Missouri
Department of
Natural Resources

BELL CREEK
WBID 1470

Recreational Use Attainability Analysis

May 2007

PREPARED FOR:
RFP No: B3Z07134
Water Quality Monitoring & Assessment Section
Water Protection Program
Division of Environmental Quality
MISSOURI DEPARTMENT OF NATURAL RESOURCES
301 West High Street
Jefferson City, MO 65102

PREPARED BY:
MEC WATER RESOURCES, INC.
1123 Wilkes Blvd., Ste. 400
Columbia, MO 65201

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):	Bell Creek
Missouri Water Body Identification (WBID) Number:	1470
8-digit HUC: 10290201	County: Pulaski
Upstream Legal Description (from Table H):	09, 37N, 12W
Downstream Legal Description(from Table H):	Mouth
Number of sites evaluated	4
List all sites numbers, listed consequantly upstream to downstream: site 1, site 2, site 3, site 4	

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

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

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

Discharger Facility Name(s):	Whispering Oaks MHP
Discharger Permit Number(s):	MO0121517

IV. UAA Surveyor (please print legibly)

Name of Surveyor Nick Meunks	Telephone Number: 573-443-4100
Organization/Employer:	MEC Water Resources
Position:	Water Quality Scientist

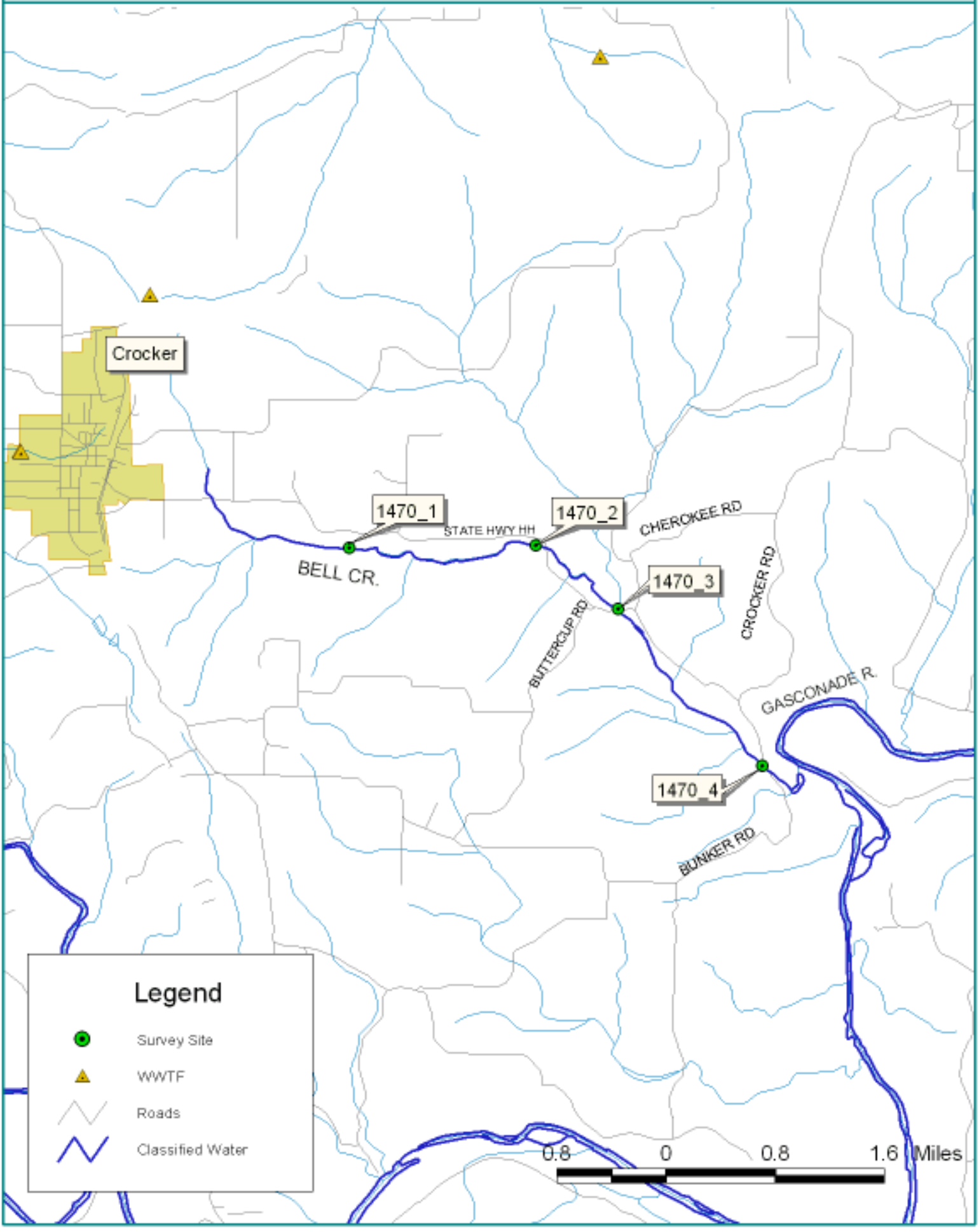
Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Nick Meunks **Date:** 5-14-07

