Dearborn River TMDL Planning Area: Appendix B

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SAMPLING AND ANALYSIS PLAN

DEARBORN RIVER MAINSTEM

01/26/05 WED 12:48 FAX 406 761 8477 F3 FWP Region 4 002

FISH KILL REPORT FORM

Waterbody Dearborn River

Name/address/phone number of person reporting kill

Investigators George Liknes

Date of fish kill

Date of investigation 8/2/2000

Geographic extent of fish kill
Dead fish were observed upstream of the Highway 287 bridge

Portion of lake/stream surveyed

Species and size of fish killed Mottled Sculpins, Longnose Dace

Number of fish killed (e.g. number per mile or number per acre)
Dead sculpin and Longnose Dace were observed scattered throughout shallow water areas between the bridge & thermograph, especially in riffle areas

Known or suspected cause of fish kill
Water temperatures exceeded critical thermal maximum.

Temperature measurements 78F @ gage house @ 16:20
max on thermograph = 83F 79F @ thermographs @ 16:42 (N47.20816° W112.1[illegible]°)

Dissolved oxygen measurements

Discharge measurements USGS gage (06073500) located at lower end of area walked

Other measurements
Thermograph data

Water/fish samples collected

Comments ~~Easily could have been 500+ fish~~
Hundreds of trout, primarily rainbows from 3" to 20" were packed into a spring area with substantially cooler water than surface water in the Dearborn. Spring originates on left bank within the rip-rap 12 immediately upstream from USGS gage house. Upon spooking the fish, they would move off the bank but once they got into the hot surface water, they would return to the cooler spring influenced area even when I stood on the bank right next to them.

03 – 0822 – __

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-M12
Trip ID: 2003-DRBLW Date: 7/21/03
Personnel: Laidlaw / Bowman

Waterbody Name Dearborn River County Lewis & Clark HUC 10030102
Station ID M12DRBNR06 Visit # ____ Location Dearborn River Below Confluence w/Flat Creek
Lat 47°11'43.6" Long 112°01'02.7" Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84
Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☒	03-0822W	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☒	Macroinvertebrate Habitat Asmt. ☐	03-0822M	KICK HESS OTHER:
Algae/Macrophytes	☒	Aquatic Plant Form ☐	03-0822A	PERI-1 OTHER:
Chlorophyll a	☒		03-0822C	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☐			
Field Notes	☐			
Other				

Measurements:	Time: 11:00	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 19.50	A
pH:	8.40	
SC: (mS/cm)	.275	
SC x 1000 =		µmho/cm
DO: (mg/L)	9.02 / 98.3%	
TUR: Clear ☒ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments:	1.17 NTU	
	1.04 NTU	

Macroinvertebrate Kick Duration: 3.5 min Kick Length (Ft.): 60'

Site Visit Comments:

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 7-24-03 **Site Visit Code:** 03-0822

Waterbody: Dearborn River Below Confluence **Station ID:** M12DRBA06

Personnel: Landlaw / Bowman

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	15'	0	0			
2	17	.3	.19			
3	22	.68	.60			
4	25	1.04	.18			
5	28	1.1	1.24			
6	31	1.0	1.23			
7	33	1.0	1.43			
8	35	1.15	.96			
9	37	1.55	1.33			
10	39	1.7	2.31			
11	41	1.4	.99			
12	43	1.25	1.69			
13	45	1.20	1.21			
14	47	1.1	1.01			
15	49	.8	.91			
16	51	.8	.75			
17	53	.5	.60			
18	55	.45	.15			
19	57	.2	0			
20	58	.2	0			
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Page 1 of 2

