Missouri
Department of
Natural Resources

TRIBUTARY TO LITTLE BEAVER CREEK
WBID 1530

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

GAK 5/11/07

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):	Tributary to Little Beaver Creek
Missouri Water Body Identification (WBID) Number:	1530
8-digit HUC:	County: Phelps
Upstream Legal Description (from Table H):	16, 37N, 8W
Downstream Legal Description(from Table H):	mouth
Number of sites evaluated	2
List all sites numbers, listed cnsequantly upstream to downstream: Site 1, Site 2	

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):	Deer Run Apartments
Discharger Permit Number(s):	MO 0111121

IV. UAA Surveyor (please print legibly)

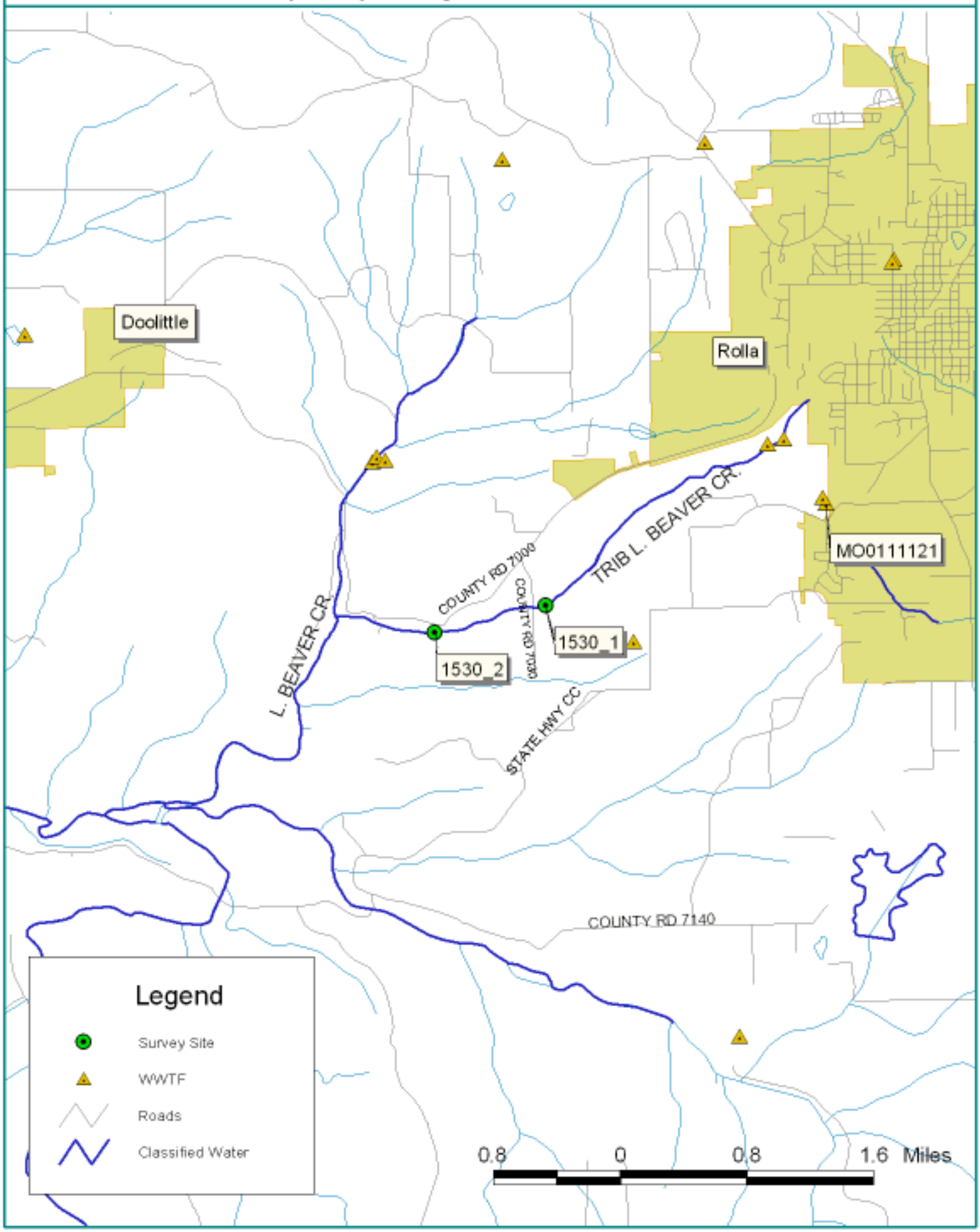
Name of Surveyor Nick Muenks	Telephone Number: 573-443-4100
Organization/Employer: MEC Water Resources	
Position: ~~Agem~~ Water Quality Scientist	

