8.10	0.60
Right Bank	12.00	0.00	11.00	0.00	10.50	0.00	10.50	0.00	9.20	0.00	9.50	0.00	8.00	0.00	8.00	0.00	7.80	0.00	8.90	0.00	9.00	0.00
Feature Type (riffle, run, or pool)	Run		Run		Run		Run		Run		Run		Run		Run		Run		Run		Run	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10.6.08

WBID # 0115

Site # 7

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10/06/08 15:21	Location Description (e.g., road crossing): Off of ~~Archer~~ Archer Ln.
Stream Name: Bear Creek	
Current Weather Conditions: Pt. Cldy, Breezy, 75°F	Facility Name(s): Buck Subdivision WWTF / Kirksville WWTF
Weather Conditions for Past 10 days: 0.6in/rainfall	Permit Number(s): MO 0107557 / MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☒; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): 0550461	Northing (UTM Y): 4433650	Horizontal Accuracy: (EPE / FOM / PDOP) 19 ~~Meters~~ SWCH ft
Site 11	Easting (UTM X): 0550547	Northing (UTM Y): 4433505	Horizontal Accuracy: (EPE / FOM / PDOP) 24 ~~Meters~~ SWCH ft

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
0115-7-125	Up Stream	0115-7-126	Down Stream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☒ None of the above	☐ 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.)

N/A

3014

Stream Name & WBID # Bear Creek 0115 Date of Survey 10/06/08

Site # 7

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☒ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☐ No trespass sign	☒ Steep slopes	☒ Other: Pasture
Comments: N/A				

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☒ None of the above	Comments / Other: N/A			

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

— % Cobble	— % Gravel	40 % Sand	20 % Silt	40 % Mud/Clay	— % Bedrock

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

Algal growth common

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☒ None	☐ Other:
Color:	☐ Clear	☐ Green	☐ Gray	☐ Milky	☒ Other: Brown
Bottom Deposit:	☐ Sludge	☐ Solids	☒ Fine sediments	☐ None	☒ Other: Woody debris
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☒ None	☐ Other:

*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 affect another use.

JRM

Stream Name & WBID # Bear Creek #0115 Date of Survey 10/6/08

Site # 07

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		NA			

Comments: (Please record any additional comments here.)

NA

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

Printed Names of Personnel Collecting Data: Jennifer Hrabik, James VeVerka

Surveyor's Signature: Jennifer Hrabik Date of Survey: 10/6/08

Organization: AE Solutions Position: Environmental Specialist

10-16-08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 7

Estimated Channel Incision: 0.00 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01 UTM X: 550461 UTM Y: 4433650 +/- 19 (feet)

11 UTM X: 550547 UTM Y: 4433505 +/- 24 (feet)

Average Stream Width: 7.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 150 (meters)
(20x average stream width)

Field Staff: JH, JV

Dissolved Oxygen

Date: 10/6/2008 Time: 15:21

Dissolved Oxygen: 8.05 (mg/L)

Dissolved Oxygen: 84.7 (% sat)

Specific Cond: 586 (µS/cm)

Water Temperature: 17.9 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.51	0.23	0.57	0.18	0.62	>1.00	0.57	0.13	0.54	0.15	0.65	0.18	0.58	0.14	0.56	0.30	0.44	0.41	0.45	0.44	0.76	0.38
2	1.02	0.41	1.14	0.18	1.24	>1.00	1.14	0.13	1.08	0.21	1.30	0.22	1.16	0.35	1.12	0.41	0.88	0.58	0.90	0.57	1.52	0.65
3	1.53	0.41	1.71	0.14	1.86	>1.00	1.71	0.17	1.62	0.33	1.95	0.23	1.74	0.54	1.68	0.55	1.32	0.70	1.35	0.67	2.28	0.74
4	2.04	0.50	2.28	0.30	2.48	>1.00	2.28	0.21	2.16	0.40	2.60	0.29	2.32	0.65	2.24	0.68	1.76	0.79	1.80	0.94	3.04	0.71
5	2.55	0.48	2.85	0.35	3.10	>1.00	2.85	0.23	2.70	0.41	3.25	0.27	2.90	0.52	2.80	0.68	2.20	0.89	2.25	0.84	3.80	0.70
6	3.06	0.45	3.42	0.44	3.72	>1.00	3.42	0.18	3.24	0.33	3.90	0.25	3.48	0.43	3.36	0.54	2.64	0.85	2.70	0.83	4.56	0.68
7	3.57	0.17	3.99	0.35	4.34	>1.00	3.99	0.16	3.78	0.22	4.55	0.27	4.06	0.50	3.92	0.38	3.08	0.80	3.15	0.75	5.32	0.45
8	4.08	0.17	4.56	0.28	4.96	>1.00	4.56	0.13	4.32	0.13	5.20	0.25	4.64	0.53	4.48	0.35	3.52	0.65	3.60	0.60	6.08	0.48
9	4.59	0.13	5.13	0.33	5.58	>1.00	5.13	0.14	4.86	0.13	5.85	0.24	5.22	0.30	5.04	0.16	3.96	0.57	4.05	0.42	6.84	0.35
Right Bank	5.10	0.00	5.70	0.00	6.20	0.00	5.70	0.00	5.40	0.00	6.50	0.00	5.80	0.00	5.60	0.00	4.40	0.00	4.50	0.00	7.60	0.00
Feature Type (riffle, run, or pool)	Run		Run		Pool		Run		Run		Run		Run		Run		Run		Run		Run	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10/6/2008

WBID # 0115

Site # 8

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10/06/08 16:08	Location Description (e.g., road crossing): off of lantern road.
Stream Name: Bear Creek	
Current Weather Conditions: Overcast, Breezy, 75°F	Facility Name(s): Bunk subdivision WWTF / Kirksville WWTF
Weather Conditions for Past 10 days: 0.6in/rainfall	Permit Number(s): MO 0107557 / MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☒; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): 0550830	Northing (UTM Y): 4431995	Horizontal Accuracy: (EPE / FOM / PDOP) 57 ~~Meters~~ SV FH
Site 11	Easting (UTM X): 0550802	Northing (UTM Y): 4431785	Horizontal Accuracy: (EPE / FOM / PDOP) ~~180~~ 68 ~~Meters~~ SV FH

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
0115_8_127	Up Stream	0115_8_128	Down Stream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☒ None of the above	☐ 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.)

N/A

Stream Name & WBID # Bear Creek, 0815 Date of Survey 10/06/08

Site # 8

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☒ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☐ No trespass sign	☒ Steep slopes	☒ Other: Pastures

Comments:
private property

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☒ None of the above	Comments / Other: N/A			

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

— % Cobble	— % Gravel	10 % Sand	10 % Silt	80 % Mud/Clay	— % Bedrock

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

abundant algal growth

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☒ None	☐ Other:
Color:	☐ Clear	☐ Green	☐ Gray	☐ Milky	☒ Other: Brown
Bottom Deposit:	☐ Sludge	☐ Solids	☒ Fine sediments	☐ None	☒ Other: Woody Debris
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☒ None	☐ Other:

*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 affect another use.

Stream Name & WBID # Bear Creek # 0115 Date of Survey 10/16/08

Site # 08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		NA RWC			

Comments: (Please record any additional comments here.)

NA RWC

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

Printed Names of Personnel Collecting Data: Jennifer Hrabik + James VeVerka

Surveyor's Signature: Jennifer Hrabik Date of Survey: 10/16/08

Organization: AE Solutions Position: Environmental Specialist

RWC 10-16-08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 8

Estimated Channel Incision: 0.00 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01 UTM X: 550830 UTM Y: 4431995 +/- 57 (feet)

11 UTM X: 550802 UTM Y: 4431785 +/- 68 (feet)

Average Stream Width: 9.0 (meters) Length of Survey Segment: 180 (meters)

(To determne Length of Reach) (20x average stream width)

Field Staff: JH, JV

Dissolved Oxygen

Date: 10/6/2008 Time: 16:08

Dissolved Oxygen: 6.23 (mg/L)

Dissolved Oxygen: 66.4 (% sat)

Specific Cond: 538 (µS/cm)

Water Temperature: 18.3 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.68	0.14	0.84	0.36	0.76	0.37	0.78	0.62	0.92	0.24	0.70	0.73	0.90	>1.00	0.87	0.29	1.05	>1.00	1.10	>1.00	0.88	0.40
2	1.36	0.36	1.68	0.38	1.52	0.44	1.56	0.93	1.84	0.55	1.40	0.95	1.80	>1.00	1.74	0.37	2.10	>1.00	2.20	>1.00	1.76	>1.00
3	2.04	0.54	2.52	0.44	2.28	0.40	2.34	0.85	2.76	0.54	2.10	0.95	2.70	>1.00	2.61	0.45	3.15	>1.00	3.30	>1.00	2.64	>1.00
4	2.72	>1.00	3.36	0.40	3.04	0.55	3.12	0.87	3.68	0.65	2.80	>1.00	3.60	>1.00	3.48	0.87	4.20	>1.00	4.40	>1.00	3.52	>1.00
5	3.40	>1.00	4.20	0.39	3.80	0.53	3.90	0.99	4.60	0.64	3.50	>1.00	4.50	>1.00	4.35	>1.00	5.25	>1.00	5.50	>1.00	4.40	>1.00
6	4.08	>1.00	5.04	0.47	4.56	0.50	4.68	0.95	5.52	0.51	4.20	>1.00	5.40	>1.00	5.22	0.99	6.30	>1.00	6.60	>1.00	5.28	>1.00
7	4.76	>1.00	5.88	0.50	5.32	0.58	5.46	0.92	6.44	0.47	4.90	>1.00	6.30	>1.00	6.09	0.83	7.35	>1.00	7.70	>1.00	6.16	>1.00
8	5.44	>1.00	6.72	0.48	6.08	0.40	6.24	0.75	7.36	0.45	5.60	>1.00	7.20	>1.00	6.96	0.70	8.40	>1.00	8.80	>1.00	7.04	>1.00
9	6.12	>1.00	7.56	0.36	6.84	0.20	7.02	0.64	8.28	0.44	6.30	>1.00	8.10	>1.00	7.83	0.60	9.45	>1.00	9.90	>1.00	7.92	0.38
Right Bank	6.80	0.00	8.40	0.00	7.60	0.00	7.80	0.00	9.20	0.00	7.00	0.00	9.00	0.00	8.70	0.00	10.50	0.00	11.00	0.00	8.80	0.00
Feature Type (riffle, run, or pool)	Run		Run		Run		Run		Run		Run		Run		Run		Pool		Pool		Run	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width

GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.

Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)

Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)

All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10/6/2008

WBID # 0115

Site # 09

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10/7/08 09:35	Location Description (e.g., road crossing): Hwy 156 Crossing
Stream Name: Bear Creek	
Current Weather Conditions: Overcast	Facility Name(s): Buck Subdivision WWTF / Kirksville WWTF
Weather Conditions for Past 10 days: 0.6" rain	Permit Number(s): MO 0107557 / MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☑; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)				
Site 01	Easting (UTM X): 551625	Northing (UTM Y): 4430130	Horizontal Accuracy: (EPE / FOM / PDOP) 14	Meters ~~Ft~~
Site 11	Easting (UTM X): 551605	Northing (UTM Y): 4429920	Horizontal Accuracy: (EPE / FOM / PDOP) 15	Meters ~~Ft~~

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
129	upstream	130	dnstream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☑ None of the above	☐ 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.)

Stream Name & WBID # Bear Creek #015 Date of Survey 10/7/08

Site # 09

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☐ No trespass sign	☒ Steep slopes	☐ Other:

Comments:

private property

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☒ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☐ None of the above	Comments / Other:			

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

— % Cobble	— % Gravel	20 % Sand	— % Silt	80 % Mud/Clay	— % Bedrock

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

NONE

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☒ None	☐ Other:
Color:	☐ Clear	☐ Green	☐ Gray	☐ Milky	☒ Other: Brown
Bottom Deposit:	☐ Sludge	☐ Solids	☒ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☒ None	☐ Other:

*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 affect another use.

Stream Name & WBID # Bear Creek # 0115 Date of Survey 10/7/08

Site # 09

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		NA			

Comments: (Please record any additional comments here.)