Data Mgmt. Approved

21.1.1.12

MACROINVERTEBRATE HABITAT ASSESSMENT FIELD FORM RIFFLE/RUN PREVALENCE

Date: 7-24-03 Site Visit Code: 03-0822

Waterbody: Dearborn River Below Site: MTADRBN006

Personnel: Cadieux / Brown

HABITAT PARAMETER	OPTIMAL	SUB-OPTIMAL	MARGINAL	POOR
1A. Riffle Development	Well-developed riffle; riffle as wide as stream & extends two times width of stream.	Riffle as wide as stream but length less than two times width.	Reduced riffle area that is not as wide as stream & its length less than two times width.	Riffles virtually non-existent
1A. score: 9	9-10	6-8	3-5	0-2
Comments:				
1B. Benthic Substrate	Diverse substrate dominated by cobble.	Substrate diverse with abundant cobble, but bedrock, boulders, fine gravel, or sand prevalent.	Substrate dominated by bedrock, boulders, sand, or silt; cobble present.	Monotonous fine gravel, sand, silt, or bedrock substrate.
1B. score: 10	9-10	6-8	3-5	0-2
Comments:				
2. Embeddedness	Gravel, cobble, or boulder particles are between 0-25% surrounded by fine sediment (particles less than 6.35 mm [.25"]).	Gravel, cobble, or boulder particles are between 25-50 % surrounded by fine sediment.	Gravel, cobble, or boulder particles are between 50-75% surrounded by fine sediment.	Gravel, cobble, or boulder particles are over 75% surrounded by fine sediment.
2. score: 18	16-20	11-15	6-10	0-5
Comments:				
3. Channel Alteration (channelization, straightening, dredging, other alterations)	Channel alterations absent or minimal; stream pattern apparently in natural state.	Some channelization present, usually in areas of crossings, etc. Evidence of past alterations (before past 20 years) may be resent, but more recent channel alteration is not present.	New embankments present on both banks; 40-80% of the stream reach channelized & disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized & disrupted.
3. score: 20	16-20	11-15	6-10	0-5
Comments:				
4. Sediment Deposition	Little or no enlargement of bars & less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from coarse gravel; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, coarse sand on old & new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, & bends; moderate deposition in pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
4. score: 19	16-20	11-15	6-10	0-5
Comments:				

5. Channel Flow Status	Water fills baseflow channel; minimal amount of channel substrate exposed.	Water fills > 75% of the baseflow channel; < 25% channel substrate exposed.	Water fills 25-75% of the baseflow channel; riffle substrates mostly exposed.	Very little water in channel, & mostly present as standing pools.
5. score: 15	16-20	11-15	6-10	0-5
Comments:				
6. Bank Stability (score each bank) NOTE: Determine left or right side while facing downstream.	Banks stable; no evidence of erosion or bank failure; little apparent potential for future problems.	Moderately stable; infrequent, small areas of erosion mostly healed over.	Moderately unstable; moderate frequency & size of erosional areas; up to 60% of banks in reach have erosion; high erosion potential during high flow.	Unstable; many eroded areas; "raw" areas frequent along straight sections & bends; obvious bank sloughing; 60-100% of banks have erosion scars on sideslopes.
6. score: 10	9-10	6-8	3-5	0-2
	Left Side 10	Average:		
	Right Side 10	Comments: bedrock on left side		
7. Bank Vegetation Protection (score each bank) NOTE: reduce scores for annual crops & weeds which do not hold soil well (e.g. knapweed).	Over 90% of the streambank surfaces covered by stabilizing vegetation; vegetative disruption minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by vegetation; disruption evident, but not affecting full plant growth potential to any great extent; more than one-half of potential plant height evident.	50-70% of the streambank surfaces covered in vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of potential plant height remaining.	Less than 50% of the streambank surfaces covered by vegetation; extensive disruption of vegetation; vegetation removed to 2 inches or less.
7. score: 10	9-10	6-8	3-5	0-2
	Left Side 10	Average:		
	Right Side 10	Comments: (bedrock) rock wall downstream of riffle		
8. Vegetated Zone Width (score each side)	Width of vegetated zone > 100 feet.	Width of vegetated zone 30-100 feet.	Width of vegetated zone 10-30 feet.	Width of vegetated zone < 10 feet.
8. score: 10	9-10	6-8	3-5	0-2
	Left Side 10	Average:		
	Right Side 10	Comments:		

TOTAL SCORE: Score compared to maximum possible:

Place Site Visit

03 – 0725 – __

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-MT2

Trip ID: 2003-DREEN Date: 7/22/03

Personnel: Goldhus, Bowman

Waterbody Name Dearborn River County Lewis + Clark HUC 10030102

Station ID M12DRBN04 Visit # 2 Location @ Hwy 287 Bridge

Lat — Long — Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84

Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☒	03-0725W	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☒	Macroinvertebrate Habitat Asmt. ☐	03-0725M	KICK HESS OTHER:
Algae/Macrophytes	☒	Aquatic Plant Form ☐	03-0725A	PERI-1 OTHER:
Chlorophyll a	☒		03-0725C	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☐			
Field Notes	☐			
Other				

Measurements:	Time: 18:45
Q / Flow (cfs)	USGS gage Est. ☐
Temp: (°C)	W 26.94 A
pH:	8.21
SC: (mS/cm)	.285
SC x 1000 =	µmho/cm
DO: (mg/L)	7.55 mg/l 99.8%
TUR: Clear ☒ Slight ☐ Turbid ☐ Opaque ☐	
Turbidity Comments:	1.12 NTU 1.66 NTU

Macroinvertebrate Kick Duration: 4 min. 30 sec Kick Length (Ft.): 120'

Site Visit Comments:

Revised 3/2003 DMA

21.1.1.12

MACROINVERTEBRATE HABITAT ASSESSMENT FIELD FORM RIFFLE/RUN PREVALENCE

Date: 7-22-03 Site Visit Code: 03-0725

Waterbody: Dearborn River Site: M/2 PBAUR04

Personnel: Andrew Bowman

HABITAT PARAMETER	OPTIMAL	SUB-OPTIMAL	MARGINAL	POOR
1A. Riffle Development	Well-developed riffle; riffle as wide as stream & extends two times width of stream.	Riffle as wide as stream but length less than two times width.	Reduced riffle area that is not as wide as stream & its length less than two times width.	Riffles virtually non-existent
1A. score: 9	9-10	6-8	3-5	0-2
Comments:				
1B. Benthic Substrate	Diverse substrate dominated by cobble.	Substrate diverse with abundant cobble, but bedrock, boulders, fine gravel, or sand prevalent.	Substrate dominated by bedrock, boulders, sand, or silt; cobble present.	Monotonous fine gravel, sand, silt, or bedrock substrate.
1B. score: 10	9-10	6-8	3-5	0-2
Comments:	very cobble dominated			
2. Embeddedness	Gravel, cobble, or boulder particles are between 0-25% surrounded by fine sediment (particles less than 6.35 mm [.25"]).	Gravel, cobble, or boulder particles are between 25-50 % surrounded by fine sediment.	Gravel, cobble, or boulder particles are between 50-75% surrounded by fine sediment.	Gravel, cobble, or boulder particles are over 75% surrounded by fine sediment.
2. score: 19	16-20	11-15	6-10	0-5
Comments:	[illegible] sediment			
3. Channel Alteration (channelization, straightening, dredging, other alterations)	Channel alterations absent or minimal; stream pattern apparently in natural state.	Some channelization present, usually in areas of crossings, etc. Evidence of past alterations (before past 20 years) may be resent, but more recent channel alteration is not present.	New embankments present on both banks; 40-80% of the stream reach channelized & disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized & disrupted.
3. score: 20	16-20	11-15	6-10	0-5
Comments:				
4. Sediment Deposition	Little or no enlargement of bars & less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from coarse gravel; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, coarse sand on old & new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, & bends; moderate deposition in pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
4. score: 19	16-20	11-15	6-10	0-5
Comments:				

lots of downfallen trees [illegible]

