



Missouri
Department of
Natural Resources

Use Attainability Analysis

for

WBID 0381 Willow Creek

Submitted by
SES Inc.

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): Willow Creek
Missouri Water Body Identification (WBID) Number: 381
8-digit HUC: 10300101
County(ies), Listed Upstream to Downstream: Ray
Upstream Legal Description (from Table H): 51N 27W section16
Downstream Legal Description (from Table H): 51N 27W section26
Number of sites evaluated: 4
List all site numbers, <u>consecutively upstream to downstream</u> : 1, 2, 3, 4
Include a Site Location Map(s). 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): Richmond S. WWTF MO0100200
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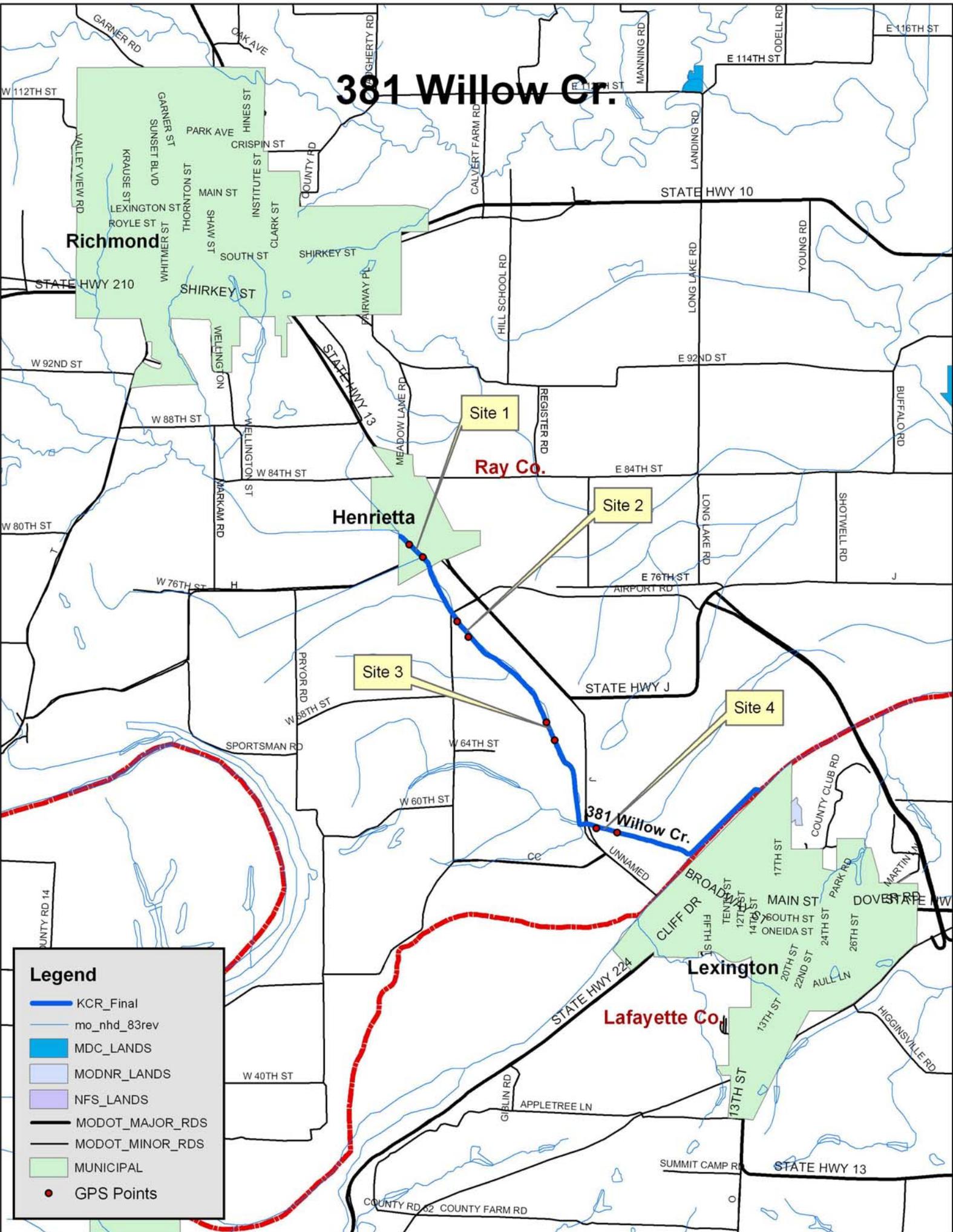
III. UAA Surveyor (please **PRINT** legibly)