Woody debris at Transect 1

Powerlines across stream at Transect 2

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

Printed Names of Personnel Collecting Data: Tiffanie Hamilton, Jennifer Hrabik

Surveyor's Signature: Tiffanie A. Hamilt Date of Survey: 10/6/08

Organization: AE Solutions Position: Field Technician

RAC 10-16-08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 0115 Site #: 0115_09

Estimated Channel Incision: 1.50 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01 UTM X: 551625 UTM Y: 4430130 +/- 14 (ft)

11 UTM X: 551605 UTM Y: 4429920 +/- 15 (ft)

Average Stream Width: 9.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 180 (meters)
(20x average stream width)

Field Staff: JRH, TAH

Dissolved Oxygen

Date: 10/7/2008 Time: 9:35

Dissolved Oxygen: 3.52 (mg/L)

Dissolved Oxygen: 37.0 (% sat)

Specific Cond: 465 (µS/cm)

Water Temperature: 17.5 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.89	0.72	0.90	0.70	0.90	0.70	0.92	0.56	1.06	>1.00	0.95	0.69	0.93	0.68	0.96	0.68	0.97	0.28	0.40	0.10	0.88	>1.00
2	1.78	0.80	1.80	0.94	1.80	0.85	1.84	0.90	2.12	>1.00	1.90	0.93	1.86	0.80	1.92	0.67	1.94	0.30	0.80	0.17	1.76	>1.00
3	2.67	0.94	2.70	>1.00	2.70	1.00	2.76	>1.00	3.18	>1.00	2.85	>1.00	2.79	0.82	2.88	0.88	2.91	0.23	1.20	0.14	2.64	>1.00
4	3.56	0.90	3.60	>1.00	3.60	>1.00	3.68	>1.00	4.24	>1.00	3.80	>1.00	3.72	0.94	3.84	0.80	3.88	0.13	1.60	0.18	3.52	0.89
5	4.45	0.90	4.50	>1.00	4.50	>1.00	4.60	>1.00	5.30	>1.00	4.75	>1.00	4.65	0.84	4.80	0.74	4.85	0.03	2.00	0.25	4.40	0.86
6	5.34	0.88	5.40	>1.00	5.40	>1.00	5.52	>1.00	6.36	>1.00	5.70	>1.00	5.58	0.65	5.76	0.75	5.82	0.05	2.40	0.26	5.28	0.75
7	6.23	0.87	6.30	>1.00	6.30	>1.00	6.44	>1.00	7.42	>1.00	6.65	>1.00	6.51	0.60	6.72	0.60	6.79	0.01	2.80	0.29	6.16	0.79
8	7.12	0.76	7.20	>1.00	7.20	0.92	7.36	0.89	8.48	>1.00	7.60	>1.00	7.44	0.52	7.68	0.44	7.76	0.01	3.20	0.24	7.04	0.38
9	8.01	0.64	8.10	0.82	8.10	0.83	8.28	0.61	9.54	>1.00	8.55	>1.00	8.37	0.39	8.64	0.36	8.73	0.16	3.60	0.25	7.92	0.59
Right Bank	8.90	0.00	9.00	0.00	9.00	0.00	9.20	0.00	10.60	0.00	9.50	0.00	9.30	0.00	9.60	0.00	9.70	0.00	4.05	0.00	8.80	0.00
Feature Type (riffle, run, or pool)	Pool		Pool		Pool		Pool		Pool		Pool		Run		Run		Riffle		Riffle		Run	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10/7/2008

WBID # 0115 ~~10~~ 24

Site # 10

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10/7/08 10:00	Location Description (e.g., road crossing): 50 m downstream Site 09
Stream Name: Bean Creek	
Current Weather Conditions: overcast	Facility Name(s): Buck Subdivision WWTF / Kirksville WWTF
Weather Conditions for Past 10 days: 0.6in / rainfall	Permit Number(s): MO 0107557 / MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☑; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)				
Site 01	Easting (UTM X): 0551658	Northing (UTM Y): 4429899	Horizontal Accuracy: (EPE / FOM / PDOP) 23	~~Meters~~ ft
Site 11	Easting (UTM X): 0551790	Northing (UTM Y): 4429756	Horizontal Accuracy: (EPE / FOM / PDOP) 15	~~Meters~~ ft

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
131	upstream	132	downstream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☑ None of the above	☐ 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.)

JRH

Stream Name & WBID # Bear Creek 0115 Date of Survey 10/7/08

Site # 10

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☐ No trespass sign	☒ Steep slopes	☐ Other:

Comments:

Private Property, Hunting land - deer stands present.

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☒ None of the above	Comments / Other:			

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

— % Cobble	— % Gravel	80 % Sand	— % Silt	20 % Mud/Clay	— % Bedrock

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

Benthic algae - sparse.

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☑ None	☐ Other:
Color:	☑ Clear	☐ Green	☐ Gray	☐ Milky	☐ Other:
Bottom Deposit:	☐ Sludge	☐ Solids	☑ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☑ None	☐ Other:

*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 affect another use.

JLH

Stream Name & WBID # Bear Creek 0115 Date of Survey 10/7/08

Site # 10

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		NA			

Comments: (Please record any additional comments here.)

Many downed trees throughout site.

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

Printed Names of Personnel Collecting Data: Tiffanie Hamilton, Jennifer Hrabik

Surveyor's Signature: Tiffanie A. Hamilton Date of Survey: 10/7/08

Organization: AE Solutions Position: Field Technician

AHC 10-16-08

JRH

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 0115 Site #: 0115_10

Estimated Channel Incision: 1.0 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01 UTM X: 551658 UTM Y: 4429899 +/- 23 (feet)

11 UTM X: 551790 UTM Y: 4429756 +/- 15 (feet)

Average Stream Width: 9.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 180 (meters)
(20x average stream width)

Field Staff: TAH, JRH

Dissolved Oxygen

Date: 10/7/2008 Time: 10:00

Dissolved Oxygen: 5.83 (mg/L)

Dissolved Oxygen: 61.2 (% sat)

Specific Cond: 436 (µS/cm)

Water Temperature: 17.5 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.64	0.19	0.79	>1.00	1.00	0.38	1.01	0.65	1.00	>1.00	0.75	0.64	0.70	0.35	1.02	0.91	0.99	0.35	0.63	0.13	1.04	0.23
2	1.28	0.22	1.58	0.99	2.00	0.34	2.02	>1.00	2.00	>1.00	1.50	0.95	1.40	0.59	2.04	>1.00	1.98	0.36	1.26	0.20	2.08	0.19
3	1.92	0.43	2.37	0.92	3.00	0.37	3.03	>1.00	3.00	>1.00	2.25	>1.00	2.10	0.68	3.06	>1.00	2.97	0.34	1.89	0.28	3.12	0.13
4	2.56	0.45	3.16	0.78	4.00	0.35	4.04	>1.00	4.00	>1.00	3.00	0.89	2.80	0.86	4.08	>1.00	3.96	0.35	2.52	0.30	4.16	0.01
5	3.20	0.45	3.95	0.71	5.00	0.16	5.05	>1.00	5.00	>1.00	3.75	0.93	3.50	0.80	5.10	>1.00	4.95	0.43	3.15	0.33	5.20	0.00
6	3.84	0.45	4.74	0.63	6.00	0.83	6.06	>1.00	6.00	>1.00	4.50	0.83	4.20	0.94	6.12	>1.00	5.94	0.55	3.78	0.38	6.24	0.39
7	4.48	0.43	5.53	0.58	7.00	>1.00	7.07	>1.00	7.00	>1.00	5.25	0.59	4.90	0.81	7.14	>1.00	6.93	0.64	4.41	0.55	7.28	0.50
8	5.12	0.39	6.32	0.54	8.00	0.74	8.08	>1.00	8.00	>1.00	6.00	0.68	5.60	0.58	8.16	>1.00	7.92	0.70	5.04	0.69	8.32	0.43
9	5.76	0.34	7.11	0.40	9.00	0.45	9.09	0.84	9.00	0.79	6.75	0.30	6.30	0.14	9.18	0.80	8.91	0.65	5.67	0.49	9.36	0.44
Right Bank	6.40	0.00	7.90	0.00	10.00	0.00	10.10	0.00	10.00	0.00	7.50	0.00	7.00	0.00	10.20	0.00	9.90	0.00	6.30	0.00	10.40	0.00
Feature Type (riffle, run, or pool)	Run		Pool		Run		Pool		Pool		Run		Run		Pool		Run		Run		Run	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10/7/2008

WBID # 115

Site # 11

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10-7-08 11:30	Location Description (e.g., road crossing): Limestone road crossing Limestone cross river bottom 400'm from end of.
Stream Name: Bear Creek	
Current Weather Conditions: cloudy, breezy, 60°F	Facility Name(s): Bark Subd. WWTF Kirkswille WWTF
Weather Conditions for Past 10 days: 0.6 in / rain	Permit Number(s): MO 0107557 MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☒; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): 0551778	Northing (UTM Y): 4427733	Horizontal Accuracy: (EPE / FOM / PDOP) 16.0 Meters
Site 11	Easting (UTM X): 0551678	Northing (UTM Y): 4427676	Horizontal Accuracy: (EPE / FOM / PDOP) 6.4 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
0115-11-011	upstream	0115-11-012	DNstream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☒ None of the above	☐ 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.)

N/A

Stream Name & WBID # Bear Creek 0115 Date of Survey 10-7-08

Site # 11

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☒ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☒ Fence	☒ No trespass sign	☒ Steep slopes	☒ Other: Row Crops

Comments:
- No hunting sign also
- Private property

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☒ None of the above	Comments / Other: N/A			

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

0 % Cobble	0 % Gravel	80 % Sand	5 % Silt	15 % Mud/Clay	0 % Bedrock

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

algal growth uncommon
no aquatic grasses w/in stream

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☒ None	☐ Other:
Color:	☒ Clear	☐ Green	☐ Gray	☐ Milky	☒ Other: Brown
Bottom Deposit:	☐ Sludge	☐ Solids	☒ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☒ None	☐ Other:

*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 affect another use.

Stream Name & WBID # Bear Creek 0115 Date of Survey 10-7-08

Site # 11

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		N/A			

Comments: (Please record any additional comments here.)

- Lots of metal/steel in stream from a pre existing bridge
- Limestone road doesn't exist anymore (to stream). Stops 400m short (Private Property after that)

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

Printed Names of Personnel Collecting Data: Jonathan Witte, Cody Luebbering

Surveyor's Signature: Cody Luebbering Date of Survey: 10-7-08

Organization: MEC Water Resources Inc. Position: Water Quality Scientist I

A uc 10-16-08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 11

Estimated Channel Incision: 0.00 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01	UTM X:	551778	UTM Y:	4427733	+/- 16.0 (meters)
11	UTM X:	551678	UTM Y:	4427676	+/- 6.4 (meters)

Average Stream Width: 8.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 160 (meters)
(20x average stream width)

Field Staff: JW, CL

Dissolved Oxygen

Date: 10.7.08 Time: 11:30

Dissolved Oxygen: 4.74 (mg/L)

Dissolved Oxygen: 50.2 (% sat)

Specific Cond: 527 (µS/cm)

Water Temperature: 17.6 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.60	0.03	0.58	0.12	1.00	0.34	0.58	0.11	0.72	0.18	0.54	0.13	0.81	0.70	0.75	0.08	0.72	0.08	0.73	0.19	0.67	0.09
2	1.20	0.12	1.16	0.25	1.99	0.78	1.16	0.22	1.44	0.37	1.08	0.28	1.62	0.83	1.50	0.34	1.44	0.23	1.46	0.40	1.34	0.36
3	1.80	0.31	1.74	0.14	2.99	0.52	1.74	0.62	2.16	0.55	1.62	0.25	2.43	0.95	2.25	0.58	2.16	0.20	2.19	0.45	2.01	0.38
4	2.40	0.42	2.32	0.09	3.98	0.91	2.32	0.70	2.88	0.70	2.16	0.34	3.24	>1.00	3.00	0.50	2.88	0.32	2.92	0.53	2.68	0.26
5	3.00	0.60	2.90	0.04	4.98	>1.00	2.90	0.86	3.60	0.83	2.70	0.34	4.05	>1.00	3.75	0.46	3.60	0.33	3.65	0.51	3.35	0.26
6	3.60	0.77	3.48	0.25	5.97	>1.00	3.48	0.93	4.32	0.83	3.24	0.33	4.86	>1.00	4.50	0.48	4.32	0.31	4.38	0.42	4.02	0.38
7	4.20	0.65	4.06	0.29	6.97	>1.00	4.06	0.54	5.04	0.71	3.78	0.23	5.67	0.99	5.25	0.72	5.04	0.36	5.11	0.27	4.69	0.48
8	4.80	0.48	4.64	0.30	7.96	0.60	4.64	0.36	5.76	0.51	4.32	0.14	6.48	0.93	6.00	0.57	5.76	0.35	5.84	0.22	5.36	0.43
9	5.40	0.09	5.22	0.07	8.96	0.32	5.22	0.14	6.48	0.27	4.86	0.03	7.29	0.53	6.75	0.37	6.48	0.31	6.57	0.12	6.03	0.34
Right Bank	6.00	0.00	5.80	0.00	9.95	0.00	5.80	0.00	7.20	0.00	5.40	0.00	8.10	0.00	7.50	0.00	7.20	0.00	7.30	0.00	6.70	0.00
Feature Type (riffle, run, or pool)	Run		Riffle		Pool		Run		Run		Run		Run		Run		Run		Run		Run	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10.7.08

WBID # 115

Site # 12

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10-7-08 9:50	Location Description (e.g., road crossing): Mustang st. road crossing
Stream Name: Bear Creek	
Current Weather Conditions: Cloudy 60° F	Facility Name(s): Burk Subdivision WWTF Kirksville WWTF
Weather Conditions for Past 10 days: 0.6 in/ rainfall	Permit Number(s): MO 0107557 MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ■; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): 0551600	Northing (UTM Y): 4426056	Horizontal Accuracy: (EPE / FOM / PDOP) 10.2 Meters
Site 11	Easting (UTM X): 0551614	Northing (UTM Y): 4425913	Horizontal Accuracy: (EPE / FOM / PDOP) 6.0 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
0115-12-013	upstream	0115-12-014	Dnstream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	■ None of the above	☐ 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.)

N/A

2124

Stream Name & WBID # Bear Creek 0115 Date of Survey 10-7-08

Site # 12

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☒ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☒ Fence	☐ No trespass sign	☒ Steep slopes	☒ Other: Pasture

Comments: N/A

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☒ None of the above	Comments / Other: N/A			

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

1 % Cobble	4 % Gravel	80 % Sand	5 % Silt	10 % Mud/Clay	0 % Bedrock

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

-algal growth uncommon
-little to no aquatic grasses w/in stream

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☒ None	☐ Other:
Color:	☒ Clear	☒ Green	☐ Gray	☐ Milky	☐ Other:
Bottom Deposit:	☐ Sludge	☐ Solids	☒ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☒ None	☐ Other:

*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 affect another use.

Stream Name & WBID # Bear Creek 011.5 Date of Survey 10-7-08

Site # 12

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		N/A			

Comments: (Please record any additional comments here.)

