



Use Attainability Analysis

for

WBID 3769 Muddy 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):	MUDDY CREEK
Missouri Water Body Identification (WBID) Number:	3769
8-digit HUC:	10280103
County(ies), Listed Upstream to Downstream:	Linn
Upstream Legal Description (from Table H):	05, 58N, 20W
Downstream Legal Description (from Table H):	31, 58N, 20W
Number of sites evaluated:	4
List all site numbers, consecutively upstream to downstream:	Site 01: Folk Rd crossing      Site 04: 150 m upstream of Fulgo Rd crossing Site 02: Farley Rd crossing Site 03: Fort Rd crossing
<b>Include a Site Location Map(s).</b> The map must include all requirements detailed in the <i>Missouri Recreational Use Attainability Analyses: Water Body Survey and Assessment Protocol</i> (Section IV.D.8.a).	

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

Facility Name(s) and Permit Number(s):
Linnell WTP - MO G640119
Linnell WWTF - MO 0093491

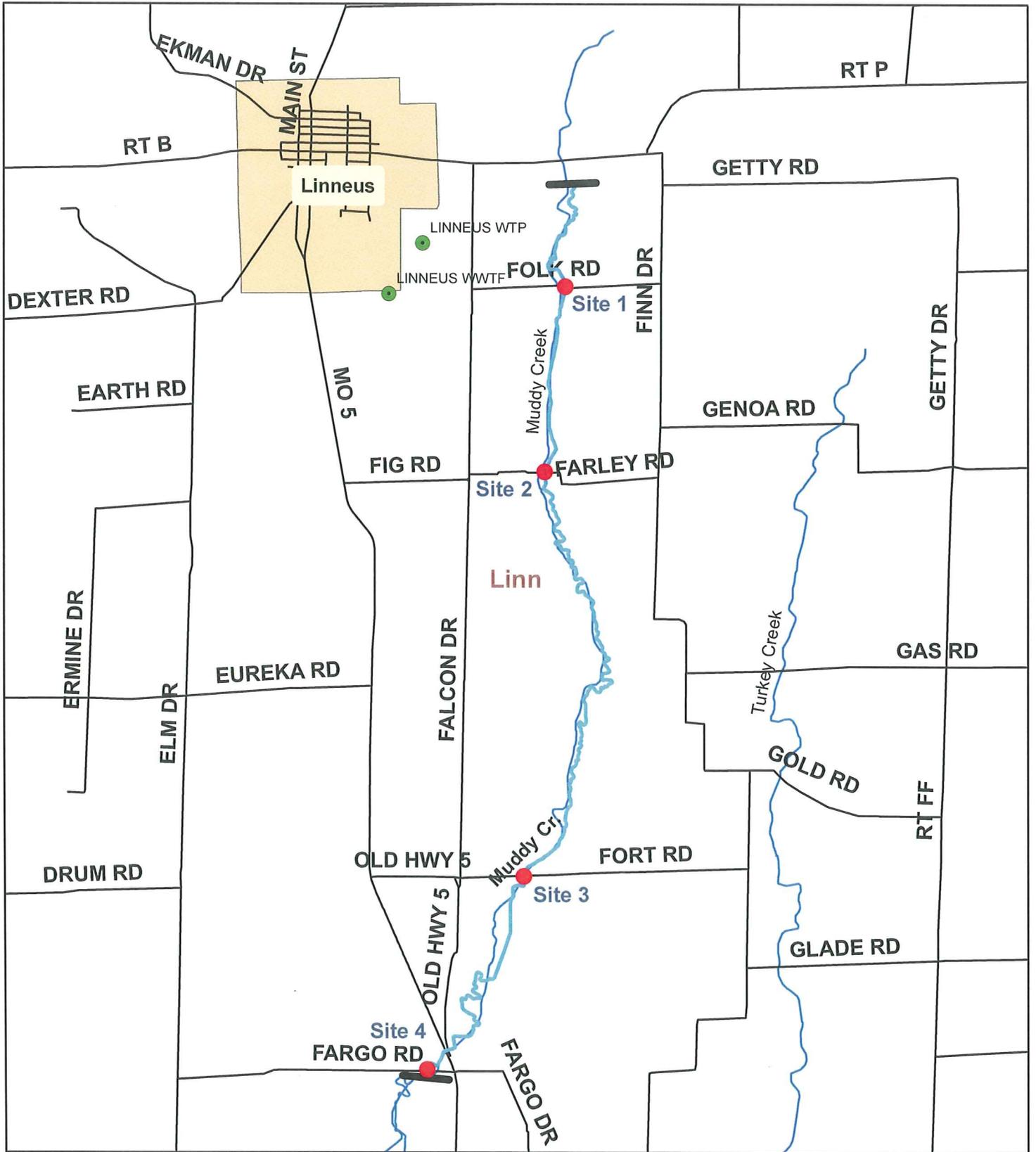
**III. UAA Surveyor** (please **PRINT** legibly)

Name of Surveyor: Renae Martin	Telephone Number: (573) 443-4100
Organization/Employer: MEC WATER Resources / AE Solutions	

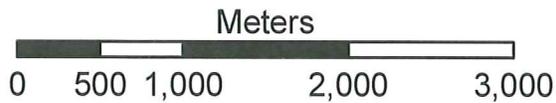
Please verify that you have completed all sections of all data sheets, checked all applicable boxes, provided a map (that includes all requirements listed in the *Missouri Recreational Use Attainability Analyses: Water Body Survey and Assessment Protocol*) and that this form is complete.