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

Signed: Nick Muenks **Date:** 5/9/07

GAC 5-14-07

Trib L Beaver Cr (1530), Length = 2.0 mi., Permit # MO0111121



WBID# 1530
Site# 1

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B - Site Characterization
(must be completed for each site)

Date & Time: 5/9/07 1730	Site Location Description (e.g., road crossing): upstream of 7030 Cnty Rd crossing
Personnel (Data Collectors): NM / JR	
Current Weather Conditions: Mostly Cloudy	Facility Name: Deer Run ~~Apptm~~ Apartments Permit Number: MO0111121
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: 0604095		Y: 4197873	
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	± 30 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)
1530_1_621	looking upstream from Transect 1	1530_1_625	Upstream view @ transect 7
1530_1_622	Downstrm @ transect 7		
1530_1_623	Upstrm @ transect 7		
1530_1_624	Upstrm @ transect 7		

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.) Owner declined in person interview but ~~would~~ may have mailed interview. owner did comment saying that the Stream typically has no flow and is mostly dry during summer months.

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# 1530
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	07	40	6.0	20		0.16
RUN	06	30	8.5	15		0.17
POOL	02	10	5.9	50		0.85

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%.)

60 % Cobble	30 % Gravel	5 % Sand	0 % Silt	0 % Mud/Clay	5 % Bedrock

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

Benthic algae present in pools

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: present in some locations of pools
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 Mueller Date of Survey: 5/9/07

Organization: MEC Water Resources Position: Water Quality Scientist

February 16, 2007

RMC 5-14-07

MEC Recreational Use Attainability Analysis Field Survey Sheet

Waterbody ID: 1530 Site #: 1
(WBID_Site#)

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

GPS Location (taken at transect 1):

UTM X: 0604095 UTM Y: 4197873

Horizontal Accuracy Estimate (GPS Data Quality): +/- 30 (feet)

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

Field Staff: Nick Muenks Jerrod Roberts

Dissolved Oxygen

Date: 5/9/07 Time: 17:30

Dissolved Oxygen: 9.35 (mg/L)

Dissolved Oxygen: 105.4 (% sat)

Specific Cond: 615.0 (µS/cm)