Riparian avg. width 20m, was fenced off from cattle

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

Printed Names of Personnel Collecting Data: Jonathan Wille, Cody Luebbering

Surveyor's Signature: Cody Luebbering Date of Survey: 10-7-08

Organization: MEC Water Resources Inc. Position: Water Quality Scientist I

ANC 10-16-08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 12

Estimated Channel Incision: 0.10 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01	UTM X:	551600	UTM Y:	4426056	+/- 10.2 (meters)
11	UTM X:	551614	UTM Y:	4425913	+/- 6.0 (meters)

Average Stream Width: 7.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 150 (meters)
(20x average stream width)

Field Staff: JW, CL

Dissolved Oxygen

Date: 10/7/2008 Time: 9:50

Dissolved Oxygen: 7.01 (mg/L)

Dissolved Oxygen: 73.1 (% sat)

Specific Cond: 598 (µS/cm)

Water Temperature: 17.4 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.42	0.11	0.58	0.15	0.52	0.02	0.33	0.13	0.53	0.14	1.26	0.04	0.84	0.24	0.86	0.23	0.56	0.47	0.70	0.23	0.53	0.07
2	0.84	0.17	1.16	0.33	1.04	0.01	0.66	0.38	1.06	0.43	2.52	0.54	1.68	0.29	1.72	0.35	1.12	0.91	1.40	0.47	1.06	0.35
3	1.26	0.16	1.74	0.29	1.56	0.29	0.99	0.67	1.59	0.68	3.78	0.68	2.52	0.37	2.58	0.56	1.68	0.94	2.10	0.64	1.59	0.55
4	1.68	0.16	2.32	0.30	2.08	0.52	1.32	0.75	2.12	0.70	5.04	0.27	3.36	0.34	3.44	0.60	2.24	0.89	2.80	0.02	2.12	0.79
5	2.10	0.26	2.90	0.29	2.60	0.72	1.65	0.75	2.65	0.85	6.30	0.01	4.20	0.35	4.30	0.55	2.80	0.75	3.50	0.54	2.65	0.75
6	2.52	0.24	3.48	0.26	3.12	0.77	1.98	0.72	3.18	0.83	7.56	0.04	5.04	0.33	5.16	0.40	3.36	0.56	4.20	0.48	3.18	0.67
7	2.94	0.22	4.06	0.35	3.64	0.59	2.31	0.59	3.71	0.84	8.82	0.18	5.88	0.43	6.02	0.40	3.92	0.48	4.90	0.38	3.71	0.35
8	3.36	0.20	4.64	0.26	4.16	0.37	2.64	0.39	4.24	0.57	10.08	0.16	6.72	0.37	6.88	0.53	4.48	0.30	5.60	0.46	4.24	0.19
9	3.78	0.08	5.22	0.17	4.68	0.13	2.97	0.21	4.77	0.38	11.34	0.13	7.56	0.23	7.74	0.14	5.04	0.07	6.30	0.32	4.77	0.10
Right Bank	4.20	0.00	5.80	0.00	5.20	0.00	3.30	0.00	5.30	0.00	12.60	0.00	8.40	0.00	8.60	0.00	5.60	0.00	7.00	0.00	5.30	0.00
Feature Type (riffle, run, or pool)	Run		Run		Pool		Run		Pool		Run		Run		Run		Pool		Run		Run	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10/7/2008

WBID # 0115

Site # 13

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10/7/08 1117	Location Description (e.g., road crossing): Mesquite Rd crossing
Stream Name: Bear Creek	
Current Weather Conditions: Overcast	Facility Name(s): Park Subdivision WWTF / Kirksville WWTP
Weather Conditions for Past 10 days: 0.6 in /rain	Permit Number(s): MO 0107557 / MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☑; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): 0552160	Northing (UTM Y): 4423288	Horizontal Accuracy: (EPE / FOM / PDOP) 22 ~~Meters~~ YRH Ft
Site 11	Easting (UTM X): 0552085	Northing (UTM Y): 4423076	Horizontal Accuracy: (EPE / FOM / PDOP) 20 ~~Meters~~ YRH Ft

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
133	downstream	134	upstream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☑ None of the above	☐ 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.)

Stream Name & WBID # Bear Creek 0115 Date of Survey 10/7/08

Site # 13

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☐ No trespass sign	☑ Steep slopes	☐ Other:

Comments:

Private Property, Agricultural

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☑ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☐ None of the above	Comments / Other:			

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

— % Cobble	— % Gravel	20 % Sand	— % Silt	80 % Mud/Clay	— % Bedrock

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

Willows – sparse

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☑ None	☐ Other:
Color:	☑ Clear	☐ Green	☐ Gray	☐ Milky	☑ Other: Brown
Bottom Deposit:	☐ Sludge	☐ Solids	☑ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☑ None	☐ Other:

*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 affect another use.

Stream Name & WBID # Bear Creek 0115 Date of Survey 10/7/08

Site # 13

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		NA			

Comments: (Please record any additional comments here.)

Ferrous oxide deposits on banks at water

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

Printed Names of Personnel Collecting Data: Tiffanie Hamilton, Jennifer Hrabik

Surveyor's Signature: Tiffanie A. Hamilton Date of Survey: 10/6/08

Organization: AE Solutions Position: Field Technician

RuC 10-16-08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 0115 Site #: 0115_13

Estimated Channel Incision: 3.50 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01 UTM X: 552160 UTM Y: 4423288 +/- 22 (ft)

11 UTM X: 552085 UTM Y: 4423076 +/- 20 (ft)

Average Stream Width: 9.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 180 (meters)
(20x average stream width)

Field Staff: JRH, TAH

Dissolved Oxygen

Date: 10/7/2008 Time: 11:17

Dissolved Oxygen: 5.69 (mg/L)

Dissolved Oxygen: 60.2 (% sat)

Specific Cond: 681 (µS/cm)

Water Temperature: 17.8 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1.07	0.37	1.02	0.88	0.57	0.18	0.95	0.79	0.74	>1.00	0.70	0.14	0.88	0.21	0.95	>1.00	0.96	>1.00	0.75	0.16	0.87	>1.00
2	2.14	0.53	2.04	>1.00	1.14	0.30	1.90	>1.00	1.48	>1.00	1.40	0.31	1.76	0.16	1.90	>1.00	1.92	>1.00	1.50	0.24	1.74	>1.00
3	3.21	0.80	3.06	>1.00	1.71	0.38	2.85	>1.00	2.22	>1.00	2.10	0.34	2.64	0.09	2.85	>1.00	2.88	>1.00	2.25	0.21	2.61	>1.00
4	4.28	0.95	4.08	>1.00	2.28	0.43	3.80	>1.00	2.96	0.79	2.80	0.29	3.52	0.15	3.80	>1.00	3.84	>1.00	3.00	0.29	3.48	>1.00
5	5.35	0.95	5.10	>1.00	2.85	0.43	4.75	>1.00	3.70	0.60	3.50	0.29	4.40	0.02	4.75	>1.00	4.80	>1.00	3.75	0.38	4.35	>1.00
6	6.42	>1.00	6.12	>1.00	3.42	0.35	5.70	>1.00	4.44	0.44	4.20	0.23	5.28	0.00	5.70	>1.00	5.76	>1.00	4.50	0.64	5.22	>1.00
7	7.49	>1.00	7.14	>1.00	3.99	0.31	6.65	>1.00	5.18	0.38	4.90	0.18	6.16	0.12	6.65	>1.00	6.72	>1.00	5.25	0.89	6.09	>1.00
8	8.56	>1.00	8.16	>1.00	4.56	0.25	7.60	>1.00	5.92	0.35	5.60	0.20	7.04	0.58	7.60	>1.00	7.68	>1.00	6.00	>1.00	6.96	>1.00
9	9.63	0.76	9.18	0.93	5.13	0.25	8.55	0.88	6.66	0.12	6.30	0.14	7.92	0.87	8.55	>1.00	8.64	>1.00	6.75	0.54	7.83	>1.00
Right Bank	10.70	0.00	10.20	0.00	5.70	0.00	9.50	0.00	7.40	0.00	7.00	0.00	8.80	0.00	9.50	0.00	9.60	0.00	7.50	0.00	8.70	0.00
Feature Type (riffle, run, or pool)	Pool		Pool		Run		Run		Run		Run		Riffle		Pool		Pool		Run		Pool	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10/7/2008

WBID # 0115

Site # 14

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10.1.08 12:25	Location Description (e.g., road crossing):
Stream Name: Bear Creek	at Nathatch Ave. Crossing
Current Weather Conditions: 70° F, overcast	Facility Name(s): Burk Subd. ~~010~~ WWTF Kirksville WWTF
Weather Conditions for Past 10 days: 0.6 in / rain	Permit Number(s): MO 010 7557 MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☑; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)				
Site 01	Easting (UTM X): 0554181	Northing (UTM Y): 4421534	Horizontal Accuracy: (EPE / FOM / PDOP) 9.8	Meters
Site 11	Easting (UTM X): 0554406	Northing (UTM Y): 4421431	Horizontal Accuracy: (EPE / FOM / PDOP) 4.5	Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
0115-14-015	Up Stream	0115-14-016	Dn Stream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☑ None of the above	☐ 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.)

N/A

Stream Name & WBID # Bear Creek 0115 Date of Survey 10-7-08

Site # 14

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☐ No trespass sign	☑ Steep slopes	☑ Other: row crop

Comments:

Riparian ~ 10m

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☑ None of the above	Comments / Other: N/A			

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

0 % Cobble	5 % Gravel	75 % Sand	10 % Silt	10 % Mud/Clay	0 % Bedrock

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

Few aq. grasses, plants

Algal growth uncommon

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☑ None	☐ Other:
Color:	☑ Clear	☐ Green	☐ Gray	☐ Milky	☑ Other: brown
Bottom Deposit:	☐ Sludge	☐ Solids	☑ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☐ None	☑ Other: leaves

*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 affect another use.

SCH

Stream Name & WBID # Bear Creek 0115 Date of Survey 10-7-08

Site # 14

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		N/A			

Comments: (Please record any additional comments here.)

N/A

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

Printed Names of Personnel Collecting Data: Jonathan Witte, Cody Luebbering

Surveyor's Signature: Cody Luebbering Date of Survey: 10-7-08

Organization: MEC Water Resources Inc. Position: Water Quality Scientist I

QMC 10-16-08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 14

Estimated Channel Incision: 0.00 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01 UTM X: 554181 UTM Y: 4421534 +/- 9.8 (meters)

11 UTM X: 554406 UTM Y: 4421431 +/- 4.5 (meters)

Average Stream Width: 9.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 180 (meters)
(20x average stream width)

Field Staff: JW, CL

Dissolved Oxygen

Date: 10.7.08 Time: 12:25

Dissolved Oxygen: 4.87 (mg/L)

Dissolved Oxygen: 57.0 (% sat)

Specific Cond: 696 (µS/cm)

Water Temperature: 17.6 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1.03	0.09	0.88	0.11	0.98	0.19	1.21	0.42	1.03	0.21	0.91	0.02	0.74	0.38	0.76	>1.00	0.92	0.03	0.77	0.30	0.68	0.16
2	2.06	0.34	1.75	0.26	1.96	0.22	2.42	0.38	2.06	0.40	1.82	0.15	1.48	0.46	1.52	0.98	1.84	0.11	1.54	0.49	1.36	0.20
3	3.09	0.28	2.63	0.29	2.94	0.15	3.63	0.04	3.09	0.59	2.73	0.00	2.22	0.11	2.28	0.95	2.76	0.22	2.31	0.75	2.04	0.16
4	4.12	0.30	3.50	0.28	3.92	0.04	4.84	0.07	4.12	0.50	3.64	0.00	2.96	0.17	3.04	0.95	3.68	0.33	3.08	0.92	2.72	0.12
5	5.15	0.27	4.38	0.27	4.90	0.16	6.05	0.08	5.15	0.42	4.55	0.41	3.70	0.31	3.80	>1.00	4.60	0.42	3.85	>1.00	3.40	0.14
6	6.18	0.29	5.25	0.26	5.88	0.30	7.26	0.20	6.18	0.31	5.46	0.56	4.44	0.38	4.56	>1.00	5.52	0.56	4.62	>1.00	4.08	0.15
7	7.21	0.30	6.13	0.30	6.86	0.21	8.47	0.21	7.21	0.26	6.37	0.34	5.18	0.37	5.32	0.99	6.44	>1.00	5.39	>1.00	4.76	0.12
8	8.24	0.31	7.00	0.31	7.84	0.24	9.68	0.22	8.24	0.22	7.28	0.31	5.92	0.14	6.08	0.87	7.36	0.87	6.16	>1.00	5.44	0.07
9	9.27	0.15	7.88	0.15	8.82	0.15	10.89	0.16	9.27	0.14	8.19	0.12	6.66	0.03	6.84	0.27	8.28	0.45	6.93	0.68	6.12	0.03
Right Bank	10.30	0.00	8.75	0.00	9.80	0.00	12.10	0.00	10.30	0.00	9.10	0.00	7.40	0.00	7.60	0.00	9.20	0.00	7.70	0.00	6.80	0.00
Feature Type (riffle, run, or pool)	Run		Run		Run		Run		Run		Run		Run		Run		Run		Pool		Riffle	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10.7.08

WBID # 0115

Site # 15

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10/7/08 12:30	Location Description (e.g., road crossing): Navajo Rd crossing
Stream Name: Bean creek	
Current Weather Conditions: overcast	Facility Name(s): Buck Subdivision WWTF / Kirkville WWTF
Weather Conditions for Past 10 days: 0.6in/rainfall	Permit Number(s): MO 0107537 / MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☑; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)				
Site 01	Easting (UTM X): 0555692	Northing (UTM Y): 4420644	Horizontal Accuracy: (EPE / FOM / PDOP)	20 ~~Meters~~ Ft
Site 11	Easting (UTM X): 0555790	Northing (UTM Y): 4420526	Horizontal Accuracy: (EPE / FOM / PDOP)	28 ~~Meters~~ Ft

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
135	upstream	136	downstream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☑ None of the above	☐ 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.)