Name of Surveyor: Aaron Ball	Telephone Number: 913.307.0046 Ext.14
Organization/Employer: SES, Inc.	

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: Aaron Ball **Date:** 5.23.08

381 Willow Cr.



Legend

- KCR_Final
- mo_nhd_83rev
- MDC_LANDS
- MODNR_LANDS
- NFS_LANDS
- MODOT_MAJOR_RDS
- MODOT_MINOR_RDS
- MUNICIPAL
- GPS Points

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: 5.20.08 9:30	Location Description (e.g., road crossing): Highway H
Stream Name: Willow Cr.	
Current Weather Conditions: clear	Facility Name(s): Richmond WWTF
Weather Conditions for Past 10 days: 0.58 inches	Permit Number(s): MO0100200
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): 0418922	Northing (UTM Y): 4343104	Horizontal Accuracy: (EPE / FOM / PDOP) 4 Meters
Site 11	Easting (UTM X): 0419125	Northing (UTM Y): 4342919	Horizontal Accuracy: (EPE / FOM / PDOP) 6 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
7	downstream, T1	8	upstream, T11		
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 <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 checked="" type="checkbox"/> Urban areas	<input checked="" 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: crop fields
Comments:				

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	% Gravel	70% Sand	20% Silt	10% Mud/Clay	% Bedrock
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Aquatic Vegetation*: (Note amount of vegetation or algal growth at the assessment site.)

algae covers 30% of substrate

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 checked="" 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: Gilisa Gould and Aaron Ball

Surveyor’s Signature: Aaron Ball Date of Survey: 5.20.08

Organization: SES, Inc. Position: Field Team Leader

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: <u>Willow Cr.</u> Waterbody ID: <u>381</u> Site #: <u>1</u> Estimated Channel Incision: <u>4</u> (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: <u>0418922</u> UTM Y: <u>4343104</u> +/- <u>4</u> (meters) 11 UTM X: <u>0419125</u> UTM Y: <u>4342919</u> +/- <u>6</u> (meters) Average Stream Width: <u>3</u> (meters) Length of Survey Segment: <u>150</u> (meters) (To determine Length of Reach) (20x average stream width) Field Staff: <u>Gilisa Gould and Aaron Ball</u>	<h4 style="text-align: center; margin: 0;">Dissolved Oxygen</h4> Date: <u>5.20.08</u> Time: <u>9:30</u> Dissolved Oxygen: <u>16.9</u> (mg/L) Dissolved Oxygen: _____ (% sat) Specific Cond: _____ (µS/cm) Water Temperature: <u>20</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)																				
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	0.40	0.20	0.30	0.20	0.30	0.30	0.20	0.10	0.30	0.10	0.20	0.10	0.20	0.20	0.20	0.10	0.20	0.05	0.20	0.15	0.40	0.20
	2	0.80	0.20	0.60	0.20	0.60	0.45	0.40	0.10	0.60	0.10	0.40	0.15	0.40	0.25	0.40	0.20	0.40	0.00	0.40	0.30	0.80	0.30
	3	1.20	0.30	0.90	0.30	0.90	0.45	0.60	0.20	0.90	0.05	0.60	0.30	0.60	0.25	0.60	0.20	0.60	0.00	0.60	0.30	1.20	0.20
	4	1.60	0.30	1.20	0.40	1.20	0.40	0.80	0.20	1.20	0.10	0.80	0.30	0.80	0.30	0.80	0.20	0.80	0.00	0.80	0.30	1.60	0.15
	5	2.00	0.30	1.50	0.45	1.50	0.35	1.00	0.15	1.50	0.20	1.00	0.30	1.00	0.35	1.00	0.20	1.00	0.05	1.00	0.30	2.00	0.20
	6	2.40	0.20	1.80	0.40	1.80	0.30	1.20	0.10	1.80	0.35	1.20	0.30	1.20	0.40	1.20	0.20	1.20	0.30	1.20	0.25	2.40	0.20
	7	2.80	0.20	2.10	0.30	2.10	0.30	1.40	0.10	2.10	0.30	1.40	0.35	1.40	0.30	1.40	0.20	1.40	0.30	1.40	0.20	2.80	0.20
	8	3.20	0.20	2.40	0.20	2.40	0.30	1.60	0.10	2.40	0.25	1.60	0.30	1.60	0.25	1.60	0.20	1.60	0.25	1.60	0.20	3.20	0.20
	9	3.60	0.10	2.70	0.15	2.70	0.15	1.80	0.05	2.70	0.20	1.80	0.20	1.80	0.10	1.80	0.10	1.80	0.25	1.80	0.10	3.60	0.20
Right Bank		4.00	0.00	3.00	0.00	3.00	0.00	2.00	0.00	3.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00	4.00	0.00
Feature Type		run		run		run		run		run		run		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: Aaron Ball Date: 5.23.08