Signed: Renae Martin Date: 7/18/08

7/22/08



**Muddy Creek  
WBID 3769  
Linn County**



WBID # 3769

Site # 01

**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: <u>8/22/08 09:43</u>	Location Description (e.g., road crossing):
Stream Name: <u>Muddy Cr.</u>	<u>Folk Rd. crossing</u>
Current Weather Conditions: <u>mostly cloudy</u>	Facility Name(s): <u>Linnear WTP # Linnear WWTF</u>
Weather Conditions for Past 10 days: <u>1.29" rain</u>	Permit Number(s): <u>MO G640119 # MO 0093491</u>
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought <input checked="" type="checkbox"/> ; Phase I <input type="checkbox"/> ; Phase II <input type="checkbox"/> ; Phase III <input type="checkbox"/> ; Phase IV <input type="checkbox"/> ; Unknown <input type="checkbox"/>	

**Site Location:**

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): <u>0486043</u>	Northing (UTM Y): <u>4413214</u>	Horizontal Accuracy: (EPE / FOM / PDOP) <u>16</u> Meters <sup>ft</sup> <u>ft</u>
Site 11	Easting (UTM X): <u>0486003</u>	Northing (UTM Y): <u>4413074</u>	Horizontal Accuracy: (EPE / FOM / PDOP) <u>17</u> Meters <sup>ft</sup> <u>ft</u>

**Photos:**

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
<u>0106</u>	<u>upstream</u>	<u>0107</u>	<u>downstream</u>		
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.)

<input type="checkbox"/> Swimming	<input type="checkbox"/> Skin diving	<input type="checkbox"/> SCUBA diving	<input type="checkbox"/> Tubing	<input type="checkbox"/> Water skiing
<input type="checkbox"/> Wind surfing	<input type="checkbox"/> Kayaking	<input type="checkbox"/> Boating	<input type="checkbox"/> Wading	<input type="checkbox"/> Rafting
<input type="checkbox"/> Hunting	<input type="checkbox"/> Trapping	<input type="checkbox"/> Fishing	<input checked="" type="checkbox"/> None of the above	<input type="checkbox"/> Other:
Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D- Recreational Use Interview when conducting interviews.) <p style="text-align: center;"><u>N/A</u></p>				

Stream Name & WBID # Muddy Cr. 3769

Date of Survey 8/22/08

Site # 01

**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.)

<input type="checkbox"/> City/county parks	<input type="checkbox"/> Playgrounds	<input type="checkbox"/> MDC conservation lands	<input type="checkbox"/> Urban areas	<input type="checkbox"/> Rural Residential
<input type="checkbox"/> Campgrounds	<input type="checkbox"/> State parks	<input type="checkbox"/> National forests	<input type="checkbox"/> Nature trails	<input type="checkbox"/> Stairs/walkway
<input type="checkbox"/> Boating accesses	<input type="checkbox"/> Fence	<input type="checkbox"/> No trespass sign	<input type="checkbox"/> Steep slopes	<input type="checkbox"/> Other:
Comments: <u>private property</u>				

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

<input checked="" type="checkbox"/> Roads	<input type="checkbox"/> Foot paths/prints	<input type="checkbox"/> Dock/platform	<input type="checkbox"/> Camping Sites	<input type="checkbox"/> Rope swings
<input type="checkbox"/> RV / ATV Tracks	<input type="checkbox"/> Fire pit/ring	<input type="checkbox"/> NPDES Discharge	<input type="checkbox"/> Fishing Tackle	<input type="checkbox"/> Livestock Watering
<input type="checkbox"/> None of the above	Comments / Other: <u>N/A</u>			

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

<u>—</u> % Cobble	<u>5</u> % Gravel	<u>95</u> % Sand	<u>—</u> % Silt	<u>—</u> % Mud/Clay	<u>—</u> % Bedrock
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**Aquatic Vegetation\*:** (Note amount of vegetation or algal growth at the assessment site.)

<u>Benthic Algae - abundant</u>
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**Water Characteristics\*:** (Mark all that apply.)