JRH

Stream Name & WBID # Bear Creek 0115 Date of Survey 10/7/08

Site # 015

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☐ No trespass sign	☒ Steep slopes	☐ Other:

Comments:

Private property, Agricultural

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☒ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☐ None of the above	Comments / Other:			

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

– % Cobble	– % Gravel	20 % Sand	– % Silt	80 % Mud/Clay	– % Bedrock

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

Benthic algae – sparse

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☒ None	☐ Other:
Color:	☒ Clear	☐ Green	☐ Gray	☐ Milky	☐ Other:
Bottom Deposit:	☐ Sludge	☐ Solids	☒ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☒ None	☐ Other:

*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 affect another use.

Stream Name & WBID # Bear Creek 0115 Date of Survey 10/7/08

Site # 15

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		NA	BMC		

Comments: (Please record any additional comments here.)

Active beaver sign.
Log jam at Transect 6

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

Printed Names of Personnel Collecting Data: Tiffanie Hamilton, Jennifer Hrabik

Surveyor's Signature: Tiffanie A. Hamilt Date of Survey: 10/6/08

Organization: AE Solutions Position: Field Technician

BMC 10-16-08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 0115 Site #: 0115_15

Estimated Channel Incision: 1.00 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01 UTM X: 555692 UTM Y: 4420644 +/- 20 (feet)

11 UTM X: 555790 UTM Y: 4420526 +/- 28 (feet)

Average Stream Width: 7.4 (meters)
(To determne Length of Reach)

Length of Survey Segment: 150 (meters)
(20x average stream width)

Field Staff: TAH, JRH

Dissolved Oxygen

Date: 10/7/2008 Time: 12:30

Dissolved Oxygen: 6.53 (mg/L)

Dissolved Oxygen: 68.7 (% sat)

Specific Cond: 617 (µS/cm)

Water Temperature: 17.8 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.68	0.16	0.78	0.27	0.75	0.42	0.89	0.46	0.80	0.45	0.72	0.41	0.80	0.64	0.57	0.35	0.71	0.50	0.74	0.50	0.68	0.49
2	1.36	0.15	1.56	0.57	1.50	0.49	1.78	0.46	1.60	0.48	1.44	0.50	1.60	0.69	1.14	0.38	1.42	0.49	1.48	0.54	1.36	0.53
3	2.04	0.14	2.34	0.55	2.25	0.59	2.67	0.41	2.40	0.55	2.16	0.55	2.40	0.68	1.71	0.43	2.13	0.42	2.22	0.59	2.04	0.50
4	2.72	0.14	3.12	0.48	3.00	0.50	3.56	0.40	3.20	0.63	2.88	0.54	3.20	0.62	2.28	0.43	2.84	0.32	2.96	0.60	2.72	0.53
5	3.40	0.01	3.90	0.50	3.75	0.50	4.45	0.45	4.00	0.66	3.60	0.54	4.00	0.65	2.85	0.45	3.55	0.34	3.70	0.60	3.40	0.49
6	4.08	0.05	4.68	0.54	4.50	0.54	5.34	0.58	4.80	0.58	4.32	0.58	4.80	0.67	3.42	0.46	4.26	0.18	4.44	0.54	4.08	0.49
7	4.76	0.00	5.46	0.42	5.25	0.50	6.23	0.60	5.60	0.55	5.04	0.50	5.60	0.59	3.99	0.49	4.97	0.20	5.18	0.51	4.76	0.53
8	5.44	0.05	6.24	0.37	6.00	0.52	7.12	0.58	6.40	0.44	5.76	0.38	6.40	0.49	4.56	0.44	5.68	0.17	5.92	0.50	5.44	0.54
9	6.12	0.12	7.02	0.38	6.75	0.41	8.01	0.49	7.20	0.40	6.48	0.21	7.20	0.44	5.13	0.42	6.39	0.16	6.66	0.47	6.12	0.55
Right Bank	6.80	0.00	7.80	0.00	7.50	0.00	8.90	0.00	8.00	0.00	7.20	0.00	8.00	0.00	5.70	0.00	7.10	0.00	7.40	0.00	6.80	0.00
Feature Type (riffle, run, or pool)	Riffle		Run		Run		Run		Run		Run		Run		Run		Run		Run		Run	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10/7/2008

WBID # 0115

Site # 16

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10-6-08 17:15	Location Description (e.g., road crossing):
Stream Name: Bear Creek	At Nightengale rd. crossing
Current Weather Conditions: 70°F, Windy, Cloudy	Facility Name(s): Burk Subdivision WWTF Kirksville WWTF
Weather Conditions for Past 10 days: 0.6in rainfall	Permit Number(s): MO 0107557 MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☒; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): 0557480	Northing (UTM Y): 4418664	Horizontal Accuracy: (EPE / FOM / PDOP) 13.2 Meters
Site 11	Easting (UTM X): 0557395	Northing (UTM Y): 4418533	Horizontal Accuracy: (EPE / FOM / PDOP) 7.0 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
0115-16-017	Dn Stream	0115-16-018	Up Stream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☑ None of the above	☐ 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.)

N/A

Stream Name & WBID # Bear Creek 0115 Date of Survey 10-6-08

Site # 16

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	■ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☐ No trespass sign	■ Steep slopes	■ Other: Row Crops

Comments: N/A

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
■ None of the above	Comments / Other: N/A			

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

2 % Cobble	20 % Gravel	50 % Sand	14 % Silt	14 % Mud/Clay	0 % Bedrock

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

algal growth common
few to none aquatic grasses in stream

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	■ None	☐ Other:
Color:	■ Clear	■ Green	☐ Gray	☐ Milky	■ Other: Brown
Bottom Deposit:	☐ Sludge	☐ Solids	■ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	■ Scum	■ Foam	☐ None	☐ Other:

*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 affect another use.

Stream Name & WBID # Bear Creek 0115 Date of Survey 10-6-08

Site # 16

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
			N/A		

Comments: (Please record any additional comments here.)

·Lots of woody debris w/in stream

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

Printed Names of Personnel Collecting Data: Jonathan Witte, Cody Luebbering

Surveyor's Signature: Cody Luebbering Date of Survey: 10-6-08

Organization: MEC Water Resources Inc. Position: Water Quality Scientist I

AMC 10-16-08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 16

Estimated Channel Incision: 0.10 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01 UTM X: 557480 UTM Y: 4418664 +/- 13.2 (meters)

11 UTM X: 557395 UTM Y: 4418523 +/- 7.0 (meters)

Average Stream Width: 8.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 160 (meters)
(20x average stream width)

Field Staff: JW, CL

Dissolved Oxygen

Date: 10/6/2008 Time: 17:15

Dissolved Oxygen: 6.48 (mg/L)

Dissolved Oxygen: 68.8 (% sat)

Specific Cond: 577 (µS/cm)

Water Temperature: 18.3 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.83	0.21	0.81	0.15	0.50	0.35	1.07	0.17	1.47	>1.00	1.03	0.31	0.89	0.31	0.81	0.09	1.27	0.12	1.03	0.03	1.12	0.23
2	1.66	0.39	1.62	0.19	1.00	0.57	2.14	0.30	2.94	>1.00	2.06	0.41	1.78	0.42	1.62	0.13	2.54	0.15	2.06	0.00	2.24	0.57
3	2.49	0.45	2.43	0.24	1.50	0.60	3.21	0.26	4.41	>1.00	3.09	0.18	2.67	0.82	2.43	0.18	3.81	0.08	3.09	0.03	3.36	0.42
4	3.32	0.37	3.24	0.16	2.00	0.55	4.28	0.24	5.88	>1.00	4.12	0.22	3.56	>1.00	3.24	0.34	5.08	0.00	4.12	0.11	4.48	0.36
5	4.15	0.38	4.05	0.25	2.50	0.27	5.35	0.25	7.35	>1.00	5.15	0.73	4.45	>1.00	4.05	0.95	6.35	0.00	5.15	0.18	5.60	0.31
6	4.98	0.34	4.86	0.40	3.00	0.20	6.42	0.29	8.82	>1.00	6.18	0.95	5.34	>1.00	4.86	>1.00	7.62	0.08	6.18	0.22	6.72	0.30
7	5.81	0.21	5.67	0.39	3.50	0.15	7.49	0.33	10.29	>1.00	7.21	0.85	6.23	0.90	5.67	>1.00	8.89	0.37	7.21	0.15	7.84	0.01
8	6.64	0.18	6.48	0.20	4.00	0.10	8.56	0.30	11.76	>1.00	8.24	0.85	7.12	0.49	6.48	0.30	10.16	0.40	8.24	0.12	8.96	0.33
9	7.47	0.11	7.29	0.16	4.50	0.04	9.63	0.03	13.23	>1.00	9.27	0.43	8.01	0.17	7.29	0.06	11.43	0.15	9.27	0.03	10.08	0.25
Right Bank	8.30	0.00	8.10	0.00	5.00	0.00	10.70	0.00	14.70	0.00	10.30	0.00	8.90	0.00	8.10	0.00	12.70	0.00	10.30	0.00	11.20	0.00
Feature Type (riffle, run, or pool)	Run		Run		Run		Run		Pool		Pool		Run		Run		Run		Run		Run	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10/6/2008

WBID # 0115

Site # 17

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10.6.08 1730	Location Description (e.g., road crossing): 50m Dnstream from Site 16
Stream Name: Bear Creek	
Current Weather Conditions: 70°F, raining	Facility Name(s): Burk Subd. WWTF Kirksville WWTF
Weather Conditions for Past 10 days: 0.6 in /rain	Permit Number(s): MO 0107557 MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☑; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): 0557392	Northing (UTM Y): 4418468	Horizontal Accuracy: (EPE / FOM / PDOP) 9.3 Meters
Site 11	Easting (UTM X): 0557517	Northing (UTM Y): 4418365	Horizontal Accuracy: (EPE / FOM / PDOP) 12.8 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
0115_17_019	Upstream	0115_17 020	Dn Stream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☑ None of the above	☐ 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.)

N/A

Stream Name & WBID # Bear Cr. 0115 Date of Survey 10-6-08

Site # 17

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☑ Fence	☐ No trespass sign	☑ Steep slopes	☑ Other: row crop

Comments:

Riparian ~ 30m

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☒ None of the above	Comments / Other: Deer stands in raparian			

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

0 % Cobble	5 % Gravel	85 % Sand	5 % Silt	5 % Mud/Clay	0 % Bedrock

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

algal growth common
aquatic grasses not present w/in stream

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☒ None	☐ Other:
Color:	☒ Clear	☒ Green	☐ Gray	☐ Milky	☐ Other:
Bottom Deposit:	☐ Sludge	☐ Solids	☒ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☒ None	☐ Other:

*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 affect another use.

Stream Name & WBID # Bear Creek 0115 Date of Survey 10-6-08

Site # 17

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		N/A			

Comments: (Please record any additional comments here.)

- Stream banks highly eroded, producing eminse amounts of woody debris in stream bed.
- Multiple deer stands in riparian corridor.

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

Printed Names of Personnel Collecting Data: Jonathan W. He, Cody Luebbering

Surveyor's Signature: Cody Luebbering Date of Survey: 10-6-08

Organization: MEC Water Resources Inc. Position: Water Quality Scientist I

QAC 10-16-08

ARH

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 17

Estimated Channel Incision: 0.00 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01 UTM X: 557392 UTM Y: 4418468 +/- 9.3 (meters)

11 UTM X: 557517 UTM Y: 4418365 +/- 12.8 (meters)

Average Stream Width: 10.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 200 (meters)
(20x average stream width)

Field Staff: JW, CL

Dissolved Oxygen

Date: 10.6.08 Time: 17:30

Dissolved Oxygen: 6.13 (mg/L)

Dissolved Oxygen: 64.8 (% sat)

Specific Cond: 621 (µS/cm)

Water Temperature: 18.4 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1.32	0.44	1.24	0.21	0.92	0.31	1.02	0.52	1.16	0.68	1.23	0.18	1.28	0.64	0.85	0.05	1.21	0.12	0.98	0.37	0.48	0.07
2	2.64	0.72	2.48	0.23	1.84	0.74	2.04	0.81	2.32	0.86	2.46	0.48	2.56	0.92	1.70	0.11	2.42	0.07	1.96	0.37	0.96	0.10
3	3.96	0.51	3.72	0.40	2.76	0.82	3.06	0.76	3.48	>1.00	3.69	0.83	3.84	>1.00	2.55	0.16	3.63	0.22	2.94	0.11	1.44	0.22
4	5.28	0.27	4.96	0.56	3.68	0.88	4.08	0.99	4.64	>1.00	4.92	>1.00	5.12	>1.00	3.40	0.22	4.84	0.31	3.92	0.30	1.92	0.21
5	6.60	0.62	6.20	0.61	4.60	>1.00	5.10	>1.00	5.80	>1.00	6.15	>1.00	6.40	>1.00	4.25	0.23	6.05	0.00	4.90	0.14	2.40	0.21
6	7.92	0.43	7.44	0.66	5.52	>1.00	6.12	0.87	6.96	>1.00	7.38	>1.00	7.68	>1.00	5.10	0.23	7.26	0.01	5.88	0.16	2.88	0.13
7	9.24	0.49	8.68	0.73	6.44	>1.00	7.14	0.61	8.12	0.68	8.61	>1.00	8.96	>1.00	5.95	0.34	8.47	0.38	6.86	0.19	3.36	0.03
8	10.56	0.53	9.92	0.45	7.36	>1.00	8.16	0.27	9.28	0.56	9.84	>1.00	10.24	>1.00	6.80	0.42	9.68	0.12	7.84	0.15	3.84	0.01
9	11.88	0.35	11.16	0.54	8.28	>1.00	9.18	0.18	10.44	0.12	11.07	0.67	11.52	>1.00	7.65	0.46	10.89	0.02	8.82	0.04	4.32	0.02
Right Bank	13.20	0.00	12.40	0.00	9.20	0.00	10.20	0.00	11.60	0.00	12.30	0.00	12.80	0.00	8.50	0.00	12.10	0.00	9.80	0.00	4.80	0.00
Feature Type (riffle, run, or pool)	Run		Pool		Pool		Run		Pool		Pool		Pool		Run		Run		Run		Riffle	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10.6.08

WBID # 0115

Site # 18

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10-6-08 16:15	Location Description (e.g., road crossing):
Stream Name: Bear Creek	at Olive Ave. Crossing
Current Weather Conditions: Mostly Cloudy 75°F	Facility Name(s): Burk Subdivision WWTF Kirksville WWTF
Weather Conditions for Past 10 days: 0.6 in rainfall	Permit Number(s): MO 0107557 MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☒; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): 0559136	Northing (UTM Y): 4415638	Horizontal Accuracy: (EPE / FOM / PDOP) 12.5 Meters
Site 11	Easting (UTM X): 0559256	Northing (UTM Y): 4415403	Horizontal Accuracy: (EPE / FOM / PDOP) 12.2 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
0115-18-021	Upstream	0115-18-022	Onstream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☑ None of the above	☐ 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.)