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: 5.20.08 10:30	Location Description (e.g., road crossing):
Stream Name: Willow Cr.	76th Street
Current Weather Conditions: clear	Facility Name(s): Richmond S WWTF
Weather Conditions for Past 10 days: 0.58 inches	Permit Number(s): MO0100200
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): 0419631	Northing (UTM Y): 4341971	Horizontal Accuracy: (EPE / FOM / PDOP) 4 Meters
Site 11	Easting (UTM X): 0419795	Northing (UTM Y): 4341743	Horizontal Accuracy: (EPE / FOM / PDOP) 5 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
5	downstream, T1	6	upstream, T11		
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 <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 checked="" 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:				

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	% Gravel	% Sand	30% Silt	70% Mud/Clay	% Bedrock
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Aquatic Vegetation*: (Note amount of vegetation or algal growth at the assessment site.)

none

Water Characteristics*: (Mark all that apply.)

Odor:	<input type="checkbox"/> Sewage	<input type="checkbox"/> Musky	<input type="checkbox"/> Chemical	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:
Color:	<input checked="" type="checkbox"/> Clear	<input checked="" 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: Gilisa Gould and Aaron Ball

Surveyor’s Signature: Aaron Ball Date of Survey: 5.20.08

Organization: SES, Inc. Position: Field Team Leader

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: <u>Willow Cr.</u> Waterbody ID: <u>381</u> Site #: <u>2</u> Estimated Channel Incision: <u>3</u> (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: <u>0419631</u> UTM Y: <u>4341971</u> +/- <u>4</u> (meters) 11 UTM X: <u>0419795</u> UTM Y: <u>4341743</u> +/- <u>5</u> (meters) Average Stream Width: <u>5</u> (meters) Length of Survey Segment: <u>150</u> (meters) (To determine Length of Reach) (20x average stream width) Field Staff: <u>Gilisa Gould and Aaron Ball</u>	Dissolved Oxygen
	Date: <u>5.20.08</u> Time: <u>10:30</u>
	Dissolved Oxygen: <u>12.7</u> (mg/L)
	Dissolved Oxygen: _____ (% sat)
	Specific Cond: _____ (µS/cm)
	Water Temperature: <u>17.7</u> (°C)