5. Channel Flow Status	Water fills baseflow channel; minimal amount of channel substrate exposed.	Water fills > 75% of the baseflow channel; < 25% channel substrate exposed.	Water fills 25-75% of the baseflow channel; riffle substrates mostly exposed.	Very little water in channel, & mostly present as standing pools.
5. score: 16	16-20	11-15	6-10	0-5
Comments:				
6. Bank Stability (score each bank) NOTE: Determine left or right side while facing downstream.	Banks stable; no evidence of erosion or bank failure; little apparent potential for future problems.	Moderately stable; infrequent, small areas of erosion mostly healed over.	Moderately unstable; moderate frequency & size of erosional areas; up to 60% of banks in reach have erosion; high erosion potential during high flow.	Unstable; many eroded areas; "raw" areas frequent along straight sections & bends; obvious bank sloughing; 60-100% of banks have erosion scars on sideslopes.
6. score: 8.5	9-10	6-8	3-5	0-2
	Left Side 9	Average:		
	Right Side 8	Comments:		
7. Bank Vegetation Protection (score each bank) NOTE: reduce scores for annual crops & weeds which do not hold soil well (e.g. knapweed).	Over 90% of the streambank surfaces covered by stabilizing vegetation; vegetative disruption minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by vegetation; disruption evident, but not affecting full plant growth potential to any great extent; more than one-half of potential plant height evident.	50-70% of the streambank surfaces covered in vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of potential plant height remaining.	Less than 50% of the streambank surfaces covered by vegetation; extensive disruption of vegetation; vegetation removed to 2 inches or less.
7. score: 8	9-10	6-8	3-5	0-2
	Left Side 8	Average:		
	Right Side 8	Comments: lots of cobble on bars		
8. Vegetated Zone Width (score each side)	Width of vegetated zone > 100 feet.	Width of vegetated zone 30-100 feet.	Width of vegetated zone 10-30 feet.	Width of vegetated zone < 10 feet.
8. score: 9.5	9-10	6-8	3-5	0-2
	Left Side 10	Average:		
	Right Side 9	Comments:		

TOTAL SCORE: Score compared to maximum possible:

03 – 0824 – __

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-MT2
Trip ID: 2003-DRBW10 Date: 7/24/03
Personnel: Lankford / Bowman

Waterbody Name: Dearborn River
County: Lewis & Clark
HUC: 10030102
Station ID: MT2 DRBWR05 Visit #: 1 Location: Below Falls Creek above FC diversion
Lat: 47°16'50.2" Long: 112°28'54.8" Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84
Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale?

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☐	03-0824-W	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☒	Macroinvertebrate Habitat Asmt. ☒	03-0824-M	KICK HESS OTHER:
Algae/Macrophytes	☒	Aquatic Plant Form ☐	03-0824-A	PERI-1 OTHER:
Chlorophyll a	☒		03-0824-C	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☐			
Field Notes	☐			
Other				

Measurements:	Time: 15:17
Q / Flow (cfs)	Est. ☐
Temp: (°C)	W 13.44°C A
pH:	8.41
SC: (mS/cm)	.270
SC x 1000 =	µmho/cm
DO: (mg/L)	9.94 / 95.1%
TUR: Clear ☒ Slight ☐ Turbid ☐ Opaque ☐	
Turbidity Comments:	.54 NTU
	.98 NTU

Macroinvertebrate Kick Duration: 6 min + Kick Length (Ft.): 50'
Site Visit Comments: rock scrubbing

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 7/24/03 **Site Visit Code:** D3-0824

Waterbody: Dearborn River above diversion **Station ID:** M12DRBIV805

Personnel: Shad/Tim

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	4.4 LEW	0.2	0			
2	6.4	0.62	1.21			
3	8.4	0.78	2.35			
4	10.4	1.08	2.34			
5	12.4	1.27	2.24			
6	14.4	1.05	1.63			
7	16.4	1.20	2.58			
8	18.4	1.18	2.32			
9	20.4	1.20	3.02			
10	22.4	1.25	3.25			
11	24.4	1.08	2.36			
12	26.4	1.25	2.74			
13	28.4	1.12	2.13			
14	30.4	0.95	1.48			
15	32.4	1.26	2.30			
16	34.4	1.28	3.05			
17	36.4	1.10	2.83			
18	38.4	0.88	1.28			
19	40.4	0.95	3.61			
20	42.4	0.63	3.82			
21	44.4	0.80	2.20			
22	46.4	0.60	1.04			
23	48.4	0.45	0.48			
24	50.4	0.10	1.08			
25	52.2 REW	Ø	Ø			
26						
27						
28						
29						
30						