N/A

Stream Name & WBID # Bear Creek 0115

Date of Survey 10-~~X~~6-08 CL

Site # 18

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☐ No trespass sign	☐ Steep slopes	☑ Other: row crop

Comments:

Riparian ~ 20m

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☑ None of the above	Comments / Other: N/A			

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

0 % Cobble	5 % Gravel	85 % Sand	5 % Silt	5 % Mud/Clay	0 % Bedrock

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

Few aq. grasses

Algal growth uncommon

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☑ None	☐ Other:
Color:	☑ Clear	☐ Green	☐ Gray	☐ Milky	☐ Other:
Bottom Deposit:	☐ Sludge	☐ Solids	☑ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☐ None	☑ Other: leaves

*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 affect another use.

JRH

Stream Name & WBID # Bear Creek 0115 Date of Survey 10-~~7~~6-08 CL

Site # 18

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		N/A			

Comments: (Please record any additional comments here.)

N/A

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

Printed Names of Personnel Collecting Data: Jonathan Witte, Cody Luebbering

Surveyor's Signature: Cody Luebbering Date of Survey: 10-6-08

Organization: MEC Water Resources Inc. Position: Water Quality Scientist I

QWC 10-16-08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 18

Estimated Channel Incision: 0.00 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01 UTM X: 559136 UTM Y: 4415638 +/- 12.5 (meters)

11 UTM X: 559256 UTM Y: 4415403 +/- 12.2 (meters)

Average Stream Width: 8.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 160 (meters)
(20x average stream width)

Field Staff: JW, CL

Dissolved Oxygen

Date: 10/6/2008 Time: 16:15

Dissolved Oxygen: 8.13 (mg/L)

Dissolved Oxygen: 87.1 (% sat)

Specific Cond: 630 (µS/cm)

Water Temperature: 18.5 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.62	0.14	0.87	0.13	0.67	0.17	1.04	0.15	0.91	0.20	0.91	0.19	0.99	0.16	0.79	0.05	0.48	0.34	0.76	0.19	0.99	0.35
2	1.24	0.29	1.74	0.19	1.34	0.32	2.08	0.21	1.82	0.43	1.82	0.30	1.98	0.20	1.58	0.10	0.96	0.27	1.52	0.43	1.98	0.56
3	1.86	0.35	2.61	0.24	2.01	0.31	3.12	0.11	2.73	0.34	2.73	0.34	2.97	0.17	2.37	0.11	1.44	0.17	2.28	0.41	2.97	0.51
4	2.48	0.25	3.48	0.25	2.68	0.50	4.16	0.22	3.64	0.35	3.64	0.25	3.96	0.19	3.16	0.11	1.92	0.19	3.04	0.35	3.96	0.24
5	3.10	0.13	4.35	0.26	3.35	0.35	5.20	0.22	4.55	0.24	4.55	0.25	4.95	0.15	3.95	0.12	2.40	0.16	3.80	0.45	4.95	0.23
6	3.72	0.15	5.22	0.21	4.02	0.31	6.24	0.27	5.46	0.23	5.46	0.31	5.94	0.16	4.74	0.15	2.88	0.11	4.56	0.27	5.94	0.15
7	4.34	0.14	6.09	0.24	4.69	0.24	7.28	0.28	6.37	0.27	6.37	0.37	6.93	0.15	5.53	0.16	3.36	0.09	5.32	0.13	6.93	0.09
8	4.96	0.11	6.96	0.24	5.36	0.19	8.32	0.24	7.28	0.25	7.28	0.35	7.92	0.17	6.32	0.20	3.84	0.05	6.08	0.08	7.92	0.09
9	5.58	0.11	7.83	0.16	6.03	0.16	9.36	0.16	8.19	0.10	8.19	0.34	8.91	0.14	7.11	0.07	4.32	0.02	6.84	0.02	8.91	0.02
Right Bank	6.20	0.00	8.70	0.00	6.70	0.00	10.40	0.00	9.10	0.00	9.15	0.00	9.90	0.00	7.90	0.00	4.85	0.00	7.60	0.00	9.90	0.00
Feature Type (riffle, run, or pool)	Run		Run		Run		Run		Run		Run		Run		Run		Run		Run		Run	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10/6/2008

WBID # 0115

Site # 19

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10. 6. 08 1630	Location Description (e.g., road crossing):
Stream Name: Bear Creek	50 m Dnstream from Site 18
Current Weather Conditions: 70°F, Mostly Sunny	Facility Name(s): Burk Subd. WWTF Kirksville WWTF
Weather Conditions for Past 10 days: 0.6 in /rain	Permit Number(s): MO 010 7557 MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☑, Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): 0559288	Northing (UTM Y): 4415341	Horizontal Accuracy: (EPE / FOM / PDOP) 12.0 Meters
Site 11	Easting (UTM X): 0559318	Northing (UTM Y): 4415175	Horizontal Accuracy: (EPE / FOM / PDOP) 10.4 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
0115-19-023	Dn Stream	0115-19-024	Up Stream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☑ None of the above	☐ 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.)

N/A

JCH

Stream Name & WBID # Bear Creek 0115 Date of Survey 10-6-08

Site # 19

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☐ No trespass sign	☑ Steep slopes	☐ Other:

Comments: Riparian >50m

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☑ None of the above	Comments / Other: N/A			

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

0 % Cobble	5 % Gravel	85 % Sand	5 % Silt	5 % Mud/Clay	0 % Bedrock

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

Few aq. grasses

Algal growth

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☑ None	☐ Other:
Color:	☑ Clear	☐ Green	☐ Gray	☐ Milky	☐ Other:
Bottom Deposit:	☐ Sludge	☐ Solids	☑ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☐ None	☑ Other: leaves

*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 affect another use.

Stream Name & WBID # Bear Creek 0115 Date of Survey 10-6-08

Site # 19

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		N/A			

Comments: (Please record any additional comments here.)

N/A

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

Printed Names of Personnel Collecting Data: Jonathan Witte, Cody Luebbering

Surveyor's Signature: Cody Luebbering Date of Survey: 10-6-08

Organization: MEC Water Resources Inc. Position: Water Quality Scientist I

ANC 10-16-08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 19

Estimated Channel Incision: 0.10 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01 UTM X: 559288 UTM Y: 4415341 +/- 12.0 (meters)

11 UTM X: 559318 UTM Y: 4415175 +/- 10.4 (meters)

Average Stream Width: 9.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 180 (meters)
(20x average stream width)

Field Staff: JW, CL

Dissolved Oxygen

Date: 10.6.08 Time: 16:30

Dissolved Oxygen: 8.35 (mg/L)

Dissolved Oxygen: 89.2 (% sat)

Specific Cond: 631 (µS/cm)

Water Temperature: 18.5 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.49	0.04	1.06	0.21	0.61	>1.00	0.88	0.52	1.07	0.08	0.64	0.09	0.61	0.02	0.38	0.07	0.51	0.26	1.03	0.52	0.63	0.10
2	0.98	0.11	2.12	0.44	1.22	>1.00	1.76	0.71	2.14	0.21	1.28	0.27	1.22	0.08	0.76	0.44	1.02	0.70	2.06	0.70	1.26	0.33
3	1.47	0.19	3.18	>1.00	1.83	>1.00	2.64	0.85	3.21	0.29	1.92	0.46	1.83	0.14	1.14	0.40	1.53	>1.00	3.09	0.02	1.89	0.38
4	1.96	0.24	4.24	>1.00	2.44	>1.00	3.52	0.61	4.28	0.45	2.56	0.53	2.44	0.19	1.52	0.41	2.04	>1.00	4.12	0.30	2.52	0.48
5	2.45	0.31	5.30	>1.00	3.05	>1.00	4.40	0.73	5.35	0.85	3.20	0.49	3.05	0.30	1.90	0.44	2.55	>1.00	5.15	0.87	3.15	0.47
6	2.94	0.26	6.36	>1.00	3.66	>1.00	5.28	0.75	6.42	>1.00	3.84	0.50	3.66	0.51	2.28	0.44	3.06	>1.00	6.18	0.74	3.78	0.16
7	3.43	0.53	7.42	0.65	4.27	>1.00	6.16	0.66	7.49	>1.00	4.48	0.57	4.27	0.36	2.66	0.39	3.57	>1.00	7.21	0.73	4.41	0.10
8	3.92	0.60	8.48	0.35	4.88	0.75	7.04	0.59	8.56	0.81	5.12	0.43	4.88	0.25	3.04	0.35	4.08	>1.00	8.24	0.90	5.04	0.12
9	4.41	0.46	9.54	0.15	5.49	0.23	7.92	0.34	9.63	0.31	5.76	0.16	5.49	0.13	3.42	0.12	4.59	0.56	9.27	>1.00	5.67	0.04
Right Bank	4.90	0.00	10.60	0.00	6.10	0.00	8.80	0.00	10.70	0.00	6.40	0.00	6.10	0.00	3.80	0.00	5.10	0.00	10.30	0.00	6.30	0.00
Feature Type (riffle, run, or pool)	Run		Pool		Pool		Pool		Pool		Run		Run		Run		Run		Run		Run	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10.6.08

WBID # 115

Site # 20

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10.6.08 1515	Location Description (e.g., road crossing): at rd. 203 crossing
Stream Name: Bear Creek	
Current Weather Conditions: 75°F, Cloudy	Facility Name(s): Burk Subdivision WWTF, Kirksville WWTF
Weather Conditions for Past 10 days: Dolein/rainfall	Permit Number(s): MO 0107557, MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☑; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): 562519	Northing (UTM Y): 4411993	Horizontal Accuracy: (EPE / FOM / PDOP) 8.9 Meters
Site 11	Easting (UTM X): 562675	Northing (UTM Y): 4411780	Horizontal Accuracy: (EPE / FOM / PDOP) 19.9 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
115-20-025	Up Stream	115-20-026	Dn Stream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☑ None of the above	☐ 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.)

N/A

ACH

Stream Name & WBID # Bear Creek #115 Date of Survey 10.6.08

Site # 20

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☐ No trespass sign	☐ Steep slopes	☑ Other: row crop

Comments:

Riparian ~ 40m

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☑ None of the above	Comments / Other: N/A			

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

5 % Cobble	10 % Gravel	75 % Sand	5 % Silt	5 % Mud/Clay	0 % Bedrock

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

Few aq. grasses, plants

Algal growth uncommon

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☑ None	☐ Other:
Color:	☑ Clear	☐ Green	☐ Gray	☐ Milky	☐ Other:
Bottom Deposit:	☐ Sludge	☐ Solids	☑ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☑ None	☐ Other:

*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 affect another use.

Stream Name & WBID # Bear Creek #115 Date of Survey 10.6.08

Site # 20

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		N/A			

Comments: (Please record any additional comments here.)