Transect Cross-Section

		01		02		03		04		05		06		07		08		09		10		11	
Station		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	0.40	0.20	0.50	0.20	0.50	0.15	0.40	0.15	0.40	0.20	0.30	0.20	0.50	0.20	0.40	0.20	0.50	0.20	0.40	0.25	0.40	0.20
	2	0.80	0.25	1.00	0.30	1.00	0.25	0.80	0.20	0.80	0.30	0.60	0.20	1.00	0.30	0.80	0.35	1.00	0.35	0.80	0.30	0.80	0.20
	3	1.20	0.25	1.50	0.20	1.50	0.30	1.20	0.30	1.20	0.40	0.90	0.20	1.50	0.35	1.20	0.40	1.50	0.45	1.20	0.45	1.20	0.20
	4	1.60	0.30	2.00	0.20	2.00	0.25	1.60	0.35	1.60	0.40	1.20	0.25	2.00	0.40	1.60	0.40	2.00	0.50	1.60	0.45	1.60	0.25
	5	2.00	0.45	2.50	0.20	2.50	0.40	2.00	0.30	2.00	0.40	1.50	0.25	2.50	0.40	2.00	0.35	2.50	0.50	2.00	0.40	2.00	0.30
	6	2.40	0.50	3.00	0.20	3.00	0.25	2.40	0.40	2.40	0.45	1.80	0.30	3.00	0.40	2.40	0.30	3.00	0.50	2.40	0.40	2.40	0.30
	7	2.80	0.30	3.50	0.25	3.50	0.30	2.80	0.40	2.80	0.40	2.10	0.35	3.50	0.40	2.80	0.20	3.50	0.55	2.80	0.40	2.80	0.30
	8	3.20	0.30	4.00	0.20	4.00	0.30	3.20	0.40	3.20	0.25	2.40	0.30	4.00	0.30	3.20	0.10	4.00	0.35	3.20	0.30	3.20	0.20
	9	3.60	0.15	4.50	0.20	4.50	0.25	3.60	0.25	3.60	0.20	2.70	0.25	4.50	0.20	3.60	0.10	4.50	0.20	3.60	0.25	3.60	0.15
Right Bank		4.00	0.00	5.00	0.00	5.00	0.00	4.00	0.00	4.00	0.00	3.00	0.00	5.00	0.00	4.00	0.00	5.00	0.00	4.00	0.00	4.00	0.00
Feature Type		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 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: Aaron Ball Date: 5.23.08

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: 5.20.08 9:40	Location Description (e.g., road crossing):
Stream Name: Willow Cr.	upstream Highway J bridge crossing
Current Weather Conditions: clear	Facility Name(s): Richmond S WWTF
Weather Conditions for Past 10 days: 0.58 inches	Permit Number(s): MO0100200
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): 0420946	Northing (UTM Y): 4340479	Horizontal Accuracy: (EPE / FOM / PDOP) 4 Meters
Site 11	Easting (UTM X): 0421066	Northing (UTM Y): 4340216	Horizontal Accuracy: (EPE / FOM / PDOP) 6 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
3	upstream, T11	4	downstream, T1		
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 <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: crop fields
Comments:				

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	% Gravel	% Sand	30% Silt	70% Mud/Clay	% Bedrock
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Aquatic Vegetation*: (Note amount of vegetation or algal growth at the assessment site.)

none

Water Characteristics*: (Mark all that apply.)

Odor:	<input type="checkbox"/> Sewage	<input type="checkbox"/> Musky	<input type="checkbox"/> Chemical	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Other:
Color:	<input checked="" type="checkbox"/> Clear	<input checked="" 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: Gilisa Gould and Aaron Ball