AMC 5-15-07

5/22/07

Bell Creek (1470), Length = 6.0 mi., Permit # MO0121517



WBID# 1470
Site# 1

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B - Site Characterization

(must be completed for each site)

Date & Time: 5/14/07 1730	Site Location Description (e.g., road crossing): South of Hwy HH on the Kinsley property (@ 1/4 mile) Access was east of Butler Rd @ 1 mile
Personnel (Data Collectors): Nick M., Jevrod R.	
Current Weather Conditions: Clear	Facility Name: Whispering Oaks MHP
	Permit Number: MO 0121517
Weather Conditions for Past 10 days:	
Drought Conditions?: No drought ☑; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Locations:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)

Site GPS Coordinates: UTM X: 0567560 Y: 4199336

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

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

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality		Interpolation Data Quality
FOM	± _____ Meters	Source Map Scale: 1:24,000 1:100,000 Other _____
EPE	± 43.0 Feet or ± _____ Meters	± _____ Feet or ± _____ Meters
PDOP		

Photos:

Photo ID# (WBID_Site#_##)	Photo Purpose and Direction (upstream, downstream, other)	Photo ID# (WBID_Site#_##)	Photo Purpose and Direction (upstream, downstream, other)
1470-1-660	Upstrm from T7		
1470-1-661	Upstrm from T7		
1470-1-662	Downstrm from T7		
1470-1-663	Downstrm from T7		

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

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

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

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Campgrounds
☐ Boating accesses	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ No trespass sign	☒ Fence	☐ Steep slopes	☐ None of the above	☐ Other:

Comments:

WBID# 1470
Site# 1

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B - Site Characterization

(must be completed for each site)

Indications of Human Use*: (attach photos)

☐ Roads	☐ Rope swings	☐ Foot paths/prints	☐ Dock/platform	☐ Livestock Watering	☐ RV / ATV Tracks
☐ Camping Sites		☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Other:
Comments:					

Stream Morphology:

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

If so, is there an obvious current? ☒ Yes ☐ No

Select one of the following channel features:

Channel Feature	Transect (#)	Distance from access (m)	~~Width (m)~~ %	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE			30			
RUN			50			
POOL			20			

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

If so, is there an obvious current? ☐ Yes ☐ No

Select one of the following channel features:

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

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

70	% Cobble	10	% Gravel	0	% Sand	0	% Silt	0	% Mud/Clay	20	% Bedrock

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

Substrate covered with algae, some aquatic plants present ~~in~~ within stream

Water Characteristics*: (Mark all that apply.)

ODOR:	☐ Sewage	☐ Musky	☐ Chemical	☒ None	☐ Other:
COLOR:	☒ Clear	☐ Green	☐ Gray	☐ Milky	☐ Other:
BOTTOM DEPOSIT:	☐ Sludge	☐ Solids	☐ Fine sediments	☒ None	☐ Other:
WATER SURFACE DEPOSITION:	☐ Oil	☐ Scum	☐ Foam	☒ None	☐ Other:

Comments: Please attach any additional comments to this form.

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

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

Surveyor's Signature: Nick Merrill Date of Survey: 5/14/07

Organization: MEL Water Resources Position: Water Quality Scientist

February 16, 2007

RNC 5-18-07
MK 5/22/07

MEC Recreational Use Attainability Analysis Field Survey Sheet

Waterbody ID: 1470 (Bell Cr) Site #: 1 (WBID_Site#)

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

GPS Location (taken at transect 1):

UTM X: 0567560 UTM Y: 4199336

Horizontal Accuracy Estimate (GPS Data Quality): +/- 43.0 (feet)

Average Stream Width: 5 (meters) Length of Survey Segment: ~~100~~ 150 nm (meters) (20x average stream width)

Field Staff: Nick Mueuks Jerrad Roberts

Dissolved Oxygen

Date: 5/14/07 Time: 1730

Dissolved Oxygen: 9.00 (mg/L)

Dissolved Oxygen: 104.3 (% sat)

Specific Cond: 410.8 (µS/cm)

Water Temperature: 22.5 (°C)