N/A

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

Printed Names of Personnel Collecting Data: Jonathan Witte, Cody Luebbering

Surveyor's Signature: [signature] Date of Survey: 10.6.08

Organization: MEC Water Resources Position: Water Quality Scientist I

AJC 10-16-08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 20

Estimated Channel Incision: 0.00 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01	UTM X:	562519	UTM Y:	4411993	+/- 8.9 (meters)
11	UTM X:	562675	UTM Y:	4411780	+/- 19.9 (meters)

Average Stream Width: 7.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 150 (meters)
(20x average stream width)

Field Staff: JW, CL

Dissolved Oxygen

Date: 10/6/2008 Time: 15:15

Dissolved Oxygen: 6.89 (mg/L)

Dissolved Oxygen: 73.5 (% sat)

Specific Cond: 620 (µS/cm)

Water Temperature: 18.5 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.73	0.05	0.78	0.09	0.87	0.21	0.68	0.12	0.70	0.07	0.69	0.20	0.51	0.09	1.06	0.13	1.23	0.14	1.07	0.07	0.78	0.08
2	1.46	0.14	1.56	0.19	1.74	0.39	1.36	0.32	1.40	0.08	1.38	0.36	1.02	0.18	2.12	0.10	2.46	0.21	2.14	0.08	1.56	0.19
3	2.19	0.21	2.34	0.25	2.61	0.22	2.04	0.41	2.10	0.08	2.07	0.35	1.53	0.28	3.18	0.14	3.69	0.07	3.21	0.08	2.34	0.16
4	2.92	0.34	3.12	0.26	3.48	0.12	2.72	0.38	2.80	0.13	2.76	0.00	2.04	0.26	4.24	0.10	4.92	0.00	4.28	0.10	3.12	0.17
5	3.65	0.39	3.90	0.16	4.35	0.13	3.40	0.34	3.50	0.14	3.45	0.00	2.55	0.23	5.30	0.06	6.15	0.00	5.35	0.10	3.90	0.15
6	4.38	0.45	4.68	0.12	5.22	0.15	4.08	0.27	4.20	0.15	4.14	0.04	3.06	0.24	6.36	0.08	7.38	0.00	6.42	0.19	4.68	0.14
7	5.11	0.32	5.46	0.22	6.09	0.17	4.76	0.23	4.90	0.15	4.83	0.23	3.57	0.09	7.42	0.08	8.61	0.07	7.49	0.13	5.46	0.13
8	5.84	0.24	6.24	0.40	6.96	0.19	5.44	0.15	5.60	0.15	5.52	0.19	4.08	0.04	8.48	0.19	9.84	0.09	8.56	0.09	6.24	0.11
9	6.57	0.10	7.02	0.18	7.83	0.20	6.12	0.08	6.30	0.10	6.21	0.07	4.59	0.02	9.54	0.11	11.07	0.17	9.63	0.06	7.02	0.09
Right Bank	7.35	0.00	7.80	0.00	8.70	0.00	6.80	0.00	7.00	0.00	6.90	0.00	5.10	0.00	10.60	0.00	12.30	0.00	10.70	0.00	7.80	0.00
Feature Type (riffle, run, or pool)	Run		Run		Run		Run		Run		Run		Run		Run		Run		Run		Run	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10/6/2008

WBID # 115

Site # 21

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10.6.08 1530	Location Description (e.g., road crossing):
Stream Name: Bear Creek	50 m Dnstream from Site 20
Current Weather Conditions: 75°F, Cloudy	Facility Name(s): Burk Subdivision WWTF Kirksville WWTF
Weather Conditions for Past 10 days: 0.6in/rainfall	Permit Number(s): MO 0107557 MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☑; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): 562737	Northing (UTM Y): 4411735	Horizontal Accuracy: (EPE / FOM / PDOP) 8.1 Meters
Site 11	Easting (UTM X): 562972	Northing (UTM Y): 4411641	Horizontal Accuracy: (EPE / FOM / PDOP) 17.5 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
115-21-027	Upstream	115-21-028	Dnstream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☑ None of the above	☐ 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.)

N/A

JCH

Stream Name & WBID # Bear Creek #115 Date of Survey 10.6.08

Site # 21

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☐ No trespass sign	☐ Steep slopes	☐ Other:

Comments:

Riparian > 50m

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☑ None of the above	Comments / Other: N/A			

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

0 % Cobble	5 % Gravel	90 % Sand	5 % Silt	0 % Mud/Clay	0 % Bedrock

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

Few qe. grasses

Algal growth uncommon

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☑ None	☐ Other:
Color:	☑ Clear	☐ Green	☐ Gray	☐ Milky	☐ Other:
Bottom Deposit:	☐ Sludge	☐ Solids	☑ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☐ Foam	☐ None	☑ Other: leaves

*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 affect another use.

Stream Name & WBID # Bear Creek #115 Date of Survey 10.6.08

Site # 21

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
Tributary	300m	5m	unknown	0.10m	0.40m
	~~N/A~~ JW				

Comments: (Please record any additional comments here.)

N/A

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

Printed Names of Personnel Collecting Data: Jonathan Witte, Cody Luebbering

Surveyor's Signature: [signature] Date of Survey: 10.6.08

Organization: MEC Water Resources Position: WQ Scientist

auc 10-16-08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 21

Estimated Channel Incision: 0.00 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01	UTM X:	562737	UTM Y:	4411735	+/- 8.1 (meters)
11	UTM X:	562972	UTM Y:	4411641	+/- 17.5 (meters)

Average Stream Width: 8.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 160 (meters)
(20x average stream width)

Field Staff: JW, CL

Dissolved Oxygen

Date: 10/6/2008 Time: 15:30

Dissolved Oxygen: 6.35 (mg/L)

Dissolved Oxygen: 68.2 (% sat)

Specific Cond: 622 (µS/cm)

Water Temperature: 18.5 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.79	0.05	0.64	0.04	0.96	0.09	1.02	0.20	1.06	0.15	0.93	0.09	1.18	0.16	1.11	0.05	1.13	0.16	0.58	0.09	0.74	0.02
2	1.58	0.08	1.28	0.23	1.92	0.13	2.04	0.24	2.12	0.17	1.86	0.09	2.36	0.00	2.22	0.00	2.26	0.11	1.16	0.14	1.48	0.04
3	2.37	0.12	1.92	0.18	2.88	0.15	3.06	0.31	3.18	0.09	2.79	0.04	3.54	0.00	3.33	0.00	3.39	0.14	1.74	0.29	2.22	0.01
4	3.16	0.13	2.56	0.19	3.84	0.27	4.08	0.32	4.24	0.04	3.72	0.06	4.72	0.00	4.44	0.01	4.52	0.06	2.32	0.27	2.96	0.06
5	3.95	0.07	3.20	0.15	4.80	0.38	5.10	0.19	5.30	0.00	4.65	0.15	5.90	0.10	5.55	0.02	5.65	0.11	2.90	0.21	3.70	0.10
6	4.74	0.23	3.84	0.18	5.76	0.47	6.12	0.14	6.36	0.16	5.58	0.16	7.08	0.14	6.66	0.12	6.78	0.10	3.48	0.15	4.44	0.21
7	5.53	0.22	4.48	0.20	6.72	0.60	7.14	0.07	7.42	0.34	6.51	0.16	8.26	0.15	7.77	0.20	7.91	0.09	4.06	0.13	5.18	0.35
8	6.32	0.30	5.12	0.11	7.68	0.61	8.16	0.05	8.48	0.33	7.44	0.13	9.44	0.20	8.88	0.16	9.04	0.12	4.64	0.09	5.92	0.32
9	7.11	0.14	5.76	0.12	8.64	0.64	9.18	0.04	9.54	0.17	8.37	0.13	10.62	0.19	9.99	0.18	10.17	0.03	5.22	0.04	6.66	0.15
Right Bank	7.90	0.00	6.45	0.00	9.60	0.00	10.20	0.00	10.60	0.00	9.30	0.00	11.80	0.00	11.10	0.00	11.30	0.00	5.80	0.00	7.40	0.00
Feature Type (riffle, run, or pool)	Run		Run		Run		Run		Run		Run		Run		Run		Run		Run		Run	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10/6/2008

WBID # 0115

Site # 22

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 1 of 3)

(must be completed for each site)

Date & Time: 10-6-08 14:40	Location Description (e.g., road crossing): at HWY 151 crossing, upstream 50m to confluence
Stream Name: Bear Creek	
Current Weather Conditions: Cloudy 76°F	Facility Name(s): Burk Subd WWTF; Kirksville WWTF
Weather Conditions for Past 10 days: 0.6in /rain	Permit Number(s): MO 0107557; MO 0049506
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought ☒; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Location:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): 565716	Northing (UTM Y): 4409483	Horizontal Accuracy: (EPE / FOM / PDOP) 7.0 Meters
Site 11	Easting (UTM X): 565813	Northing (UTM Y): 4409289	Horizontal Accuracy: (EPE / FOM / PDOP) 6.1 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
115-22-029	Up Stream	115-22-030	Dn Stream		
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

☐ Swimming	☐ Skin diving	☐ SCUBA diving	☐ Tubing	☐ Water skiing
☐ Wind surfing	☐ Kayaking	☐ Boating	☐ Wading	☐ Rafting
☐ Hunting	☐ Trapping	☐ Fishing	☑ None of the above	☐ 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.)

N/A

HCH

Stream Name & WBID # Bear Creek #115 Date of Survey 10.6.08

Site # 22

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 2 of 3)

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☑ Rural Residential
☐ Campgrounds	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ Boating accesses	☐ Fence	☐ No trespass sign	☐ Steep slopes	☐ Other:

Comments: Riparian >50m

Evidence of Human Use*: (Attach photos and reference in "Photos" section.)

☐ Roads	☐ Foot paths/prints	☐ Dock/platform	☐ Camping Sites	☐ Rope swings
☐ RV / ATV Tracks	☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Livestock Watering
☑ None of the above	Comments / Other: N/A			

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

50 % Cobble	20 % Gravel	20 % Sand	5 % Silt	5 % Mud/Clay	0 % Bedrock

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

Numerous aq. plants + grasses, willows

Algal growth common

Water Characteristics*: (Mark all that apply.)

Odor:	☐ Sewage	☐ Musky	☐ Chemical	☑ None	☐ Other:
Color:	☑ Clear	☑ Green	☐ Gray	☐ Milky	☐ Other:
Bottom Deposit:	☐ Sludge	☑ Solids	☐ Fine sediments	☐ None	☐ Other:
Surface Deposit:	☐ Oil	☐ Scum	☑ Foam	☐ None	☑ Other: leaves

*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 affect another use.

Stream Name & WBID # Bear Creek #115 Date of Survey 10. 6. 08

Site # 22

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B – Site Characterization (Page 3 of 3)

Additional Stream Morphology: (Record isolated pools or other features identified during the survey that may support recreational uses.)

Channel Feature	Distance from access location (m)	Width (m)	Length (m)	Median Depth (m)	Max Depth (m)
		N/A			

Comments: (Please record any additional comments here.)

N/A

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

Printed Names of Personnel Collecting Data: Jonathan Witte, Cody Luebbering

Surveyor's Signature: [signature] Date of Survey: 10. 6. 08

Organization: MEC Water Resources Position: WQ Scientist

QAC 10-16-08

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: Bear Creek Waterbody ID: 115 Site #: 22

Estimated Channel Incision: 0.00 (m) (height between low bank width and water)

GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM)

01	UTM X:	565716	UTM Y:	4409483	+/- 7.0 (meters)
11	UTM X:	565813	UTM Y:	4409289	+/- 6.1 (meters)

Average Stream Width: 12.0 (meters)
(To determne Length of Reach)

Length of Survey Segment: 240 (meters)
(20x average stream width)

Field Staff: JW, CL

Dissolved Oxygen

Date: 10.6.08 Time: 14:40

Dissolved Oxygen: 8.02 (mg/L)

Dissolved Oxygen: 85.0 (% sat)

Specific Cond: 545 (µS/cm)

Water Temperature: 18.2 (°C)

Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
Left Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1.34	0.36	2.21	0.07	1.77	0.10	1.14	0.19	0.75	0.08	1.46	0.07	0.74	0.03	0.68	0.01	0.50	0.11	0.82	0.03	0.99	0.19
2	2.68	0.46	4.42	0.13	3.54	0.11	2.28	0.20	1.50	0.13	2.92	0.08	1.48	0.04	1.35	0.02	1.00	0.31	1.64	0.05	1.98	0.04
3	4.02	0.52	6.63	0.08	5.31	0.20	3.42	0.34	2.25	0.15	4.38	0.04	2.22	0.11	2.03	0.05	1.50	0.27	2.46	0.07	2.97	0.03
4	5.36	0.48	8.84	0.00	7.08	0.00	4.56	0.35	3.00	0.14	5.84	0.06	2.96	0.17	2.70	0.09	2.00	0.19	3.28	0.11	3.96	0.05
5	6.70	0.35	11.05	0.00	8.85	0.00	5.70	0.33	3.75	0.16	7.30	0.13	3.70	0.17	3.38	0.14	2.50	0.17	4.10	0.13	4.95	0.09
6	8.04	0.31	13.26	0.00	10.62	0.00	6.84	0.23	4.50	0.14	8.76	0.10	4.44	0.22	4.05	0.25	3.00	0.20	4.92	0.14	5.94	0.09
7	9.38	0.21	15.47	0.00	12.39	0.00	7.98	0.15	5.25	0.11	10.22	0.12	5.18	0.21	4.73	0.25	3.50	0.16	5.74	0.15	6.93	0.16
8	10.72	0.11	17.68	0.56	14.16	0.12	9.12	0.14	6.00	0.06	11.68	0.09	5.92	0.18	5.40	0.22	4.00	0.08	6.56	0.21	7.92	0.14
9	12.06	0.09	19.89	0.45	15.93	0.09	10.26	0.12	6.75	0.02	13.14	0.10	6.66	0.09	6.08	0.13	4.50	0.06	7.38	0.22	8.91	0.11
Right Bank	13.40	0.00	22.10	0.00	17.70	0.00	11.40	0.00	7.50	0.00	14.60	0.00	7.40	0.00	6.75	0.00	5.00	0.00	8.20	0.00	9.90	0.00
Feature Type (riffle, run, or pool)	Run		Riffle		Run		Run		Riffle		Riffle		Run		Riffle		Run		Run		Run	

Notes: Transects will be measured beginning on left descending bank (0 depth) and finishing on right descending bank (0 depth). This width is the wetted width
GPS locations corresponds to Transect 01 and 11. Transects ordered in upstream to downstream order.
Depth measurements taken at 10 equally spaced locations along transect (determine bv dividing wetted width by ten)
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)
All measurements to be taken to the nearest 0.01 meter.