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

\*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 # Muddy Cr. 3769

Date of Survey 8/22/08

Site # 01

**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.)

log jam @ Transect # 4  
2008

**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: 8/22/08

Organization: AE Solutions Position: Field Technician

## Field Data Sheets for Recreational Use Stream Surveys

### Data Sheet C - Field Survey Results

Stream Name: <u>Muddy Creek</u> Waterbody ID: <u>3769</u> Site #: <u>3769 01</u>  Estimated Channel Incision: <u>0.20</u> (m) (height between low bank width and water)  GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM) <b>01</b> UTM X: <u>486043</u> UTM Y: <u>4413214</u> +/- <u>16</u> (feet) <b>11</b> UTM X: <u>486003</u> UTM Y: <u>4413074</u> +/- <u>17</u> (feet)  Average Stream Width: <u>1.6</u> (meters)      Length of Survey Segment: <u>150</u> (meters) (To determine Length of Reach)      (20x average stream width)  Field Staff: <u>JRH, TAH</u>	<b>Dissolved Oxygen</b>  Date: <u>8/22/2008</u> Time: <u>9:43</u>  Dissolved Oxygen: <u>7.82</u> (mg/L)  Dissolved Oxygen: <u>89.0</u> (% sat)  Specific Cond: <u>462</u> (µS/cm)  Water Temperature: <u>21.8</u> (°C)
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#### Transect Cross-Section

		01		02		03		04		05		06		07		08		09		10		11	
Station		Distance (m)	Depth (m)																				
<b>Left Bank</b>		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	0.09	0.01	0.22	0.10	0.12	0.01	0.17	0.14	0.13	0.01	0.34	0.15	0.14	0.04	0.14	0.01	0.11	0.03	0.10	0.01	0.19	0.07
	2	0.18	0.04	0.44	0.07	0.24	0.03	0.34	0.17	0.26	0.03	0.68	0.15	0.28	0.10	0.28	0.02	0.22	0.07	0.20	0.03	0.38	0.02
	3	0.27	0.05	0.66	0.04	0.36	0.04	0.51	0.11	0.39	0.01	1.02	0.23	0.42	0.05	0.42	0.04	0.33	0.11	0.30	0.05	0.57	0.03
	4	0.36	0.01	0.88	0.03	0.48	0.05	0.68	0.05	0.52	0.03	1.36	0.22	0.56	0.03	0.56	0.04	0.44	0.10	0.40	0.05	0.76	0.10
	5	0.45	0.02	1.10	0.03	0.60	0.04	0.85	0.08	0.65	0.02	1.70	0.28	0.70	0.03	0.70	0.05	0.55	0.08	0.50	0.04	0.95	0.14
	6	0.54	0.04	1.32	0.04	0.72	0.02	1.02	0.09	0.78	0.01	2.04	0.26	0.84	0.01	0.84	0.05	0.66	0.02	0.60	0.05	1.14	0.13
	7	0.63	0.05	1.54	0.05	0.84	0.01	1.19	0.14	0.91	0.01	2.38	0.30	0.98	0.01	0.98	0.05	0.77	0.01	0.70	0.05	1.33	0.13
	8	0.72	0.03	1.76	0.04	0.96	0.01	1.36	0.10	1.04	0.01	2.72	0.31	1.12	0.01	1.12	0.03	0.88	0.01	0.80	0.04	1.52	0.10
	9	0.81	0.01	1.98	0.03	1.08	0.01	1.53	0.03	1.17	0.01	3.06	0.22	1.26	0.01	1.26	0.01	0.99	0.01	0.90	0.02	1.71	0.05
<b>Right Bank</b>		0.85	0.00	2.20	0.00	1.20	0.00	1.70	0.00	1.25	0.00	3.40	0.00	1.35	0.00	1.35	0.00	1.05	0.00	0.95	0.00	1.85	0.00
<b>Feature Type</b>		Run		Run		Run		Pool		Riffle		Pool		Run		Run		Riffle		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 by 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: 8/22/2008

WBID # 3769

Site # 02

**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: <u>8/22/08 10:13</u>	Location Description (e.g., road crossing): <u>Farley Rd crossing</u>
Stream Name: <u>Muddy Cr.</u>	
Current Weather Conditions: <u>mostly cloudy</u>	Facility Name(s): <u>Linneus WTP ? Linneus WWTF</u>
Weather Conditions for Past 10 days: <u>1.29" rain</u>	Permit Number(s): <u>MO G640119 ? MO 0093491</u>
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought <input checked="" type="checkbox"/> ; Phase I <input type="checkbox"/> ; Phase II <input type="checkbox"/> ; Phase III <input type="checkbox"/> ; Phase IV <input type="checkbox"/> ; Unknown <input type="checkbox"/>	

**Site Location:**

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): <u>0485843</u>	Northing (UTM Y): <u>4411598</u>	Horizontal Accuracy: (EPE / FOM / PDOP) <u>19</u> Meters <u>25 FT</u>
Site 11	Easting (UTM X): <u>0485875</u>	Northing (UTM Y): <u>4411476</u>	Horizontal Accuracy: (EPE / FOM / PDOP) <u>21</u> Meters <u>25 FT</u>

**Photos:**

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
<u>108</u>	<u>upstream</u>	<u>109</u>	<u>dnstream</u>		

