



Missouri  
Department of  
Natural Resources

## Use Attainability Analysis

for

WBID 3162 Cave Springs Branch

Submitted by  
Olsson Associates

To  
Missouri Department of Natural Resources  
Water Protection Program

On  
June 3, 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): Cave Spring Branch
Missouri Water Body Identification (WBID) Number: 3162
8-digit HUC: 11070207
County(ies), Listed Upstream to Downstream: Jasper
Upstream Legal Description (from Table H): 21, 28N, 29W
Downstream Legal Description (from Table H): 16, 28N, 29W
Number of sites evaluated: 3
List all site numbers, <u>consecutively upstream to downstream</u> : 1, 2, 3
<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):  Empire Energy Center          MO-0116874
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**III. UAA Surveyor** (please **PRINT** legibly)

Name of Surveyor:          Rodney Holland          Telephone Number: 417-890-8802
Organization/Employer: Olsson Associates

**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:  Date: 4/25/08



**MISSOURI RECREATIONAL  
USE ATTAINABILITY ANALYSIS**



Feet  
0 1,000 2,000  
1 in. equals 2,000 ft.

**Stream:** Cave Spring Br.  
**WBID:** 3162

**Map Sheet:** 1/1  
**County:** Jasper



WBID # 3162

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)

<b>Date &amp; Time:</b> 4-29-08	9:30 a.m.	Location Description (e.g., road crossing):
<b>Stream Name:</b> Cave Spring Branch		10 meters downstream of Hwy F bridge
Current Weather Conditions: Sunny		Facility Name(s): Empire Energy Center
Weather Conditions for Past 10 days: 2.07" rain @ Joplin		Permit Number(s): MO-0116874
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): 402682	Northing (UTM Y): 4110572	Horizontal Accuracy: (EPE / FOM / PDOP)	135 ft. <del>Meters</del>	
Site 11	Easting (UTM X): 402586	Northing (UTM Y): 4110718	Horizontal Accuracy: (EPE / FOM / PDOP)	92 ft. <del>Meters</del>	

**Photos:**

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
3162-1-A	Upstream looking down				
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
3162-1-B	Bridge				
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
3162-1-C	Downstream looking up				

**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 <i>Data Sheet D- Recreational Use Interview</i> when conducting interviews.)				

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.)

<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 checked="" type="checkbox"/> Other:
Comments: Private land				

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

<input 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 checked="" type="checkbox"/> None of the above	Comments / Other:			

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

% Cobble	80% Gravel	20% Sand	% Silt	% Mud/Clay	% Bedrock
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**Aquatic Vegetation\*:** (Note amount of vegetation or algal growth at the assessment site.)

None
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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 type="checkbox"/> Fine sediments	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:
Surface Deposit:	<input type="checkbox"/> Oil	<input type="checkbox"/> Scum	<input type="checkbox"/> Foam	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:

\*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.

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)

**Comments:** (Please record any additional comments here.)

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

Printed Names of Personnel Collecting Data: Rodney Holland, Christopher Parks

Surveyor's Signature:  Date of Survey: 4-29-08

Organization: Olsson Associates Position: Field Team Leader & Field Team Member

## Field Data Sheets for Recreational Use Stream Surveys

### Data Sheet C - Field Survey Results

Stream Name: <u>Cave Spring Branch</u> Waterbody ID: <u>3162</u> Site #: <u>1</u>  Estimated Channel Incision: <u>0.4</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>402682</u> UTM Y: <u>4110572</u> +/- <u>135 ft.</u> (meters) <b>11</b> UTM X: <u>402586</u> UTM Y: <u>4110718</u> +/- <u>92 ft.</u> (meters)  Average Stream Width: <u>8</u> (meters)      Length of Survey Segment: <u>160</u> (meters) (To determine Length of Reach)      (20x average stream width)  Field Staff: <u>Rodney Holland and Christopher Parks</u>	<h4 style="text-align: center; margin: 0;">Dissolved Oxygen</h4> Date: <u>4/29/2008</u> Time: <u>9:35 p.m.</u>  Dissolved Oxygen: <u>10.42</u> (mg/L)  Dissolved Oxygen: <u>95.6</u> (% sat)  Specific Cond: <u>277</u> (µS/cm)  Water Temperature: <u>14.2</u> (°C)
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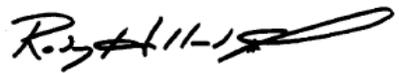
#### Transect Cross-Section