Water Temperature: 21.1 (°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	0.80	0.11	0.0	0.33	0.10	0.10	0.0	0.26	0.20	0.14	1.00	0.14	0.50	0.10	2.00	0.10	0.70	0.10	1.50	0.10	0.60	0.10
2	1.40	0.10	0.53	0.31	0.95	0.25	1.00	0.38	1.12	0.24	1.37	<0.10	0.95	<0.10	2.08	0.11	0.96	0.13	1.60	<0.10	1.00	0.18
3	2.00	<0.10	1.06	0.53	1.80	0.46	2.00	0.51	2.04	0.24	1.74	0.12	1.40	<0.10	2.16	0.10	1.22	0.15	1.70	<0.10	1.40	0.26
4	2.60	<0.10	1.59	0.80	2.65	0.59	3.00	0.43	2.96	0.24	2.11	0.17	1.85	0.12	2.24	<0.10	1.48	0.16	1.80	<0.10	1.80	0.33
5	3.20	<0.10	2.12	0.85	3.50	0.73	4.00	0.56	3.88	0.23	2.48	0.14	2.30	0.13	2.32	<0.10	1.74	0.15	1.90	<0.10	2.20	0.40
6	3.80	<0.10	2.65	0.69	4.35	0.67	5.00	0.53	4.80	0.26	2.85	<0.10	2.75	<0.10	2.40	0.11	2.00	0.17	2.00	<0.10	2.60	0.43
7	4.40	<0.10	3.18	0.43	5.20	0.60	6.00	0.48	5.72	0.26	3.22	0.13	3.20	0.16	2.48	0.12	2.26	0.18	2.10	<0.10	3.00	0.44
8	5.00	<0.10	3.71	0.27	6.05	0.54	7.00	0.44	6.64	0.17	3.59	0.11	3.65	<0.10	2.56	0.11	2.52	0.17	2.20	<0.10	3.40	0.42
9	5.60	0.10	4.24	0.22	6.90	0.63	8.00	0.37	7.56	0.12	3.96	<0.10	4.10	<0.10	2.64	0.11	2.78	0.16	2.30	<0.10	3.80	0.40
10	6.20	0.17	4.77	0.20	7.75	0.60	9.00	0.23	8.48	<0.10	4.33	<0.10	4.55	<0.10	2.72	0.12	3.04	0.15	2.40	<0.10	4.20	0.33
11	6.80	0.13	5.30	0.12	8.60	0.22	10.00	0.10	9.40	0.10	4.70	0.10	5.00	0.11	2.80	0.10	3.30	0.15	2.50	0.10	4.60	0.19
12	7.60	0	5.90	0			10.60	0	11.40	0	8.50	0	6.00	0	3.30	0	3.70	0	2.90	0	4.70	0
Feature Type (riffle, run, or pool)	~~pool~~ riffle		pool		pool		pool		pool		run		riffle		riffle		pool		~~run~~ 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: Nicholas W Muenks Date: 5/9/07

NWC 5-14-07

WBID# 1530
Site# 2

Field Data Sheets for Recreational Use Stream Surveys

Data Sheet B - Site Characterization
(must be completed for each site)

Date & Time: 5/11/07 700	Site Location Description (e.g., road crossing): Bray ~~CA~~ NM Conservation Area
Personnel (Data Collectors): NM/JR	
Current Weather Conditions: Cloudy	Facility Name: Deer Run Apartments Permit Number: MO 0111121
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: 0602977 Y: 4197603

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 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)
1530-2-642	Dwnstrm T1	1530-2-646	Dwnstrm T11
1530-2-643	Dwnstrm T1	1530-2-647	Upstrm T11
1530-2-644	Upstrm T1	1530-2-648	~~Ups~~ Dwnstrm T11
1530-2-645	Upstrm T1		

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: MDC area requires special use permit, Gated drive

WBID# 1530
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: Road crossing on conservation area
Foot path runs parallel to Stream

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	07	30	4.0	15		0.27
RUN	09	50	3.60	60		0.42
POOL	None present					N/m

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%.)

40 % Cobble	9 % Gravel	1 % Sand	0 % Silt	0 % Mud/Clay	50 % Bedrock

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

None observed

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 Muenk Date of Survey: 5/11/07

Organization: MEC Water Resources Position: Water Quality Scientist

AJRC 5-14-07

February 16, 2007

MEC Recreational Use Attainability Analysis Field Survey Sheet

Waterbody ID: 1530 Site #: 2 (WBID_Site#)

Estimated Channel Incision: 0 (m) (height between low bank width and water)

GPS Location (taken at transect 1):

UTM X: 0602977 UTM Y: 4197603

Horizontal Accuracy Estimate (GPS Data Quality): +/- 25 (feet)

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

Field Staff: Nick Muenks Jerrod Roberts

Dissolved Oxygen

Date: 5/11/07 Time: 700

Dissolved Oxygen: 9.28 (mg/L)