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

<input type="checkbox"/> Swimming	<input type="checkbox"/> Skin diving	<input type="checkbox"/> SCUBA diving	<input type="checkbox"/> Tubing	<input type="checkbox"/> Water skiing
<input type="checkbox"/> Wind surfing	<input type="checkbox"/> Kayaking	<input type="checkbox"/> Boating	<input type="checkbox"/> Wading	<input type="checkbox"/> Rafting
<input type="checkbox"/> Hunting	<input type="checkbox"/> Trapping	<input type="checkbox"/> Fishing	<input checked="" type="checkbox"/> None of the above	<input type="checkbox"/> Other:
Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D- Recreational Use Interview when conducting interviews.) <u>N/A</u>				

Stream Name & WBID # Muddy Cr 3769

Date of Survey 8/22/08

Site # 02

**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.)

<input type="checkbox"/> City/county parks	<input type="checkbox"/> Playgrounds	<input type="checkbox"/> MDC conservation lands	<input type="checkbox"/> Urban areas	<input type="checkbox"/> Rural Residential
<input type="checkbox"/> Campgrounds	<input type="checkbox"/> State parks	<input type="checkbox"/> National forests	<input type="checkbox"/> Nature trails	<input type="checkbox"/> Stairs/walkway
<input type="checkbox"/> Boating accesses	<input type="checkbox"/> Fence	<input type="checkbox"/> No trespass sign	<input type="checkbox"/> Steep slopes	<input type="checkbox"/> Other:
Comments: <u>private property</u>				

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

<input checked="" type="checkbox"/> Roads	<input type="checkbox"/> Foot paths/prints	<input type="checkbox"/> Dock/platform	<input type="checkbox"/> Camping Sites	<input type="checkbox"/> Rope swings
<input type="checkbox"/> RV / ATV Tracks	<input type="checkbox"/> Fire pit/ring	<input type="checkbox"/> NPDES Discharge	<input type="checkbox"/> Fishing Tackle	<input type="checkbox"/> Livestock Watering
<input type="checkbox"/> None of the above	Comments / Other: <u>N/A</u>			

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

<u>—</u> % Cobble	<u>—</u> % Gravel	<u>90</u> % Sand	<u>—</u> % Silt	<u>10</u> % Mud/Clay	<u>—</u> % Bedrock
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**Aquatic Vegetation\*:** (Note amount of vegetation or algal growth at the assessment site.)

<u>Benthic Algae - abundant</u>
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**Water Characteristics\*:** (Mark all that apply.)

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

\*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 # Muddy Cr 3769

Date of Survey 8/22/08

Site # 02

**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: Tiffanie Hamilton, Jennifer Hrabik

Surveyor's Signature: Tiffanie A. Hamilton Date of Survey: 8/22/08

Organization: AE Solutions Position: Field Technician

SV  
8/22/08

## Field Data Sheets for Recreational Use Stream Surveys

### Data Sheet C - Field Survey Results

Stream Name: <u>Muddy Creek</u> Waterbody ID: <u>3769</u> Site #: <u>3769_02</u>  Estimated Channel Incision: <u>0.10</u> (m) (height between low bank width and water)  GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM) <b>01</b> UTM X: <u>485843</u> UTM Y: <u>4411598</u> +/- <u>19</u> (feet) <b>11</b> UTM X: <u>485875</u> UTM Y: <u>4411476</u> +/- <u>21</u> (feet)  Average Stream Width: <u>1.4</u> (meters)      Length of Survey Segment: <u>150</u> (meters) (To determine Length of Reach)      (20x average stream width)  Field Staff: <u>JRH, TAH</u>	<b>Dissolved Oxygen</b>  Date: <u>8/22/2008</u> Time: <u>10:13</u>  Dissolved Oxygen: <u>5.69</u> (mg/L)  Dissolved Oxygen: <u>64.1</u> (% sat)  Specific Cond: <u>468</u> (µS/cm)  Water Temperature: <u>21.6</u> (°C)
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#### Transect Cross-Section