		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		0.58	0.09	0.70	0.09	0.92	0.15	0.89	0.12	0.89	0.21	0.84	0.06	0.70	0.48	0.80	0.39	1.20	0.18	0.56	0.05	0.69	0.25
2		1.16	0.15	1.40	0.06	1.84	0.27	1.78	0.22	1.78	0.51	1.68	0.19	1.40	0.39	1.60	0.41	2.40	0.38	1.12	0.11	1.38	0.51
3		1.74	0.33	2.10	0.15	2.76	0.22	2.67	0.42	2.67	0.74	2.52	0.21	2.10	0.38	2.40	0.49	3.60	0.49	1.68	0.13	2.07	0.38
4		2.32	0.48	2.80	0.26	3.68	0.19	3.56	0.56	3.56	0.91	3.36	0.22	2.80	0.41	3.20	0.41	4.80	0.52	2.24	0.21	2.76	0.35
5		2.90	0.49	3.50	0.29	4.60	0.12	4.45	0.64	4.45	0.93	4.20	0.21	3.50	0.32	4.00	0.39	6.00	0.73	2.80	0.22	3.45	0.31
6		3.48	0.52	4.20	0.30	5.52	0.13	5.34	0.63	5.34	0.93	5.04	0.23	4.20	0.22	4.80	0.32	7.20	0.82	3.36	0.32	4.14	0.31
7		4.06	0.41	4.90	0.35	6.44	0.24	6.23	0.51	6.23	0.88	5.88	0.22	4.90	0.15	5.60	0.28	8.40	0.55	3.92	0.23	4.83	0.25
8		4.64	0.31	5.60	0.42	7.36	0.55	7.12	0.29	7.12	0.73	6.72	0.18	5.60	0.08	6.40	0.39	9.60	0.41	4.48	0.21	5.52	0.15
9		5.22	0.15	6.30	0.43	8.28	0.52	8.01	0.29	8.01	0.41	7.56	0.21	6.30	0.06	7.20	0.08	10.80	0.33	5.04	0.19	6.21	0.05
<b>Right Bank</b>		5.80	0.00	7.00	0.00	9.20	0.00	8.90	0.00	8.90	0.00	8.40	0.00	7.00	0.00	8.00	0.00	12.00	0.00	5.60	0.00	6.90	0.00
<b>Feature Type</b>		run	run																				

red 0.05 was actually <0.05.

**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.

MAXIMUM      0.93  
 MEDIAN        0.31

  
 Surveyor's Signature: \_\_\_\_\_ Date: 4/29/2008

WBID # 3162

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)

<b>Date &amp; Time:</b> 4-29-08	10:30 a.m.	Location Description (e.g., road crossing):
<b>Stream Name:</b> Cave Spring Branch		10 meters downstream of Railroad bridge
Current Weather Conditions: Sunny		Facility Name(s): Empire Energy Center
Weather Conditions for Past 10 days: 2.07" rain @ Joplin		Permit Number(s): MO-0116874
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): 402597	Northing (UTM Y): 4110909	Horizontal Accuracy: (EPE / FOM / PDOP)	32 ft.	<del>Meters</del>
Site 11	Easting (UTM X): 402588	Northing (UTM Y): 4111074	Horizontal Accuracy: (EPE / FOM / PDOP)	228 ft.	<del>Meters</del>

**Photos:**

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
3162-2-A	Upstream looking down				
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
3162-2-B	Railroad				
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
3162-2-C	Downstream looking up				

**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 <i>Data Sheet D- Recreational Use Interview</i> when conducting interviews.)				

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.)

<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 checked="" type="checkbox"/> Other:
Comments: Private property				

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

<input 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: Railroad bridge			

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

% Cobble	80% Gravel	20% Sand	% Silt	% Mud/Clay	% Bedrock
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**Aquatic Vegetation\*:** (Note amount of vegetation or algal growth at the assessment site.)

None
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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 type="checkbox"/> Fine sediments	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:
Surface Deposit:	<input type="checkbox"/> Oil	<input type="checkbox"/> Scum	<input type="checkbox"/> Foam	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:

\*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.

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)