Surveyor’s Signature: Aaron Ball Date of Survey: 5.20.08

Organization: SES, Inc. Position: Field Team Leader

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: <u>Willow Cr.</u> Waterbody ID: <u>381</u> Site #: <u>3</u> Estimated Channel Incision: <u>1</u> (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: <u>0420946</u> UTM Y: <u>4340479</u> +/- <u>4</u> (meters) 11 UTM X: <u>0421066</u> UTM Y: <u>4340216</u> +/- <u>6</u> (meters) Average Stream Width: <u>4</u> (meters) Length of Survey Segment: <u>150</u> (meters) (To determine Length of Reach) (20x average stream width) Field Staff: <u>Gilisa Gould and Aaron Ball</u>	Dissolved Oxygen Date: <u>5.20.08</u> Time: <u>9:40</u> Dissolved Oxygen: <u>7.7</u> (mg/L) Dissolved Oxygen: _____ (% sat) Specific Cond: _____ (µS/cm) Water Temperature: <u>17</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)																				
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	0.50	0.20	0.50	0.20	0.40	0.20	0.30	0.20	0.40	0.25	0.50	0.20	0.50	0.10	0.40	0.20	0.50	0.10	0.40	0.20	0.50	0.15
	2	1.00	0.30	1.00	0.20	0.80	0.30	0.60	0.30	0.80	0.35	1.00	0.25	1.00	0.25	0.80	0.25	1.00	0.20	0.80	0.30	1.00	0.25
	3	1.50	0.30	1.50	0.30	1.20	0.40	0.90	0.40	1.20	0.40	1.50	0.25	1.50	0.30	1.20	0.30	1.50	0.30	1.20	0.30	1.50	0.35
	4	2.00	0.30	2.00	0.35	1.60	0.45	1.20	0.45	1.60	0.55	2.00	0.30	2.00	0.35	1.60	0.40	2.00	0.40	1.60	0.40	2.00	0.40
	5	2.50	0.35	2.50	0.40	2.00	0.50	1.50	0.50	2.00	0.50	2.50	0.35	2.50	0.40	2.00	0.45	2.50	0.45	2.00	0.40	2.50	0.35
	6	3.00	0.40	3.00	0.40	2.40	0.50	1.80	0.50	2.40	0.45	3.00	0.40	3.00	0.40	2.40	0.40	3.00	0.30	2.40	0.30	3.00	0.35
	7	3.50	0.45	3.50	0.35	2.80	0.50	2.10	0.35	2.80	0.30	3.50	0.40	3.50	0.40	2.80	0.30	3.50	0.30	2.80	0.30	3.50	0.30
	8	4.00	0.30	4.00	0.30	3.20	0.40	2.40	0.35	3.20	0.20	4.00	0.30	4.00	0.30	3.20	0.25	4.00	0.25	3.20	0.20	4.00	0.25
	9	4.50	0.20	4.50	0.10	3.60	0.20	2.70	0.10	3.60	0.05	4.50	0.15	4.50	0.20	3.60	0.10	4.50	0.20	3.60	0.15	4.50	0.10
Right Bank		5.00	0.00	5.00	0.00	4.00	0.00	3.00	0.00	4.00	0.00	5.00	0.00	5.00	0.00	4.00	0.00	5.00	0.00	4.00	0.00	5.00	0.00
Feature Type <small>(riffle, run, or pool)</small>		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 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: Aaron Ball Date: 5.23.08

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: 5.20.08 9:00	Location Description (e.g., road crossing):
Stream Name: Willow Cr.	downstream from Highway J bridge crossing
Current Weather Conditions: clear	Facility Name(s): Richmond S WWTF
Weather Conditions for Past 10 days: 0.58 inches	Permit Number(s): MO0100200
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): 0421682	Northing (UTM Y): 4338917	Horizontal Accuracy: (EPE / FOM / PDOP)	5 Meters
Site 11	Easting (UTM X): 0421988	Northing (UTM Y): 4338851	Horizontal Accuracy: (EPE / FOM / PDOP)	4 Meters

Photos:

Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
1	upstream, T11	2	downstream, T1		
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 <i>Data Sheet D- Recreational Use Interview</i> when conducting interviews.)				

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.)

<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: crop fields
Comments:				

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

none in water

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 checked="" type="checkbox"/> Other: brown, silty
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.