Station	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)																				
<b>Left Bank</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0.20	0.02	0.27	0.08	0.13	0.03	0.17	0.01	0.21	0.04	0.11	0.02	0.19	0.04	0.16	0.02	0.10	0.02	0.14	0.01	0.23	0.03
2	0.40	0.05	0.54	0.11	0.26	0.05	0.34	0.02	0.42	0.05	0.22	0.02	0.38	0.09	0.32	0.01	0.20	0.01	0.28	0.02	0.46	0.04
3	0.60	0.12	0.81	0.14	0.39	0.08	0.51	0.03	0.63	0.02	0.33	0.05	0.57	0.04	0.48	0.04	0.30	0.01	0.42	0.03	0.69	0.02
4	0.80	0.14	1.08	0.20	0.52	0.11	0.68	0.02	0.84	0.01	0.44	0.03	0.76	0.03	0.64	0.03	0.40	0.01	0.56	0.01	0.92	0.07
5	1.00	0.15	1.35	0.24	0.65	0.12	0.85	0.04	1.05	0.01	0.55	0.05	0.95	0.02	0.80	0.02	0.50	0.01	0.70	0.01	1.15	0.03
6	1.20	0.16	1.62	0.19	0.78	0.12	1.02	0.02	1.26	0.04	0.66	0.03	1.14	0.01	0.96	0.01	0.60	0.01	0.84	0.02	1.38	0.08
7	1.40	0.14	1.89	0.12	0.91	0.05	1.19	0.01	1.47	0.02	0.77	0.02	1.33	0.01	1.12	0.01	0.70	0.01	0.98	0.03	1.61	0.04
8	1.60	0.10	2.16	0.09	1.04	0.03	1.36	0.01	1.68	0.01	0.88	0.01	1.52	0.01	1.28	0.01	0.80	0.05	1.12	0.04	1.84	0.05
9	1.80	0.05	2.43	0.05	1.17	0.01	1.53	0.01	1.89	0.01	0.99	0.01	1.71	0.01	1.44	0.01	0.90	0.02	1.26	0.01	2.07	0.03
<b>Right Bank</b>	2.00	0.00	2.70	0.00	1.30	0.00	1.65	0.00	2.05	0.00	1.10	0.00	1.90	0.00	1.60	0.00	1.00	0.00	1.40	0.00	2.25	0.00
<b>Feature Type</b>	Run		Run		Run		Riffle		Run		Run		Riffle		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 by 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: 8/22/2008

WBID # 3769

Site # 03

**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: <u>8/22/08 10:43</u>	Location Description (e.g., road crossing):
Stream Name: <u>Muddy Cr.</u>	<u>Fort Rd Crossing</u>
Current Weather Conditions: <u>mostly cloudy</u>	Facility Name(s): <u>Linneus WTP? Linneus WWTF</u>
Weather Conditions for Past 10 days: <u>1.29" rain</u>	Permit Number(s): <u>MO 61040119 ; MO 0093491</u>
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought <input checked="" type="checkbox"/> ; Phase I <input type="checkbox"/> ; Phase II <input type="checkbox"/> ; Phase III <input type="checkbox"/> ; Phase IV <input type="checkbox"/> ; Unknown <input type="checkbox"/>	

**Site Location:**

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)					
Site 01	Easting (UTM X): <u>0485672</u>	Northing (UTM Y): <u>4408190</u>	Horizontal Accuracy: (EPE / FOM / PDOP) <u>19</u> <sup>24</sup> Meters <del>FF</del>		
Site 11	Easting (UTM X): <u>0485583</u>	Northing (UTM Y): <u>4408096</u>	Horizontal Accuracy: (EPE / FOM / PDOP) <u>58</u> <sup>24</sup> Meters <del>FF</del>		

**Photos:**

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
<u>110</u>	<u>upstream</u>	<u>111</u>	<u>dnstream</u>	<u>112</u>	<u>fence</u>
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
<u>113</u>	<u>livestock watering</u>				
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose

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

<input type="checkbox"/> Swimming	<input type="checkbox"/> Skin diving	<input type="checkbox"/> SCUBA diving	<input type="checkbox"/> Tubing	<input type="checkbox"/> Water skiing
<input type="checkbox"/> Wind surfing	<input type="checkbox"/> Kayaking	<input type="checkbox"/> Boating	<input type="checkbox"/> Wading	<input type="checkbox"/> Rafting
<input type="checkbox"/> Hunting	<input type="checkbox"/> Trapping	<input type="checkbox"/> Fishing	<input checked="" type="checkbox"/> None of the above	<input type="checkbox"/> Other:
Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D- Recreational Use Interview when conducting interviews.) <u>N/A</u>				

Stream Name & WBID # Muddy Cr 3769

Date of Survey 8/22/08

Site # 03

**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.)

<input type="checkbox"/> City/county parks	<input type="checkbox"/> Playgrounds	<input type="checkbox"/> MDC conservation lands	<input type="checkbox"/> Urban areas	<input type="checkbox"/> Rural Residential
<input type="checkbox"/> Campgrounds	<input type="checkbox"/> State parks	<input type="checkbox"/> National forests	<input type="checkbox"/> Nature trails	<input type="checkbox"/> Stairs/walkway
<input type="checkbox"/> Boating accesses	<input checked="" type="checkbox"/> Fence <sup>①</sup>	<input type="checkbox"/> No trespass sign	<input type="checkbox"/> Steep slopes	<input type="checkbox"/> Other:
Comments: <u>private property</u> <u>① at Transect 3</u>				

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

<input checked="" type="checkbox"/> Roads	<input type="checkbox"/> Foot paths/prints	<input type="checkbox"/> Dock/platform	<input type="checkbox"/> Camping Sites	<input type="checkbox"/> Rope swings
<input type="checkbox"/> RV / ATV Tracks	<input type="checkbox"/> Fire pit/ring	<input type="checkbox"/> NPDES Discharge	<input type="checkbox"/> Fishing Tackle	<input checked="" type="checkbox"/> Livestock Watering <sup>①</sup>
<input type="checkbox"/> None of the above	Comments / Other: <u>① Transects 4-8</u>			

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

<u>—</u> % Cobble	<u>10</u> % Gravel	<u>80</u> % Sand	<u>—</u> % Silt	<u>10</u> % Mud/Clay	<u>—</u> % Bedrock
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**Aquatic Vegetation\*:** (Note amount of vegetation or algal growth at the assessment site.)