**Comments:** (Please record any additional comments here.)

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

Printed Names of Personnel Collecting Data: Rodney Holland, Christopher Parks

Surveyor's Signature:  Date of Survey: 4-29-08

Organization: Olsson Associates Position: Field Team Leader & Field Team Member

## Field Data Sheets for Recreational Use Stream Surveys

### Data Sheet C - Field Survey Results

Stream Name: <u>Cave Spring Branch</u> Waterbody ID: <u>3162</u> Site #: <u>2</u>  Estimated Channel Incision: _____ (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>402597</u> UTM Y: <u>4110909</u> +/- <u>32 ft.</u> ( <del>meters</del> ) <b>11</b> UTM X: <u>402588</u> UTM Y: <u>4111074</u> +/- <u>228 ft.</u> ( <del>meters</del> )  Average Stream Width: <u>7</u> (meters)      Length of Survey Segment: <u>150</u> (meters) (To determine Length of Reach)      (20x average stream width)  Field Staff: <u>Rodney Holland and Christopher Parks</u>	<b>Dissolved Oxygen</b>  Date: <u>4/29/2008</u> Time: <u>10:35 p.m.</u>  Dissolved Oxygen: <u>12.22</u> (mg/L)  Dissolved Oxygen: <u>115.2</u> (% sat)  Specific Cond: <u>304</u> (µS/cm)  Water Temperature: <u>12.5</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	0.64	0.12	0.65	0.15	0.88	0.41	0.74	0.11	0.80	0.33	1.03	0.55	0.58	0.52	0.63	0.15	0.68	0.24	0.71	0.38	0.69	0.25
	2	1.28	0.29	1.30	0.29	1.76	0.46	1.48	0.22	1.60	0.68	2.60	0.52	1.16	0.81	1.26	0.28	1.36	0.36	1.42	0.51	1.38	0.40
	3	1.92	0.42	1.95	0.41	2.64	0.85	2.22	0.31	2.40	1.00	3.09	0.49	1.74	0.68	1.89	0.41	2.04	0.51	2.13	0.47	2.07	0.46
	4	2.56	0.39	2.60	0.39	3.52	0.92	2.96	0.43	3.20	0.91	4.12	0.32	2.32	0.52	2.52	0.58	2.72	0.48	2.84	0.36	2.76	0.62
	5	3.20	0.31	3.25	0.32	4.40	0.95	3.70	0.54	4.00	0.73	5.15	0.39	2.90	0.41	3.15	0.72	3.40	0.62	3.55	0.41	3.45	0.73
	6	3.84	0.30	3.90	0.31	5.28	0.93	4.44	0.73	4.80	0.58	6.18	0.48	3.48	0.31	3.78	0.89	4.08	0.81	4.26	0.46	4.14	0.69
	7	4.48	0.31	4.55	0.49	6.16	0.82	5.18	0.76	5.60	0.42	7.21	0.49	4.06	0.28	4.41	1.00	4.76	0.92	4.97	0.52	4.83	0.54
	8	5.12	0.29	5.22	0.21	7.04	0.53	5.92	0.59	6.40	0.29	8.24	0.41	4.64	0.22	5.04	1.00	5.44	0.93	5.68	0.38	5.52	0.48
	9	5.76	0.21	5.85	0.15	7.92	0.49	6.66	0.38	7.20	0.13	9.27	0.32	5.22	0.13	5.67	0.94	6.12	0.74	6.39	0.21	6.21	0.51
<b>Right Bank</b>		6.40	0.00	6.50	0.00	8.80	0.00	7.40	0.00	8.00	0.00	10.30	0.00	5.80	0.00	6.30	0.00	6.80	0.00	7.10	0.00	6.90	0.00
<b>Feature Type</b> <small>(riffle, run, or pool)</small>		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 by dividing wetted width by ten)

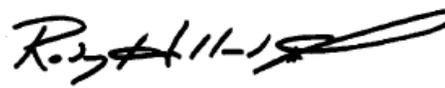
Mark dry depth measurements as 0; record actual measurements to 0.1 meter unless depth is too deep to measure (then record as > 1)

All measurements to be taken to the nearest 0.01 meter.

MAXIMUM      1.00

MEDIAN      0.46

Surveyor's Signature: \_\_\_\_\_



Date: 4/29/2008

WBID # 3162

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)

<b>Date &amp; Time:</b> 4-29-08	11:50 a.m.	Location Description (e.g., road crossing):
<b>Stream Name:</b> Cave Spring Branch		200 meters upstream of Spring River
Current Weather Conditions: Sunny		Facility Name(s): Empire Energy Center
Weather Conditions for Past 10 days: 2.07" rain @ Joplin		Permit Number(s): MO-0116874
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): 402460	Northing (UTM Y): 4111493	Horizontal Accuracy: (EPE / FOM / PDOP)	87 ft.	<del>Meters</del>
Site 11	Easting (UTM X): 402373	Northing (UTM Y): 4111602	Horizontal Accuracy: (EPE / FOM / PDOP)	140 ft.	<del>Meters</del>

**Photos:**

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
3162-3-A	Upstream looking down				
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
3162-3-B	Downstream looking up				
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 <i>Data Sheet D- Recreational Use Interview</i> when conducting interviews.)				

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.)