Surveyor's Signature: _____ Date: 10.6.08

WBID 115
Site 1
Downstream

WBID 115
Site 2
Downstream

WBID 115
Site 1
Upstream

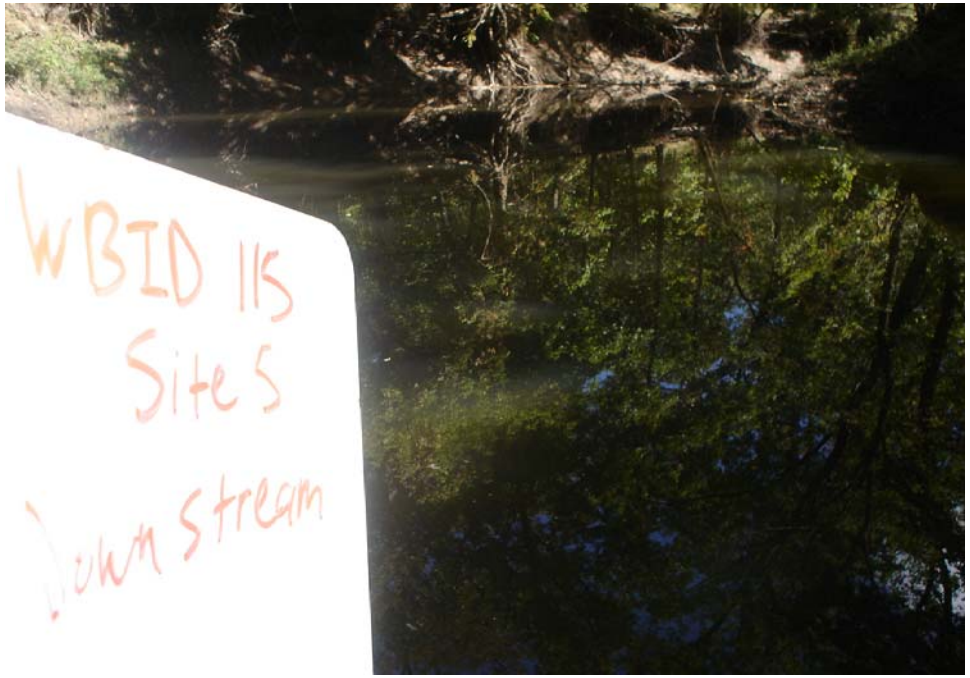
WBID 115
Site 2
Upstream

WBID 115
Site 3
Downstream

WBID 115
Site 4
Downstream

WBID 115
Site 3
Upstream

WBID 115
Site 4
Upstream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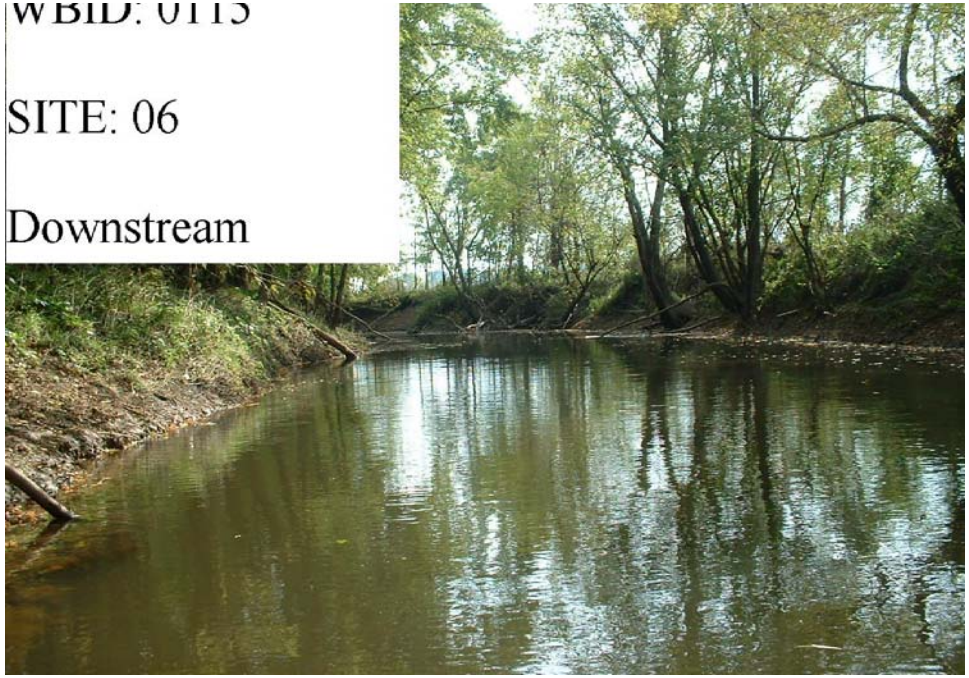
Site 5
Downstream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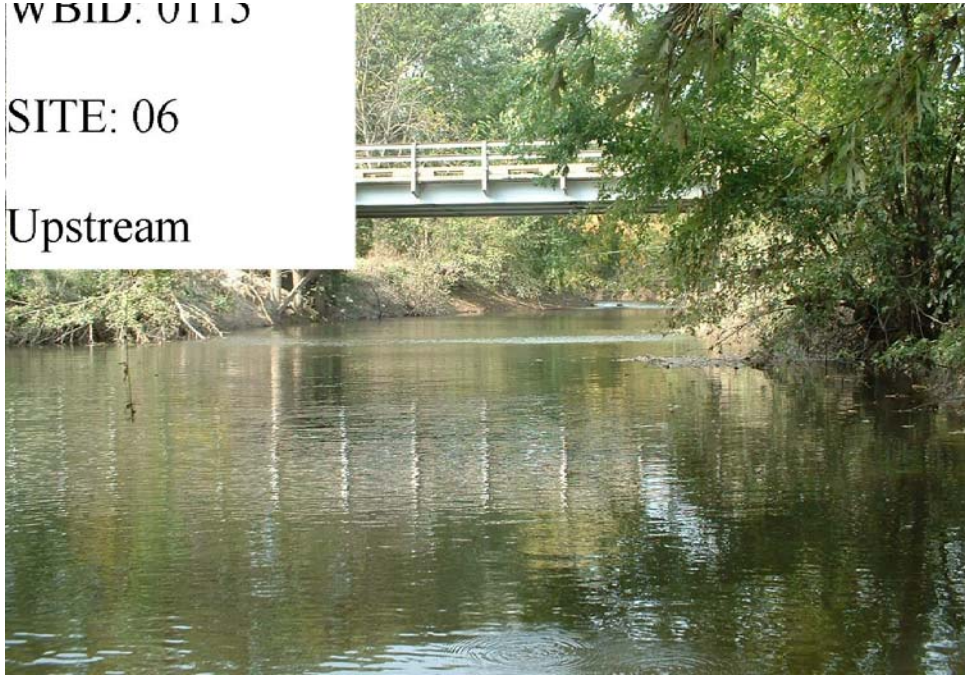
SITE: 06
Downstream

WBID 115
Site 5
Upstream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SITE: 06
Upstream