<u>Benthic Algae-abundant</u>
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**Water Characteristics\*:** (Mark all that apply.)

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

\*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 # Muddy Cr 3769

Date of Survey 8/22/08

Site # 03

**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)

**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: Tiffani Hamilton, Jennifer Arabick

Surveyor's Signature: Tiffani Hamilton Date of Survey: 8/22/08

Organization: AE Solutions Position: Field Technician

9/22/08

## Field Data Sheets for Recreational Use Stream Surveys

### Data Sheet C - Field Survey Results

Stream Name: <u>Muddy Creek</u> Waterbody ID: <u>3769</u> Site #: <u>3769 03</u>  Estimated Channel Incision: <u>0.20</u> (m) (height between low bank width and water)  GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM) <b>01</b> UTM X: <u>485672</u> UTM Y: <u>4408190</u> +/- <u>19</u> (feet) <b>11</b> UTM X: <u>485583</u> UTM Y: <u>4408096</u> +/- <u>58</u> (feet)  Average Stream Width: <u>3.2</u> (meters)      Length of Survey Segment: <u>150</u> (meters) (To determine Length of Reach)      (20x average stream width)  Field Staff: <u>JRH, TAH</u>	<b>Dissolved Oxygen</b>  Date: <u>8/22/2008</u> Time: <u>10:43</u>  Dissolved Oxygen: <u>3.79</u> (mg/L)  Dissolved Oxygen: <u>44.1</u> (% sat)  Specific Cond: <u>425</u> (µS/cm)  Water Temperature: <u>21.9</u> (°C)
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#### Transect Cross-Section

		01		02		03		04		05		06		07		08		09		10		11	
Station		Distance (m)	Depth (m)																				
<b>Left Bank</b>		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	0.32	0.05	0.30	0.14	0.35	0.21	0.83	0.48	0.12	0.03	0.24	0.05	0.75	0.39	0.20	0.03	0.12	0.01	0.11	0.01	0.13	0.03
	2	0.64	0.23	0.60	0.22	0.70	0.57	1.66	0.92	0.24	0.04	0.48	0.10	1.50	0.63	0.40	0.02	0.24	0.01	0.22	0.02	0.26	0.04
	3	0.96	0.31	0.90	0.27	1.05	0.59	2.49	>1.00	0.36	0.05	0.72	0.10	2.25	0.98	0.60	0.01	0.36	0.03	0.33	0.11	0.39	0.05
	4	1.28	0.29	1.20	0.33	1.40	0.72	3.32	>1.00	0.48	0.03	0.96	0.08	3.00	>1.00	0.80	0.08	0.48	0.05	0.44	0.14	0.52	0.08
	5	1.60	0.33	1.50	0.34	1.75	0.60	4.15	0.90	0.60	0.03	1.20	0.11	3.75	>1.00	1.00	0.05	0.60	0.04	0.55	0.09	0.65	0.07
	6	1.92	0.43	1.80	0.30	2.10	0.52	4.98	0.76	0.72	0.03	1.44	0.22	4.50	0.85	1.20	0.02	0.72	0.05	0.66	0.12	0.78	0.05
	7	2.24	0.40	2.10	0.37	2.45	0.40	5.81	0.59	0.84	0.03	1.68	0.32	5.25	0.74	1.40	0.01	0.84	0.03	0.77	0.04	0.91	0.07
	8	2.56	0.20	2.40	0.32	2.80	0.29	6.64	0.50	0.96	0.04	1.92	0.31	6.00	0.58	1.60	0.01	0.96	0.01	0.88	0.01	1.04	0.04
	9	2.88	0.12	2.70	0.19	3.15	0.04	7.47	0.64	1.08	0.01	2.16	0.30	6.75	0.33	1.80	0.01	1.08	0.01	0.99	0.01	1.17	0.05
<b>Right Bank</b>		3.20	0.00	3.00	0.00	3.50	0.00	8.30	0.00	1.25	0.00	2.45	0.00	7.50	0.00	2.00	0.00	1.15	0.00	1.05	0.00	1.30	0.00
Feature Type		Pool		Pool		Pool		Pool		Riffle		Run		Pool		Riffle		Riffle		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 by 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: 8/22/2008

WBID # 3769

Site # 04<sup>th</sup>

**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: <u>8/22/08</u> <u>1127</u>	Location Description (e.g., road crossing):
Stream Name: <u>Muddy Cr</u>	<u>Fargo Rd Crossing - upstream 150m</u>
Current Weather Conditions: <u>mostly cloudy</u>	Facility Name(s): <u>Linneus WTP ? Linneus WWTF</u>
Weather Conditions for Past 10 days: <u>1.29" rain</u>	Permit Number(s): <u>MO 0640119 ? MO 0093491</u>
Official Drought Conditions at time of this survey (search DNR home page for "drought"): No drought <input checked="" type="checkbox"/> ; Phase I <input type="checkbox"/> ; Phase II <input type="checkbox"/> ; Phase III <input type="checkbox"/> ; Phase IV <input type="checkbox"/> ; Unknown <input type="checkbox"/>	