Transect Cross-Section

Measurement	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
1	1.70	0.10	0.0	<0.10	0.70	0.10	1.60	0.10	1.00	0.11	2.00	0.11	0.70	0.10	0.40	0.10	0.90	0.11	0.10	0.11	0.20	0.10
2	2.05	0.16	1.0	<0.10	0.82	0.12	1.70	0.10	1.25	0.11	2.50	0.27	0.78	0.10	0.65	0.14	1.15	0.11	0.40	0.10	0.40	0.24
3	2.40	0.15	2.0	<0.10	0.94	0.12	1.80	0.10	1.50	0.11	3.00	0.41	0.86	0.10	0.90	0.15	1.40	0.10	0.70	0.10	0.60	0.26
4	2.75	0.17	3.0	<0.10	1.06	0.17	1.90	0.11	1.75	0.12	3.50	0.36	0.94	<0.10	1.15	0.13	1.65	0.12	1.00	<0.10	0.80	0.32
5	3.10	0.18	4.0	<0.10	1.18	0.20	2.00	0.12	2.00	0.13	4.00	0.32	1.02	<0.10	1.40	0.15	1.90	0.11	1.30	<0.10	1.00	0.30
6	3.45	0.11	5.0	<0.10	1.30	0.20	2.10	0.13	2.25	0.14	4.50	0.31	1.10	<0.10	1.65	0.14	2.15	<0.10	1.60	<0.10	1.20	6.28
7	3.80	0.14	6.0	<0.10	1.42	0.21	2.20	0.14	2.50	0.18	5.00	0.24	1.18	0.10	1.90	0.15	2.40	0.20	1.90	<0.10	1.40	0.29
8	4.15	0.11	7.0	<0.10	1.54	0.22	2.30	0.12	2.75	0.21	5.50	0.18	1.26	0.10	2.15	0.11	2.65	0.17	2.20	<0.10	1.60	0.23
9	4.50	0.10	8.0	<0.10	1.66	0.21	2.40	0.15	3.00	0.25	6.00	0.15	1.34	<0.10	2.40	0.10	2.90	0.15	2.50	<0.10	1.80	0.18
10	4.85	0.10	9.0	<0.10	1.78	0.12	2.50	0.15	3.25	0.26	6.50	0.10	1.42	0.10	2.65	0.10	3.15	0.15	2.80	<0.10	2.00	0.12
11	5.20	0.10	10.0	<0.10	1.90	0.10	2.60	0.14	3.50	0.10	7.00	0.10	1.50	0.10	2.90	0.10	3.40	0.10	3.10	0.10	2.20	0.10
12	7.00	0			2.00	0	2.70	0	3.80	0	9.00	0	4.20	0	4.00	0	4.80	0	3.80	0	3.20	0
Feature Type (riffle, run, or pool)	180 run		riffle		10 run		10 run		30 run		200 pool		270 riffle		110 run		140 run		70 riffle		100 pool	

Notes: Transects will be measured beginning on left descending bank and finishing on right descending bank.
GPS location corresponds to Transect 01. Transects ordered in upstream to downstream order.
Transects in order of up to downstream.
Mark dry depth measurements as 0; measurements less than 0.1m as <0.1; and greater than 1m as >1
Measurement 1 depth = 0.1m (unless depth is insufficient); Measurement 11 depth = 0.1m (unless depth is insufficient); Measurement 12 distance = entire wetted width distance and depth = 0m.

Signed: Nick Mueuks Date: 5/14/07

QA/C 5-18-07

QA 5/22/07

WBID# 1470
Site# 2

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B - Site Characterization

(must be completed for each site)

Date & Time: 5/14/07 1835	Site Location Description (e.g., road crossing): Hwy H4 crossing (east crossing)
Personnel (Data Collectors): Nick M., Jerrod R.	
Current Weather Conditions: Clear	Facility Name: Whispering Oaks MHP
	Permit Number: MO 0121517
Weather Conditions for Past 10 days:	
Drought Conditions?: No drought ☐; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Locations:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)			
Site GPS Coordinates: UTM X: 0569748 Y: 4199354			
HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)			
Global Positioning System (GPS)		Interpolation	
Static Mode	X	Topographic Map or DRG	
Dynamic Mode (Kinematic)		Aerial Photograph or DOQQ	
Precise Positioning Service		Satellite Imagery	
Signal Averaging		Interpolation Other	
Real Time Differential Processing			

HORIZONTAL ACCURACY ESTIMATE		
GPS Data Quality		Interpolation Data Quality
FOM	± _____ Meters	Source Map Scale: 1:24,000 1:100,000 Other _____
EPE	± 40 Feet or ± _____ Meters	± _____ Feet or ± _____ Meters
PDOP		

Photos:

Photo ID# (WBID_Site# ##)	Photo Purpose and Direction (upstream, downstream, other)	Photo ID# (WBID_Site# ##)	Photo Purpose and Direction (upstream, downstream, other)
1470_2-664	Downstrm view from T7	1470_2-667	Upstrm view from T7
1470_2-665	Downstrm view from T7		
1470_2-666	Upstrm view from T7		

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

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

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use *Data Sheet D- Recreational Use Interview* when conducting interviews.) Property owner John Kinsley stated that stream on his property was too shallow to swim in