Page 1 of 2 Data Mgmt. Approved

Revised 3/2003 DMA

SUBSTRATE DEQ/MDM

Date: 7/24/03 Site Visit Code: 03-0824

Waterbody: Dearborn Rvr above PC Diversion STORET Station ID: M12DRBNR05

Personnel: Shel/Tina

PEBBLE COUNT

Row ID	Particle Category		Size (mm)	Riffle Count	(Other) Count BF	Characteristic Group: PEBL-CNT		
						Sum	% of Total	Cum. Total
1	Silt / Clay		< 1			0		0.00%
2	Sand		1 - 2			0		0.00%
3	Very Fine	GRAVELS	2 - 4			0		0.00%
4	Fine	GRAVELS	4 - 6			0		0.00%
5	Fine	GRAVELS	6 - 8			0		0.00%
6	Medium	GRAVELS	8 - 12			0		0.00%
7	Medium	GRAVELS	12 - 16			0		0.00%
8	Coarse	GRAVELS	16 - 22			0		0.00%
9	Coarse	GRAVELS	22 - 32			0		0.00%
10	Very Coarse	GRAVELS	32 - 45			0		0.00%
11	Very Coarse	GRAVELS	45 - 64			0		0.00%
12	Small	COBBLES	64 - 90			0		0.00%
13	Small	COBBLES	90 - 128			0		0.00%
14	Large	COBBLES	128 - 180			0		0.00%
15	Large	COBBLES	180 - 256			0		0.00%
16	Small	BOULDERS	256 - 362			0		0.00%
17	Small	BOULDERS	362 - 512			0		0.00%
18	Medium	BOULDERS	512 - 1024			0		0.00%
19	Large	BOULDERS	1024 - 2048			0		0.00%
20	Bedrock	BOULDERS	> 2048			0		0.00%
21	Total # Samples			0	0	0	0.00%	

Pebble Count Data Entry Form

03 – 0712 – ___

Site Visit Form

(One Station per page)

STORET Project ID: [illegible]

Trip ID: [illegible] Date: [illegible]

Personnel: [illegible]

Waterbody Name Dearborn River County Lewis + Clark HUC 10030102

Station ID M12DRBARBOW Visit # ____ Location Dearborn @ Hwy 287

Lat 47°11'55.5" Long 112°06'35.5" Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84

Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☒	D3-0712AW	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☐	Macroinvertebrate Habitat Asmt. ☐		KICK HESS OTHER:
Algae/Macrophytes	☐	Aquatic Plant Form ☐		PERI-1 OTHER:
Chlorophyll a	☒		D3-0712C (Wash - Cloth)	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: [illegible]
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☐			
Field Notes	☐			
Other				

Measurements:	Time: 1800	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W	A
pH:		
SC: (mS/cm)		
SC x 1000 =		µmho/cm
DO: (mg/L)		
TUR: Clear ☒ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments:		

Macroinvertebrate Kick Duration: Kick Length (Ft.):

Site Visit Comments:

no water for field readings

USGS 88[illegible] station at at lake (flow)

Revised [illegible]

Revised 4/2003

TOTAL DISCHARGE:

Date: 6-17-03 **Site Visit Code:** 03-0712

Waterbody: Dearborn River @ Hwy 287 **Station ID:** M10DRBNR04

Personnel: TT (Landon Bowman)

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
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16						
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18						
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22						
23						
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25						
26						
27						
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30						

NO FLOW

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Revised 4/2003

NOTE:

First blank is used to mark the bank.
Begin measurements from the left bank (determine left bank while looking downstream).
Initial point is often the tape reading of the waterline & has no depth or velocity to measure.

If this is the case, the first measurement is made at the first point where there is adequate depth (at least 0.2 ft) and measurable velocity.

The value for the "Distance from initial point" field is not necessarily the tape reading. Make sure it is reflective of the true distance from the bank.

If there is a sharp drop in water level near the bank, you must compensate for the discharge that is occurring near the bank. To do so, you must insert a "dummy" value in the first "distance" blank. This value should be equal to the second value (i.e. the first measurement).