Dissolved Oxygen: 95.4 (% sat)

Specific Cond: 345.5 (µS/cm)

Water Temperature: 16.7 (°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	0.90	0.10	0.40	0.11	0.10	0.10	0.0	0.12	0.40	0.10	0.00	0.13	0.30	0.13	0.10	0.10	0.50	0.11	0.20	0.10	1.00	0.10
2	1.45	0.16	0.91	0.11	0.68	0.12	0.65	0.13	1.05	0.12	0.32	0.18	0.57	0.25	0.55	0.21	0.80	0.26	0.70	0.24	1.45	0.11
3	2.00	0.13	1.42	0.14	1.26	0.16	1.30	0.13	1.70	0.14	0.64	0.18	0.84	0.15	1.00	0.38	1.10	0.30	1.20	0.31	1.90	0.13
4	2.55	0.14	1.93	0.22	1.84	0.12	1.95	0.12	2.35	0.13	0.96	0.18	1.11	0.27	1.45	0.42	1.40	0.33	1.70	0.31	2.35	0.16
5	3.10	0.15	2.44	0.20	2.42	0.12	2.60	0.11	3.00	0.12	1.28	0.28	1.38	0.23	1.90	0.43	1.70	0.32	2.20	0.33	2.80	0.22
6	3.65	0.15	2.95	0.20	3.00	0.16	3.25	0.12	3.65	0.11	1.60	0.30	1.65	0.24	2.35	0.25	2.00	0.31	2.70	0.40	3.25	0.22
7	4.20	0.17	3.46	0.32	3.58	0.28	3.90	0.13	4.30	<0.10	1.92	0.26	1.92	0.25	2.80	<0.10	2.30	0.35	3.20	0.35	3.70	0.30
8	4.75	0.22	3.97	0.36	4.16	0.24	4.55	<0.10	4.95	<0.10	2.24	0.26	2.29	0.22	3.25	<0.10	2.60	0.34	3.70	0.29	4.15	0.35
9	5.30	0.15	4.48	0.33	4.74	0.26	5.20	0.10	5.60	<0.10	2.56	0.20	2.46	0.17	3.70	<0.10	2.90	0.40	4.20	0.31	4.60	0.33
10	5.85	0.13	4.99	0.28	5.32	0.24	5.85	0.12	6.25	0.13	2.88	0.16	2.73	0.10	4.15	0.15	3.20	0.42	4.70	0.17	5.05	0.31
11	6.40	0.12	5.50	0.16	5.90	0.15	6.50	0.10	6.90	0.10	3.20	0.10	3.00	0.10	4.60	0.12	3.50	0.22	5.20	0.18	5.50	0.29
12					6.20	0	6.80	0	7.00	0	3.70	0	4.00	0	5.30	0	3.60	0			5.80	0
Feature Type (riffle, run, or pool)	riffle		run		30 riffle		30 riffle		10 riffle		50 run		100 riffle		70 riffle/run		10 run		run		30 run	

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: 5/11/07

RMC 5-14-07

WBID# 1530

Site# 1 Photo ID# 1530-1-621, Upstream T1

Site# 1 Photo ID# 1530-1-622, Downstream T7

Site# 1 Photo ID# 1530-1-623, Upstream T7

Site# 1 Photo ID# 1530-1-624, Upstream T7

WBID# 1530

Site# 1 Photo ID# 1530-1-625, Upstream T7

Site# 2 Photo ID# 1530-2-642, Downstream T1

Site# 2 Photo ID# 1530-2-643, Downstream T1

Site# 2 Photo ID# 1530-2-644, Upstream T1

WBID# 1530

Site# 2 Photo ID# 1530-2-645, Upstream T1

Site# 2 Photo ID# 1530-2-646, Downstream T11

Site# 2 Photo ID# 1530-2-647, Upstream T11

Site# 2 Photo ID# 1530-2-648, Downstream T11