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Campgrounds
☐ Boating accesses	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ No trespass sign	☐ Fence	☐ Steep slopes	☒ None of the above	☐ Other:

Comments:

WBID# 1470
Site# 2

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B - Site Characterization

(must be completed for each site)

Indications of Human Use*: (attach photos)

☐ Roads	☐ Rope swings	☐ Foot paths/prints	☐ Dock/platform	☐ Livestock Watering	☐ RV / ATV Tracks
☐ Camping Sites		☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☒ Other:
Comments: Hwy ~~me~~ crossing					

Stream Morphology:

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

If so, is there an obvious current? ☒ Yes ☐ No

Select one of the following channel features:

Channel Feature	Transect (#)	Distance from access (m)	~~Width (m)~~ %	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE			60			
RUN			20			
POOL			20			

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

If so, is there an obvious current? ☐ Yes ☐ No

Select one of the following channel features:

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

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

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

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

~~None~~ min aquatic plants growing in riffle near road crossing, no plants or algae observed in most upstrm transects

Water Characteristics*: (Mark all that apply.)

ODOR:	☐ Sewage	☐ Musky	☐ Chemical	☒ None	☐ Other:
COLOR:	☒ Clear	☐ Green	☐ Gray	☐ Milky	☐ Other:
BOTTOM DEPOSIT:	☐ Sludge	☐ Solids	☐ Fine sediments	☒ None	☐ Other:
WATER SURFACE DEPOSITION:	☐ Oil	☐ Scum	☐ Foam	☒ None	☐ Other:

Comments: Please attach any additional comments to this form.

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

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

Surveyor's Signature: Nick Mucl Date of Survey: 5/14/07

Organization: MEC Water Resources Position: Water Quality Scientist

February 16, 2007

Rec 5-18-07

MEC Recreational Use Attainability Analysis Field Survey Sheet

Waterbody ID: 1470 Site #: 2 (WBID_Site#)

Estimated Channel Incision: 0.30 (m) (height between low bank width and water)

GPS Location (taken at transect 1):

UTM X: 0569748 UTM Y: 4199354

Horizontal Accuracy Estimate (GPS Data Quality): +/- 40 (feet)

Average Stream Width: 5.0 (meters) Length of Survey Segment: 100 (meters) (20x average stream width)

Field Staff: Nick Muenks Jerrod Roberts

Dissolved Oxygen

Date: 5/14/07 Time: 1835

Dissolved Oxygen: 6.35 (mg/L)

Dissolved Oxygen: 73.0 (% sat)

Specific Cond: 398.2 (µS/cm)

Water Temperature: 21.9 (°C)

Transect Cross-Section

Measurement	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
1	0.00	0.13	0.20	0.11	0.00	<0.10	3.20	0.10	1.10	0.10	1.10	0.10	3.20	0.10	0.70	0.10	0.40	0.10	0.20	0.10	0.30	0.11
2	0.25	0.24	0.45	0.16	0.53	<0.10	3.29	0.12	1.30	0.13	1.30	0.11	3.30	0.10	0.72	0.12	1.35	0.11	0.97	0.17	0.82	0.12
3	0.50	0.30	0.70	0.22	1.06	<0.10	3.38	0.12	1.50	0.14	1.50	<0.10	3.40	0.12	0.74	0.11	2.30	0.10	1.74	0.13	1.34	0.11
4	0.75	0.35	0.95	0.23	1.59	<0.10	3.47	0.13	1.70	0.17	1.70	<0.10	3.50	0.15	0.76	0.13	3.25	<0.10	2.51	0.11	1.86	0.13
5	1.00	0.51	1.20	0.27	2.12	<0.10	3.56	0.17	1.90	0.18	1.90	<0.10	3.60	0.16	0.78	0.13	4.20	0.10	3.28	<0.10	2.38	0.15
6	1.25	0.42	1.45	0.35	2.65	<0.10	3.65	0.19	2.10	0.23	2.10	0.12	3.70	0.12	0.80	0.10	5.15	0.11	4.05	<0.10	2.90	0.17
7	1.50	0.40	1.70	0.31	3.18	<0.10	3.74	0.18	2.30	0.36	2.30	0.12	3.80	0.13	0.82	0.12	6.10	0.10	4.82	<0.10	3.42	0.14
8	1.75	0.33	1.95	0.30	3.71	<0.10	3.83	0.14	2.50	0.35	2.50	0.10	3.90	0.11	0.84	0.11	7.05	<0.10	5.59	0.10	3.94	0.15
9	2.00	0.24	2.20	0.29	4.24	<0.10	3.92	0.11	2.70	0.38	2.70	0.10	4.00	0.14	0.86	0.12	8.00	0.14	6.36	0.10	4.46	0.17
10	2.25	0.19	2.45	0.22	4.77	<0.10	4.01	0.14	2.90	0.34	2.90	0.14	4.10	0.12	0.88	0.10	8.95	0.17	7.13	0.11	4.98	0.17
11	2.50	0.10	2.70	0.14	5.30	<0.10	4.10	0.10	3.10	0.23	3.10	0.10	4.20	0.10	0.90	0.10	9.90	0.11	7.90	0.10	5.50	0.11
12	2.60	0	3.60	0			4.20	0	3.50	0	4.30	0	4.30	0	1.30	0	11.00	0	12.40	0	6.20	0
Feature Type (riffle, run, or pool)	pool		pool		riffle		run		run		riffle		riffle		riffle		riffle		riffle		pool	