**Site Location:**

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site 01	Easting (UTM X): <u>0484707</u>	Northing (UTM Y): <u>4406548</u>	Horizontal Accuracy: (EPE / FOM / PDOP) <u>20</u> Meters <sup>24</sup> Ft
Site 11	Easting (UTM X): <u>0484835</u>	Northing (UTM Y): <u>4406527</u>	Horizontal Accuracy: (EPE / FOM / PDOP) <u>22</u> Meters <sup>24</sup> Ft

**Photos:**

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
<u>0114</u>	<u>trash@bridge</u>	<u>0115</u>	<u>trash@bridge</u>	<u>0116</u>	<u>Upstream</u>
<u>0117</u>	<u>downstream</u>				

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

<input type="checkbox"/> Swimming	<input type="checkbox"/> Skin diving	<input type="checkbox"/> SCUBA diving	<input type="checkbox"/> Tubing	<input type="checkbox"/> Water skiing
<input type="checkbox"/> Wind surfing	<input type="checkbox"/> Kayaking	<input type="checkbox"/> Boating	<input type="checkbox"/> Wading	<input type="checkbox"/> Rafting
<input type="checkbox"/> Hunting	<input type="checkbox"/> Trapping	<input type="checkbox"/> Fishing	<input checked="" type="checkbox"/> None of the above	<input type="checkbox"/> Other:
Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D- Recreational Use Interview when conducting interviews.) <u>N/A</u>				

Stream Name & WBID # Muddy Cr 3769

Date of Survey 8/22/02

Site # 04

**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.)

<input type="checkbox"/> City/county parks	<input type="checkbox"/> Playgrounds	<input type="checkbox"/> MDC conservation lands	<input type="checkbox"/> Urban areas	<input type="checkbox"/> Rural Residential
<input type="checkbox"/> Campgrounds	<input type="checkbox"/> State parks	<input type="checkbox"/> National forests	<input type="checkbox"/> Nature trails	<input type="checkbox"/> Stairs/walkway
<input type="checkbox"/> Boating accesses	<input checked="" type="checkbox"/> Fence ①	<input type="checkbox"/> No trespass sign	<input type="checkbox"/> Steep slopes	<input type="checkbox"/> Other:

Comments:

private property - fields  
① Along Rt descending bank

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

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

None of the above  
Comments / Other: N/A

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

<u>—</u> % Cobble	<u>—</u> % Gravel	<u>60</u> % Sand	<u>—</u> % Silt	<u>40</u> % Mud/Clay	<u>—</u> % Bedrock
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**Aquatic Vegetation\*:** (Note amount of vegetation or algal growth at the assessment site.)

Benthic Algae - abundant

**Water Characteristics\*:** (Mark all that apply.)

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

\*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 # Muddy Cr. 3769

Date of Survey 8/22/08

Site # 04

**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: Tiffanie Hamilton, Jennifer Hrabik

Surveyor's Signature: Tiffanie A. Hamilton Date of Survey: 8/22/08

Organization: AE Solutions Position: Field Technician

## Field Data Sheets for Recreational Use Stream Surveys

### Data Sheet C - Field Survey Results

Stream Name: <u>Muddy Creek</u> Waterbody ID: <u>3769</u> Site #: <u>3769 04</u>  Estimated Channel Incision: <u>0.20</u> (m) (height between low bank width and water)  GPS Location - Easting (UTM X), Northing (UTM Y), Horizontal Accuracy Estimate (EPE / PDOP / FOM) <b>01</b> UTM X: <u>484907</u> UTM Y: <u>4406548</u> +/- <u>20</u> (feet) <b>11</b> UTM X: <u>484835</u> UTM Y: <u>4406527</u> +/- <u>22</u> (feet)  Average Stream Width: <u>3.5</u> (meters)      Length of Survey Segment: <u>150</u> (meters) (To determine Length of Reach)      (20x average stream width)  Field Staff: <u>JRH, TAH</u>	<h4 style="text-align: center; margin: 0;">Dissolved Oxygen</h4> Date: <u>8/22/2008</u> Time: <u>11:27</u>  Dissolved Oxygen: <u>6.72</u> (mg/L)  Dissolved Oxygen: <u>78.3</u> (% sat)  Specific Cond: <u>446</u> (µS/cm)  Water Temperature: <u>23.0</u> (°C)
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#### Transect Cross-Section