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: Gilisa Gould and Aaron Ball

Surveyor’s Signature: Aaron Ball Date of Survey: 5.20.08

Organization: SES, Inc. Position: Field Team Leader

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet C - Field Survey Results

Stream Name: <u>Willow Cr.</u> Waterbody ID: <u>381</u> Site #: <u>4</u> Estimated Channel Incision: <u>1</u> (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: <u>0421682</u> UTM Y: <u>4338917</u> +/- <u>5</u> (meters) 11 UTM X: <u>0421988</u> UTM Y: <u>4338851</u> +/- <u>4</u> (meters) Average Stream Width: <u>6</u> (meters) Length of Survey Segment: <u>150</u> (meters) (To determine Length of Reach) (20x average stream width) Field Staff: <u>Gilisa Gould and Aaron Ball</u>	<h4 style="text-align: center; margin: 0;">Dissolved Oxygen</h4> Date: <u>5.20.08</u> Time: <u>9:00</u> Dissolved Oxygen: <u>5.8</u> (mg/L) Dissolved Oxygen: _____ (% sat) Specific Cond: _____ (µS/cm) Water Temperature: <u>20.2</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)																				
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	0.50	0.20	0.50	0.20	0.60	0.20	0.50	0.20	0.70	0.25	0.60	0.10	0.70	0.20	0.60	0.20	0.50	0.10	0.70	0.15	0.50	0.10
	2	1.00	0.40	1.00	0.30	1.20	0.35	1.00	0.30	1.40	0.40	1.20	0.10	1.40	0.40	1.20	0.40	1.00	0.25	1.40	0.30	1.00	0.20
	3	1.50	0.55	1.50	0.45	1.80	0.45	1.50	0.30	2.10	0.50	1.80	0.40	2.10	0.50	1.80	0.45	1.50	0.40	2.10	0.50	1.50	0.20
	4	2.00	0.70	2.00	0.50	2.40	0.60	2.00	0.40	2.80	0.50	2.40	0.45	2.80	0.50	2.40	0.45	2.00	0.40	2.80	0.40	2.00	0.30
	5	2.50	0.70	2.50	0.60	3.00	0.55	2.50	0.55	3.50	0.50	3.00	0.45	3.50	0.50	3.00	0.50	2.50	0.50	3.50	0.50	2.50	0.30
	6	3.00	0.65	3.00	0.60	3.60	0.50	3.00	0.50	4.20	0.45	3.60	0.50	4.20	0.45	3.60	0.50	3.00	0.50	4.20	0.50	3.00	0.30
	7	3.50	0.60	3.50	0.60	4.20	0.50	3.50	0.50	4.90	0.40	4.20	0.40	4.90	0.40	4.20	0.45	3.50	0.50	4.90	0.50	3.50	0.40
	8	4.00	0.30	4.00	0.50	4.80	0.40	4.00	0.40	5.60	0.30	4.80	0.30	5.60	0.30	4.80	0.40	4.00	0.40	5.60	0.30	4.00	0.30
	9	4.50	0.20	4.50	0.30	5.40	0.25	4.50	0.20	6.30	0.20	5.40	0.20	6.30	0.20	5.40	0.30	4.50	0.30	6.30	0.20	4.50	0.20
Right Bank		5.00	0.00	5.00	0.00	6.00	0.00	5.00	0.00	7.00	0.00	6.00	0.00	7.00	0.00	6.00	0.00	5.00	0.00	7.00	0.00	5.00	0.00
Feature Type		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 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: Aaron Ball Date: 5.23.08

WBID# 0381 Willow Creek



Site# 1 Photo ID# 7 Downstream, T01



Site# 1 Photo ID# 8, Upstream, T11



Site#2 Photo ID# 6, Upstream, T11



Site# 2 Photo ID# 5 Downstream, T01

WBID# 0381 Willow Creek



Site# 3 Photo ID# 3, Upstream, T11



Site# 3 Photo ID# 4, Downstream, T01



Site# 4 Photo ID# 1, Upstream, T11



Site# 4 Photo ID# 2, Upstream, T11