<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 checked="" type="checkbox"/> Other:
Comments: Private property				

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

<input 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 checked="" type="checkbox"/> None of the above	Comments / Other:			

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

% Cobble	80% Gravel	20% Sand	% Silt	% Mud/Clay	% Bedrock
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**Aquatic Vegetation\*:** (Note amount of vegetation or algal growth at the assessment site.)

None
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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 type="checkbox"/> Fine sediments	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:
Surface Deposit:	<input type="checkbox"/> Oil	<input type="checkbox"/> Scum	<input type="checkbox"/> Foam	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:

\*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.

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)

**Comments:** (Please record any additional comments here.)

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

Printed Names of Personnel Collecting Data: Rodney Holland, Christopher Parks

Surveyor's Signature:  Date of Survey: 4-29-08

Organization: Olsson Associates Position: Field Team Leader & Field Team Member

## Field Data Sheets for Recreational Use Stream Surveys

### Data Sheet C - Field Survey Results

Stream Name: <u>Cave Spring Branch</u> Waterbody ID: <u>3162</u> Site #: <u>3</u>  Estimated Channel Incision: _____ (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>402460</u> UTM Y: <u>4111493</u> +/- <u>87 ft.</u> ( <del>meters</del> ) <b>11</b> UTM X: <u>402373</u> UTM Y: <u>4111602</u> +/- <u>140 ft.</u> ( <del>meters</del> )  Average Stream Width: <u>8</u> (meters)      Length of Survey Segment: <u>160</u> (meters) (To determine Length of Reach)      (20x average stream width)  Field Staff: <u>Rodney Holland and Christopher Parks</u>	<b>Dissolved Oxygen</b>  Date: <u>4/29/2008</u> Time: <u>11:55 p.m.</u>  Dissolved Oxygen: <u>11.03</u> (mg/L)  Dissolved Oxygen: <u>104.3</u> (% sat)  Specific Cond: <u>308</u> (µS/cm)  Water Temperature: <u>13.1</u> (°C)
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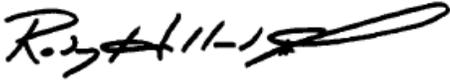
#### Transect Cross-Section

		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		0.53	0.06	0.63	0.09	0.38	0.06	0.45	0.15	0.95	0.19	0.71	0.15	0.93	0.21	1.01	0.18	0.98	0.25	0.92	1.00	1.04	1.00
2		1.06	0.11	1.26	0.23	0.76	0.10	0.90	0.22	1.90	0.26	1.42	0.31	1.86	0.44	2.02	0.39	1.96	0.41	1.84	1.00	2.08	1.00
3		1.59	0.29	1.89	0.31	1.14	0.08	1.35	0.29	2.85	0.39	2.13	0.51	2.79	0.62	3.03	0.56	2.94	0.63	2.76	1.00	3.12	1.00
4		2.12	0.43	2.52	0.32	1.52	0.09	1.80	0.41	3.80	0.49	2.84	0.77	3.72	0.84	4.04	0.79	3.92	0.74	3.68	1.00	4.16	1.00
5		2.65	0.64	3.15	0.33	1.90	0.08	2.25	0.53	4.75	0.52	3.55	1.00	4.65	0.92	5.05	0.89	4.90	0.85	4.68	0.93	5.70	1.00
6		3.18	0.72	3.78	0.15	2.28	0.13	2.70	0.71	5.70	0.53	4.26	1.00	5.58	1.00	6.06	1.00	5.88	0.91	5.52	0.81	6.24	0.79
7		3.71	0.65	4.41	0.22	2.66	0.11	3.15	0.52	6.65	0.42	4.97	1.00	6.51	1.00	7.07	1.00	6.86	0.83	6.44	0.59	7.28	0.61
8		4.24	0.52	5.04	0.38	3.04	0.20	3.60	0.42	7.60	0.41	5.68	1.00	7.44	1.00	8.08	1.00	7.84	0.69	7.36	0.32	8.32	0.35
9		4.77	0.38	5.67	0.35	3.42	0.22	4.05	0.22	8.55	0.19	6.39	1.00	8.37	1.00	9.09	1.00	8.82	0.47	8.28	0.16	9.36	0.12
<b>Right Bank</b>		5.30	0.00	6.30	0.00	3.80	0.00	4.50	0.00	9.50	0.00	7.10	0.00	9.30	0.00	10.10	0.00	9.80	0.00	9.20	0.00	10.40	0.00
<b>Feature Type</b> <small>(riffle, run, or pool)</small>		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 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.

MAXIMUM      1.00

MEDIAN      0.51

Surveyor's Signature:       Date: 4/29/2008