Notes: Transects will be measured beginning on left descending bank and finishing on right descending bank.

GPS location corresponds to Transect 01. Transects ordered in upstream to downstream order.

Transects in order of up to downstream.

Mark dry depth measurements as 0; measurements less than 0.1m as <0.1; and greater than 1m as >1

Measurement 1 depth = 0.1m (unless depth is insufficient); Measurement 11 depth = 0.1m (unless depth is insufficient); Measurement 12 distance = entire wetted width distance and depth = 0m.

Signed: Nick Muenks Date: 5/14/07

5-18-07

5/22

WBID# 1470
Site# 3

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B - Site Characterization

(must be completed for each site)

Date & Time: 5/15/07	Site Location Description (e.g., road crossing): Bunker Rd crossing - west
Personnel (Data Collectors): Nick Mueuks Jerrod Roberts	
Current Weather Conditions: Clear	Facility Name: Whispering Oaks MHP
	Permit Number: MO 0121517
Weather Conditions for Past 10 days:	
Drought Conditions?: No drought ☐; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Locations:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)

Site GPS Coordinates: UTM X: 0570712 Y: 4198614

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

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

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality		Interpolation Data Quality
FOM	± _____ Meters	Source Map Scale: 1:24,000 1:100,000 Other _____
EPE	± 25.4 Feet or ± _____ Meters	± _____ Feet or ± _____ Meters
PDOP		

Photos:

Photo ID# (WBID_Site#_##)	Photo Purpose and Direction (upstream, downstream, other)	Photo ID# (WBID_Site#_##)	Photo Purpose and Direction (upstream, downstream, other)
1470-3_668	Dwnstrm view from transect 2		
1470-3_669	Dwnstrm view from transect 2		
1470-3_670	Upstrm view from transect 2		
1470-3_671	Upstrm view from transect 2		

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

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

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use *Data Sheet D- Recreational Use Interview* when conducting interviews.) Property owner Mr. Hamilton stated that most of stream running through their property was too shallow to swim in

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Campgrounds
☐ Boating accesses	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ No trespass sign	☒ Fence *	☐ Steep slopes	☐ None of the above	☐ Other:

Comments: * there was a water gap that had recently been washed out

WBID# 1470
Site# 3

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B - Site Characterization

(must be completed for each site)

Indications of Human Use*: (attach photos)

☐ Roads	☐ Rope swings	☐ Foot paths/prints	☐ Dock/platform	☒ Livestock Watering	☐ RV / ATV Tracks
☐ Camping Sites		☐ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Other:
Comments:					

Stream Morphology:

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

If so, is there an obvious current? ☒ Yes ☐ No

Select one of the following channel features:

Channel Feature	Transect (#)	Distance from access (m)	~~Width (m)~~ % at Site	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE			~~NM 50~~ 40			
RUN			~~NM X~~ ~~NM 50~~ 30			
POOL			30			

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

If so, is there an obvious current? ☐ Yes ☐ No

Select one of the following channel features:

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

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

~~NM 50~~ 75	% Cobble	20	% Gravel	5%	% Sand	0	% Silt	0	% Mud/Clay	0	% Bedrock

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

some benthic algae, willows growing in much of stream

Water Characteristics*: (Mark all that apply.)

ODOR:	☐ Sewage	☐ Musky	☐ Chemical	☒ None	☐ Other:
COLOR:	☒ Clear	☐ Green	☐ Gray	☐ Milky	☐ Other:
BOTTOM DEPOSIT:	☐ Sludge	☐ Solids	☐ Fine sediments	☒ None	☐ Other:
WATER SURFACE DEPOSITION:	☐ Oil	☐ Scum	☐ Foam	☒ None	☐ Other:

Comments: Please attach any additional comments to this form.