Station		01		02		03		04		05		06		07		08		09		10		11	
		Distance (m)	Depth (m)																				
<b>Left Bank</b>		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	0.40	0.15	0.43	0.18	0.23	0.13	0.33	0.19	0.52	0.20	0.35	0.13	0.50	0.20	0.43	0.26	0.16	0.01	0.26	0.13	0.22	0.01
	2	0.80	0.15	0.86	0.25	0.46	0.24	0.66	0.32	1.04	0.41	0.70	0.34	1.00	0.22	0.86	0.56	0.32	0.04	0.52	0.15	0.44	0.02
	3	1.20	0.21	1.29	0.15	0.69	0.25	0.99	0.40	1.56	0.49	1.05	0.42	1.50	0.40	1.29	0.57	0.48	0.05	0.78	0.09	0.66	0.02
	4	1.60	0.29	1.72	0.21	0.92	0.22	1.32	0.43	2.08	0.55	1.40	0.44	2.00	0.71	1.72	0.55	0.64	0.05	1.04	0.10	0.88	0.01
	5	2.00	0.22	2.15	0.24	1.15	0.17	1.65	0.43	2.60	0.78	1.75	0.40	2.50	0.77	2.15	0.46	0.80	0.07	1.30	0.02	1.10	0.05
	6	2.40	0.18	2.58	0.19	1.38	0.10	1.98	0.39	3.12	0.86	2.10	0.38	3.00	0.70	2.58	0.44	0.96	0.10	1.56	0.03	1.32	0.08
	7	2.80	0.10	3.01	0.18	1.61	0.05	2.31	0.28	3.64	0.94	2.45	0.31	3.50	0.68	3.01	0.45	1.12	0.10	1.82	0.05	1.54	0.00
	8	3.20	0.02	3.44	0.13	1.84	0.01	2.64	0.13	4.16	0.98	2.80	0.20	4.00	0.34	3.44	0.25	1.28	0.05	2.08	0.14	1.76	0.09
9	3.60	0.01	3.87	0.10	2.07	0.01	2.97	0.11	4.68	0.52	3.15	0.09	4.50	0.24	3.87	0.11	1.44	0.03	2.34	0.04	1.98	0.23	
<b>Right Bank</b>		4.00	0.00	4.30	0.00	2.25	0.00	3.30	0.00	5.20	0.00	3.50	0.00	4.95	0.00	4.30	0.00	1.60	0.00	2.60	0.00	2.20	0.00
<b>Feature Type</b> <small>(riffle, run, or pool)</small>		Pool		Pool		Pool		Pool		Pool		Pool		Pool		Pool		Riffle		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 by 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: 8/22/2008

SITE #01  
DOWNSTREAM



SITE #02  
DOWNSTREAM



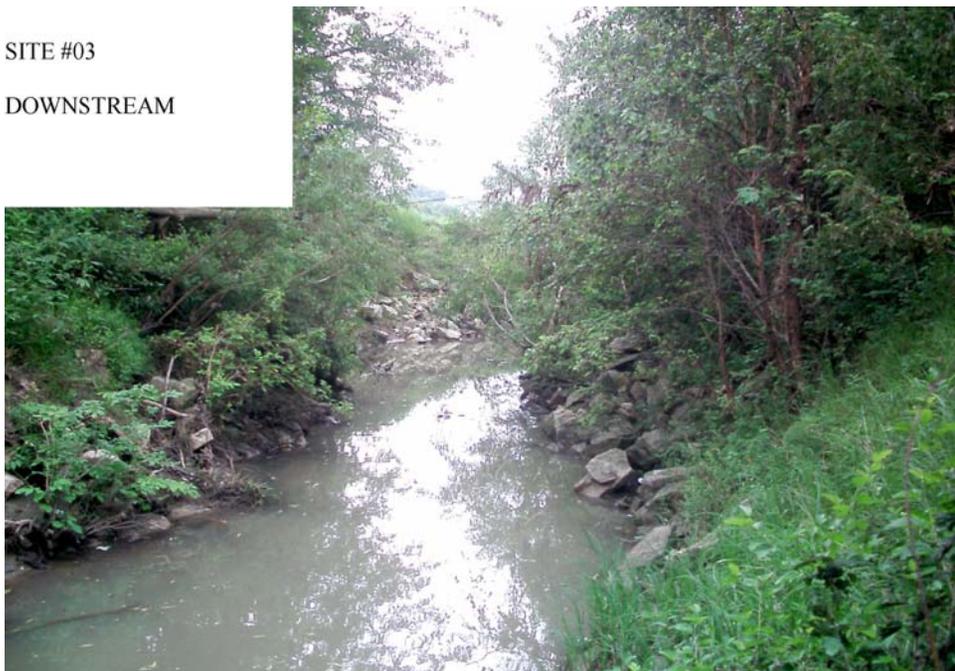
SITE #01  
UPSTREAM



SITE #02  
UPSTREAM



SITE #03  
DOWNSTREAM



SITE #03  
Livestock watering



SITE #03  
UPSTREAM



SITE #03  
FENCE





SITE #04  
Trash at Bridge



SITE #04  
DOWNSTREAM



WBID #0700  
Site #4  
Trash at  
Bridge



SITE #04  
UPSTREAM