WBID: 0115

SITE: 07

Downstream

WBID: 0115

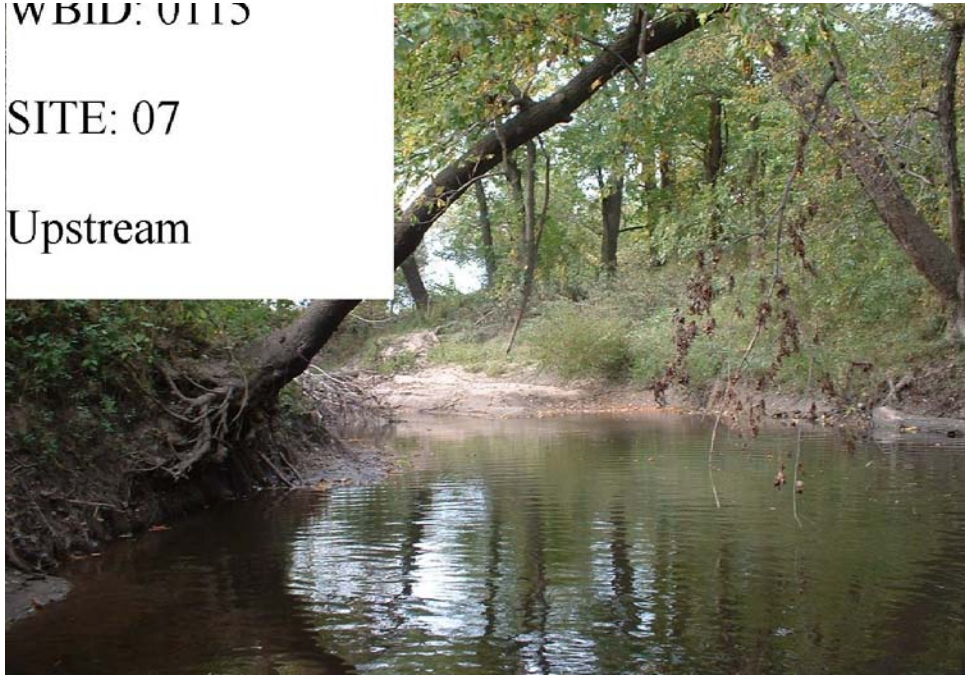
SITE: 08

Downstream

WBID: 0115

SITE: 07

Upstream



WBID: 0115

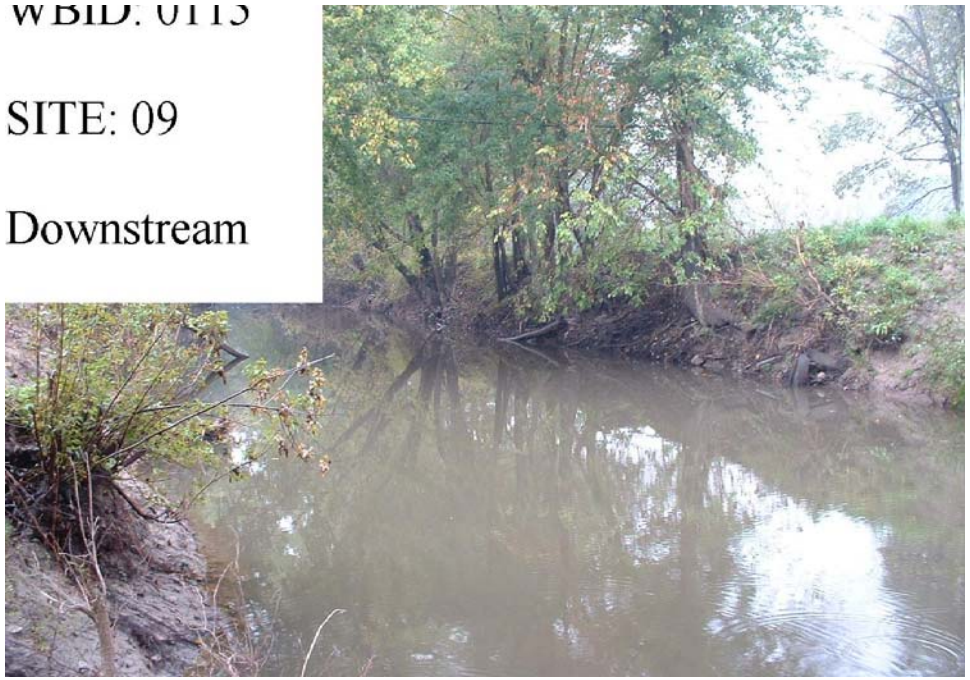
SITE: 08

Upstream

WBID: 0115

SITE: 09

Downstream



WBID: 0115

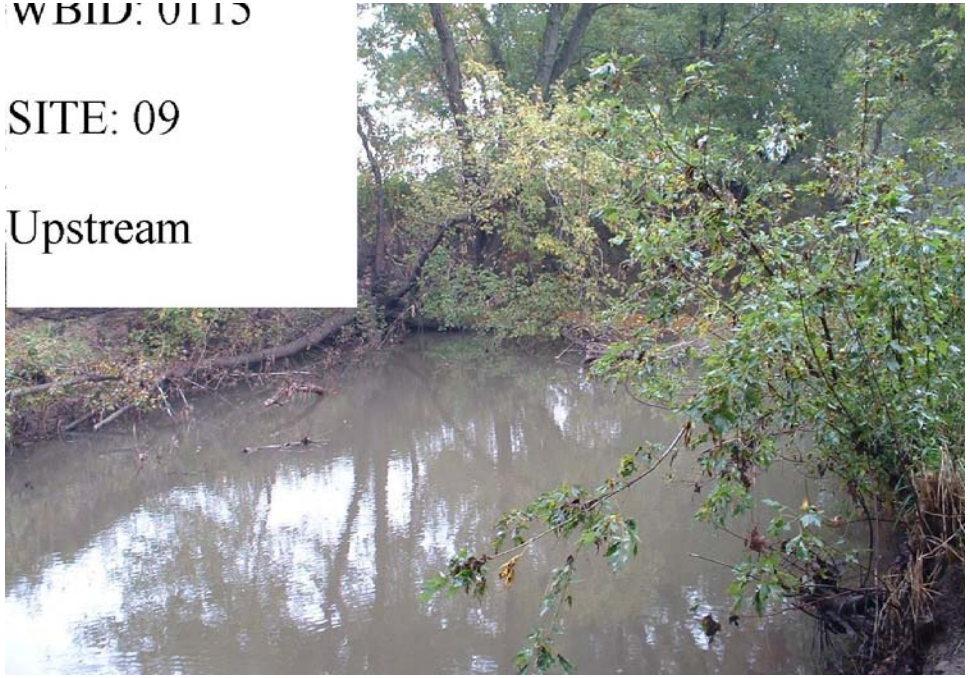
SITE: 10

Downstream

WBID: 0115

SITE: 09

Upstream



WBID: 0115

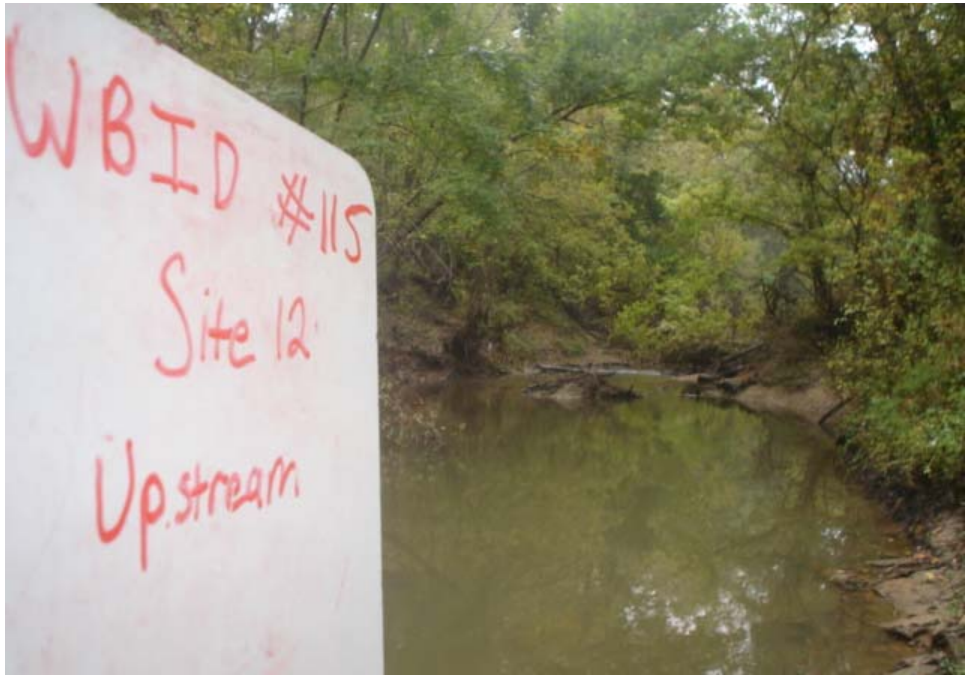
SITE: 10

Upstream

WBID 115
Site 11
Downstream

WBID #115
Site 12
Downstream

WBID 115
Site 11
UPS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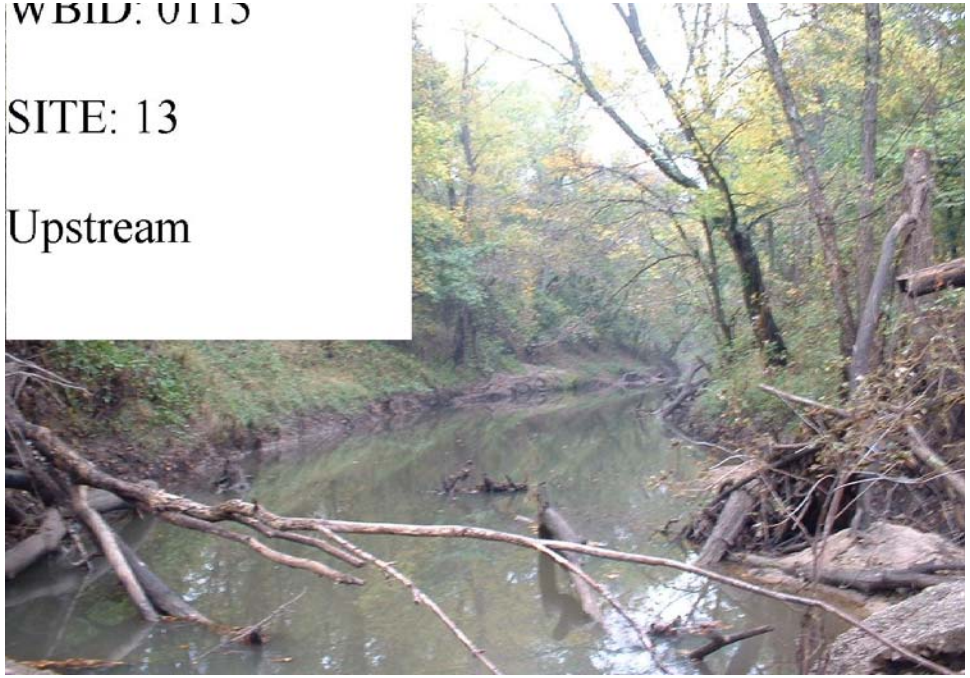
Site 12
Upstream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SITE: 13
Upstream

WBID 115
Site 14
Downstream

WBID: 0115
SITE: 13
Downstream

WBID 115
Site 14
UP.stream

WBID: 0115

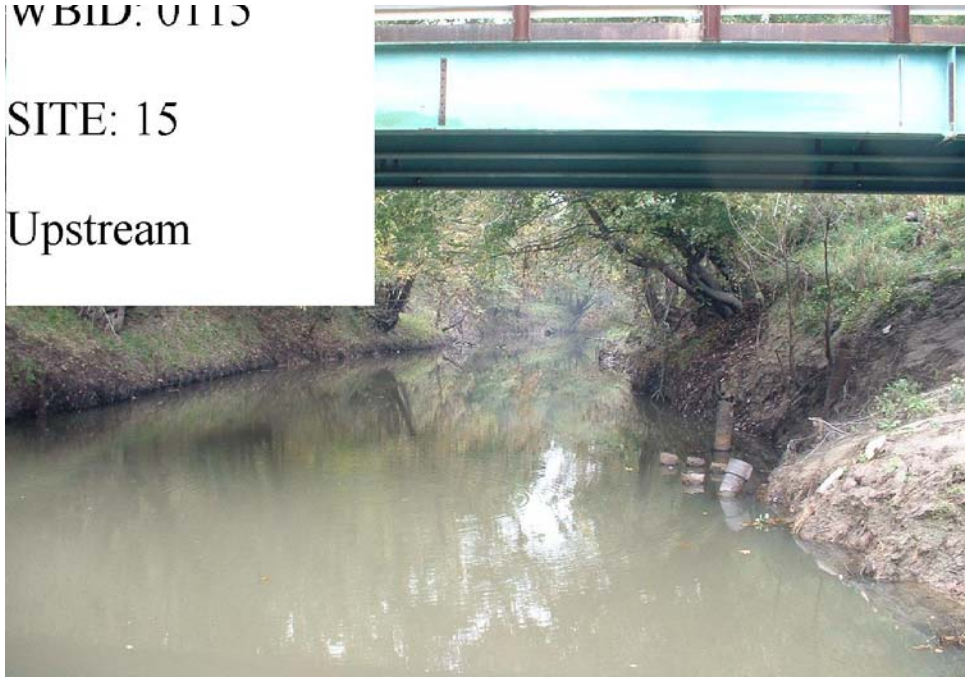
SITE: 15

Downstream

WBID: 0115

SITE: 15

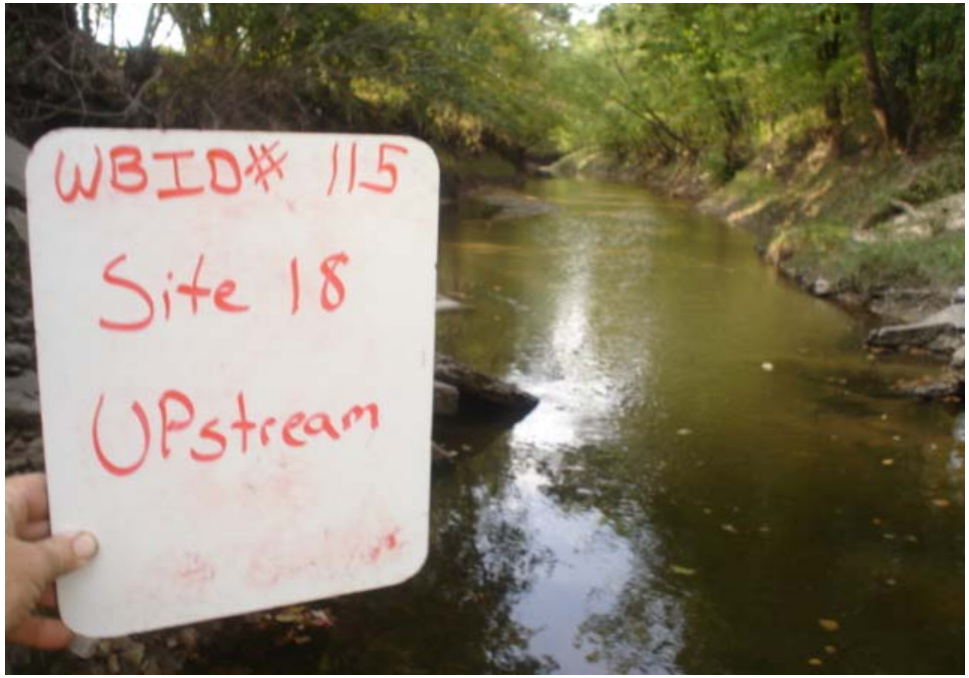
Upstream



WBID#115
Site 17
DNstream

WBID# 115
Site 18
DNstream

WBID#115
Site 17
UPstream


WBID# 115
Site 18
UPstream

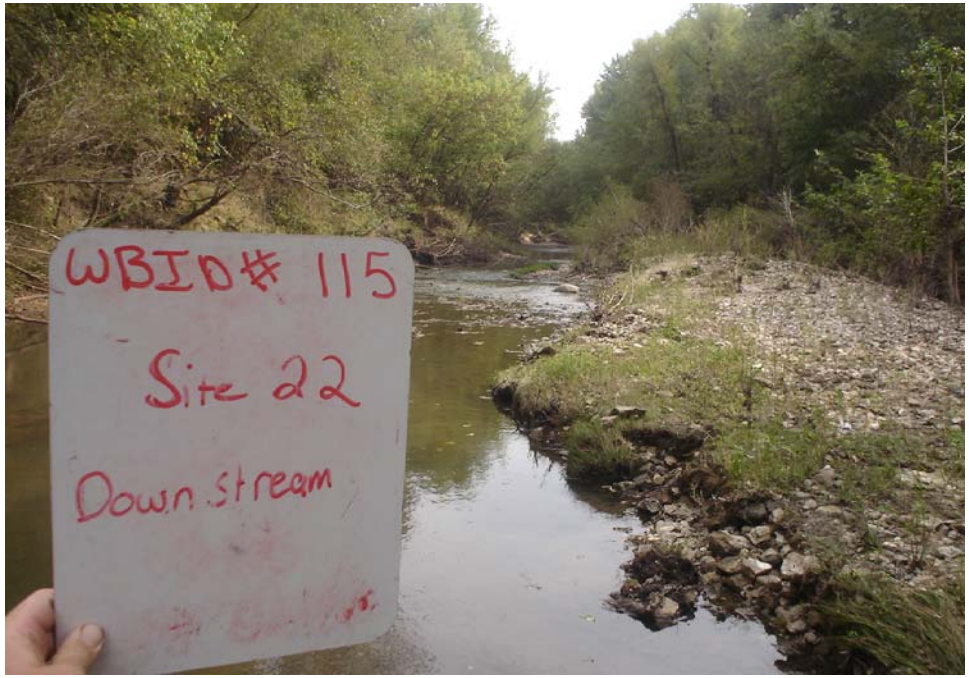
WBID#115
Site 19
UPstream

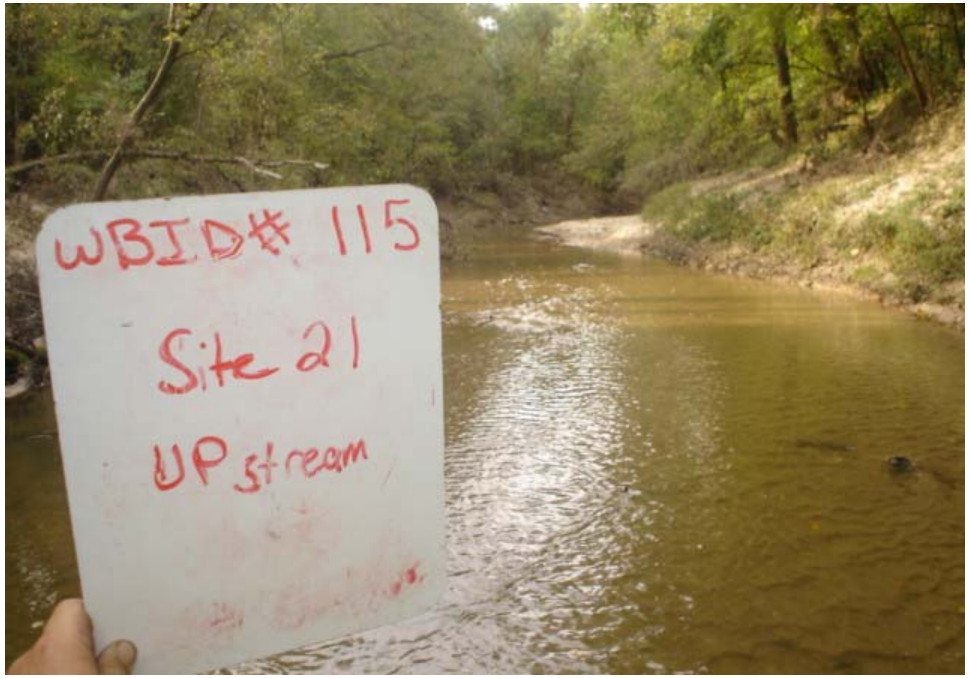
WBID# 115
Site 20
Downstream

WBID#115
Site 19
DNstream

WBID# 115
Site 20
Upstream

WBID# 115
Site 21
Downstream


WBID# 115
Site 22
Down stream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Site 21
UPstream

WBID# 115
Site 22
Upstream