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

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

Surveyor's Signature: Nikki Mueck Date of Survey: 5/15/07

Organization: MEC Water Resources Position: Water Quality Scientist

Qne 5-18-07

MEC Recreational Use Attainability Analysis Field Survey Sheet

Waterbody ID: 1470 Site #: 3 (WBID_Site#)

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

GPS Location (taken at transect 1):

UTM X: 0570712 UTM Y: 4198614

Horizontal Accuracy Estimate (GPS Data Quality): +/- 25.4 (feet)

Average Stream Width: 8 (meters) Length of Survey Segment: 160 (meters) (20x average stream width)

Field Staff: Nick Muenks Jerrod Roberts

Dissolved Oxygen

Date: 5/15/07 Time: 7:18

Dissolved Oxygen: 8.55 (mg/L)

Dissolved Oxygen: 90.5 (% sat)

Specific Cond: 372.4 (µS/cm)

Water Temperature: 17.0 (°C)

Transect Cross-Section

Measurement	01 Distance (m)	01 Depth (m)	02 Distance (m)	02 Depth (m)	03 Distance (m)	03 Depth (m)	04 Distance (m)	04 Depth (m)	05 Distance (m)	05 Depth (m)	06 Distance (m)	06 Depth (m)	07 Distance (m)	07 Depth (m)	08 Distance (m)	08 Depth (m)	09 Distance (m)	09 Depth (m)	10 Distance (m)	10 Depth (m)	11 Distance (m)	11 Depth (m)
1	0.50	0.11	0.70	0.10	2.10	0.10	0.30	0.10	2.10	0.10	0.50	0.10	0.80	0.10	0.40	0.10	0.20	0.10	0.00	0.13	0.20	0.11
2	2.00	<0.10	0.97	0.11	2.55	0.13	1.00	0.11	2.60	0.12	1.20	<0.10	1.80	0.17	1.00	0.16	0.53	0.18	0.45	0.23	0.50	0.15
3	3.50	0.0	1.24	0.10	3.00	0.14	1.70	0.14	3.10	0.19	1.90	0.11	2.80	0.18	1.60	0.24	0.86	0.28	0.90	0.30	0.80	0.18
4	5.00	0.10	1.51	0.14	3.45	0.16	2.40	0.16	3.60	0.25	2.60	0.20	3.80	0.26	2.20	0.27	1.19	0.29	1.35	0.29	1.10	0.25
5	6.50	0.0	1.78	0.18	3.90	0.19	3.10	0.25	4.10	0.88	3.30	0.24	4.80	0.30	2.80	0.25	1.52	0.34	1.80	0.26	1.40	0.21
6	8.00	0.10	2.05	0.15	4.35	0.16	3.80	0.50	4.60	0.35	4.00	0.27	5.80	0.36	3.40	0.35	1.85	0.31	2.25	0.31	1.70	0.19
7	9.50	0.47	2.32	0.17	4.80	0.17	4.50	0.57	5.10	0.42	4.70	0.32	6.80	0.42	4.00	0.24	2.18	0.22	2.70	0.26	2.00	0.15
8	11.00	0.77	2.59	0.16	5.25	0.15	5.20	0.60	5.60	0.49	5.40	0.41	7.80	0.42	4.60	0.22	2.51	0.25	3.15	0.23	2.30	0.13
9	12.50	0.85	2.86	0.20	5.70	0.22	5.90	0.50	6.10	0.43	6.10	0.33	8.80	0.46	5.20	0.17	2.84	0.16	3.60	0.20	2.60	0.13
10	14.00	0.36	3.13	0.17	6.15	0.26	6.60	0.23	6.60	0.24	6.80	0.24	9.80	0.43	5.80	0.11	3.17	0.13	4.05	0.16	2.90	0.13
11	15.50	0.10	3.40	0.11	6.60	0.14	7.30	0.16	7.10	0.10	7.50	0.11	10.80	0.12	6.40	0.10	3.50	0.10	4.50	0.10	3.20	0.10
12	15.70	0	3.90	0	6.90	0	7.60	0	7.50	0	7.80	0	11.00	0	9.60	0	4.00	0	4.80	0	5.00	0
Feature Type (riffle, run, or pool)	20 pool		30 riffle		30 run		30 run		40 pool		30 pool		[illegible] pool		320 run		50 run		30 run		140 riffle	

Notes: Transects will be measured beginning on left descending bank and finishing on right descending bank.
GPS location corresponds to Transect 01. Transects ordered in upstream to downstream order.
Transects in order of up to downstream.
Mark dry depth measurements as 0; measurements less than 0.1m as <0.1; and greater than 1m as >1
Measurement 1 depth = 0.1m (unless depth is insufficient); Measurement 11 depth = 0.1m (unless depth is insufficient); Measurement 12 distance = entire wetted width distance and depth = 0m.

Signed: Nick Muenks Date: 5/15/07

QAQC 5-15-07
[initials] 5/22

WBID# 1470
Site# 4

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B - Site Characterization

(must be completed for each site)

Date & Time: 5/15/07 9:00	Site Location Description (e.g., road crossing): Slab Crossing on Bunker Rd (East)
Personnel (Data Collectors): Nick Mwenks Jerrod Roberts	
Current Weather Conditions: Clear	Facility Name: Whispering Oaks MHP
	Permit Number: MO 0121517
Weather Conditions for Past 10 days:	
Drought Conditions?: No drought ☐; Phase I ☐; Phase II ☐; Phase III ☐; Phase IV ☐; Unknown ☐	

Site Locations:

LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS)

Site GPS Coordinates: UTM X: 0572414 Y: 4196772

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

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

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality		Interpolation Data Quality
FOM	± _____ Meters	Source Map Scale: 1:24,000 1:100,000 Other _____
EPE	± 24.0 Feet or ± _____ Meters	± _____ Feet or ± _____ Meters
PDOP		

Photos:

Photo ID# (WBID_Site# ##)	Photo Purpose and Direction (upstream, downstream, other)	Photo ID# (WBID_Site# ##)	Photo Purpose and Direction (upstream, downstream, other)
1470-4-672	view of road crossing	1470-4-677	Upstrm view at T5
1470-4-673	Dwnstrm view at T5	1470-4-678	camp fire
1470-4-674	ATV tracks - have been fenced	1470-4-679	kids sandals
1470-4-675	Dwnstrm view at T5	1470-4-680	Dwnstrm view at T11
1470-4-676	Upstrm view at T5	1470-4-682	ATV path instream
		1470-4-683	road going down to strm - dwnstrm from T11

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

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

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use *Data Sheet D- Recreational Use Interview* when conducting interviews.) Property owner Mr Hamilton stated people use this crossing often

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

☐ City/county parks	☐ Playgrounds	☐ MDC conservation lands	☐ Urban areas	☐ Campgrounds
☐ Boating accesses	☐ State parks	☐ National forests	☐ Nature trails	☐ Stairs/walkway
☐ No trespass sign	☐ Fence	☐ Steep slopes	☒ None of the above	☐ Other:

Comments:

WBID# 1470
Site# 4

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B - Site Characterization

(must be completed for each site)

Indications of Human Use*: (attach photos)

☒ Roads	☐ Rope swings	☐ Foot paths/prints	☐ Dock/platform	☐ Livestock Watering	☒ RV / ATV Tracks
☐ Camping Sites		☒ Fire pit/ring	☐ NPDES Discharge	☐ Fishing Tackle	☐ Other:
Comments:					

Stream Morphology:

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

If so, is there an obvious current? ☒ Yes ☐ No

Select one of the following channel features:

Channel Feature	Transect (#)	Distance from access (m)	Width (m) % of Segment	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE			40			
RUN			25			
POOL			35			

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

If so, is there an obvious current? ☐ Yes ☐ No

Select one of the following channel features:

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

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

5	% Cobble	85	% Gravel	10	% Sand	0	% Silt	0	% Mud/Clay	0	% Bedrock

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

approximately 5% of substrate with benthic algae

Water Characteristics*: (Mark all that apply.)

ODOR:	☐ Sewage	☐ Musky	☐ Chemical	☒ None	☐ Other:
COLOR:	☒ Clear	☐ Green	☐ Gray	☐ Milky	☐ Other:
BOTTOM DEPOSIT:	☐ Sludge	☐ Solids	☐ Fine sediments	☒ None	☐ Other:
WATER SURFACE DEPOSITION:	☐ Oil	☐ Scum	☐ Foam	☒ None	☐ Other:

Comments: Please attach any additional comments to this form.

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

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

Surveyor's Signature: Nick Meyer Date of Survey: 5/15/07

Organization: MEC Water Resources Position: Water Quality Scientist

February 16, 2007

MEC 5-18-07

MK 5/22/07

MEC Recreational Use Attainability Analysis Field Survey Sheet

Waterbody ID: 1470 Site #: 4 (WBID_Site#)

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

GPS Location (taken at transect 1):

UTM X: 0572414 UTM Y: 4196772

Horizontal Accuracy Estimate (GPS Data Quality): +/- 24.0 (feet)

Average Stream Width: 15 (meters) Length of Survey Segment: 300 (meters) (20x average stream width)

Field Staff: Nick Muenks Jerrod Roberts

Dissolved Oxygen

Date: 5/15/07 Time: 0900

Dissolved Oxygen: 8.53 (mg/L)

Dissolved Oxygen: 89.6 (% sat)

Specific Cond: 368.9 (µS/cm)

Water Temperature: 17.8 (°C)

Transect Cross-Section

Measurement	01		02		03		04		05		06		07		08		09		10		11	
	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)
1	0.30	0.11	0.00	0.10	12.0	0.10	0.50	0.10	0.00	0.10	1.00	0.10	0.30	0.14	0.40	0.10	0.30	0.10	0.50	0.10	1.30	0.11
2	1.60	0.54	1.45	<0.10	13.0	0.10	1.45	0.17	~~0.00~~ 0.70m	0.10	2.65	0.10	2.30	0.64	2.25	0.10	1.20	0.16	1.90	0.28	2.50	0.18
3	2.90	0.50	2.90	0.10	14.0	0.10	2.40	0.14	1.40	0.10	4.30	<0.10	4.30	0.35	4.10	0.00	2.10	0.20	3.30	0.16	3.70	0.23
4	4.20	0.33	4.35	0.17	15.0	0.13	3.35	0.13	2.10	0.13	5.95	<0.10	6.30	0.14	5.95	<0.10	3.00	0.27	4.70	0.10	4.90	0.27
5	5.50	0.31	5.80	0.18	16.0	0.15	4.30	0.12	2.80	0.11	7.60	<0.10	8.30	0.00	7.80	0.15	3.90	0.36	6.10	0.10	6.10	0.36
6	6.80	0.30	7.25	0.18	17.0	0.20	5.25	<0.10	3.50	<0.10	9.25	<0.10	10.30	0.12	9.65	<0.10	4.80	0.35	7.50	0.15	7.30	0.46
7	8.10	0.29	8.70	0.18	18.0	0.25	6.20	<0.10	4.20	<0.10	10.90	0.10	12.30	0.11	11.50	0.00	5.70	0.38	8.90	0.24	8.50	0.58
8	9.40	0.18	10.15	0.13	19.0	0.33	7.15	0.12	4.90	0.15	12.55	0.13	14.30	<0.10	13.35	0.00	6.60	0.31	10.30	0.36	9.70	0.58
9	10.70	0.12	11.60	0.15	20.0	0.38	8.10	0.10	5.60	0.11	14.20	0.14	16.30	0.10	15.20	0.00 ~~0.14m~~	7.50	0.22	11.70	0.35	10.90	0.57
10	12.00	0.10	13.05	0.26	21.0	0.26	9.05	0.10	6.30	<0.10	15.85	0.15	18.30	<0.10	17.05	0.14 ~~0.10m~~	8.40	0.10	13.10	0.28	12.10	0.47
11	13.30	0.11	14.50	0.13	22.0	0.10	10.00	0.10	7.00	0.10	17.50	0.10	20.30	0.10	18.90	0.10	9.30	0.12	14.50	0.11	13.30	0.12
12	13.70	0	14.90	0	22.3	0	11.90	0	15.80	0	18.20	0	21.10	0	19.50	0	11.70	0	15.50	0	13.60	0
Feature Type (riffle, run, or pool)	Pool		Pool		Pool		riffle		riffle		riffle/run		run/pool		run/riffle		run		pool		pool	

Notes: Transects will be measured beginning on left descending bank and finishing on right descending bank.

GPS location corresponds to Transect 01. Transects ordered in upstream to downstream order.

Transects in order of up to downstream.

Mark dry depth measurements as 0; measurements less than 0.1m as <0.1; and greater than 1m as >1

Measurement 1 depth = 0.1m (unless depth is insufficient); Measurement 11 depth = 0.1m (unless depth is insufficient); Measurement 12 distance = entire wetted width distance and depth = 0m.

Signed: Nick Muenk Date: 5/15/07

RMC 5-18-07

CDK 5/22/07

WBID# 1470

Site# 1 Photo ID# 1470-1-660, Upstream

Site# 1 Photo ID# 1470-1-661, Upstream

Site# 1 Photo ID# 1470-1-662, Downstream

Site# 1 Photo ID# 1470-1-663, Downstream

WBID# 1470

Site# 2 Photo ID# 1470-2-664, Downstream

Site# 2 Photo ID# 1470-2-665, Downstream

Site# 2 Photo ID# 1470-2-666, Upstream

Site# 2 Photo ID# 1470-2-667, Upstream

WBID# 1470

Site# 3 Photo ID# 1470-3-668, Downstream

Site# 3 Photo ID# 1470-3-669, Downstream

Site# 3 Photo ID# 1470-3-670, Upstream

Site# 3 Photo ID1470-3-671, Upstream

WBID# 1470

Site# 4 Photo ID# 1470-4-672, Road Crossing

Site# 4 Photo ID# 1470-4-673, Downstream T5

Site# 4 Photo ID# 1470-4-674, ATV tracks

Site# 4 Photo ID# 1470-4-675, Downstream T5

WBID# 1470

Site# 4 Photo ID# 1470-4-676, Upstream T-5

Site# 4 Photo ID# 1470-4-677, Upstream T5

Site# 4 Photo ID# 1470-4-678, Campfire

Site# 4 Photo ID# 1470-4-679, Kid sandals

WBID# 1470

Site# 4 Photo ID# 1470-4-680, Downstream T-11

Site# 4 Photo ID# 1470-4-682, ATV path

Site# 4 Photo ID# 1470-4-683, Road to stream