At points where there is stagnant water or backflow effects, begin and end measurements at the edge of where positive flow can be measured.
Read depths on wading rod ignoring the "pile-up" effect of water on the rod.
Velocity is measured at six-tenths depth from the water surface by moving the probe support so that the foot indicator marks align
25 to 30 cross-sections are adequate to reduce the level of error.

Sections should be spaced so none contain more than 10% of the flow. Ideal measurements have less than 5% in a section.

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Data Mgmt. Approved

Stream Classification

Revised 3/2003

Date: 6-17-03 **Site Visit Code:** 03-0712

Waterbody: Dearborn River @ Hwy 287 **Station ID:** M12DRAUK04

Personnel: TT (Ladeco Bowman)

Bankfull Width (W_{bkf}) 200.2 Ft.
WIDTH of the stream channel, at bankfull stage elevation, in a riffle section

6.04 use 6 bankfull values 3.02 for floodprone

Mean DEPTH (d_{bkf}) _____ Ft.
Mean DEPTH of the stream channel cross-section, at bankfull stage elevation, in a riffle section.

Bnkfl. X-Section AREA (A_{bkf}) _____ Sq. Ft.
AREA of the stream channel cross-section, at bankfull stage elevation, in a riffle section.

Width/Depth RATIO (W_{bkf} / d_{bkf}) _____ 210.98 = 20.2
Bankfull WIDTH divided by bankfull mean DEPTH, in a riffle section.

Maximum DEPTH (d_{mbkf}) _____ Ft.
Maximum depth of the bankfull channel cross-section, or distance between the bankfull stage and thalweg elevations, in a riffle section

WIDTH of Flood-Prone Area (W_{fpa}) 210.2 Ft.
Twice maximum DEPTH, or (2 x d_{mbkf}) = the stage/elevation at which flood-prone area WIDTH is determined. (riffle section)

Entrenchment Ratio (ER) _____
The ratio of flood-prone area WIDTH divided by bankfull channel WIDTH. (W_{fpa} / W_{bkf}) (riffle section)

Channel Materials (Particle Size Index) D50 _____ mm.

The D50 particle size index represents the median diameter of channel materials, as sampled from the channel surface, between the bankfull stage and thalweg elevations.

Water Surface SLOPE (S) _____ Ft./Ft.
Channel slope = "rise" over "run" for a reach approximately 20-30 bankfull channel widths in length, with the "riffle to riffle" water surface slope representing the gradient at bankfull stage.

45+290+290 = 625

10.47' DRWP01
11.07 WP03
= 1 mile

Channel SINUOSITY (K) _____ map
Sinuosity is an index of channel pattern, determined from a ratio of stream length divided by valley length (SL/VL); or estimated from a ratio of valley slope divided by channel slope (VS/S).

Stream Type _____

Comments: Upstream slope
Dist = 180.5

Data Mgmt. Approved

Revised 3/2003 DMA

SUBSTRATE DEQ/MDM

Date: 6-17-03 **Site Visit Code:** D3-0712

Waterbody: Dearborn @ Hwy 287 **STORET Station ID:** M12D

Personnel: TT/Laidlaw Bowman

PEBBLE COUNT

Row ID	Particle Category		Size (mm)	Riffle Count	(Other) Count	Characteristic Group: PEBL-CNT		
						Sum	% of Total	Cum. Total
1	Silt / Clay		< 1			0		0.00%
2	Sand		1 - 2			0		0.00%
3	Very Fine	GRAVELS	2 - 4			0		0.00%
4	Fine	GRAVELS	4 - 6			0		0.00%
5	Fine	GRAVELS	6 - 8			0		0.00%
6	Medium	GRAVELS	8 - 12			0		0.00%
7	Medium	GRAVELS	12 - 16			0		0.00%
8	Coarse	GRAVELS	16 - 22			0		0.00%
9	Coarse	GRAVELS	22 - 32			0		0.00%
10	Very Coarse	GRAVELS	32 - 45			0		0.00%
11	Very Coarse	GRAVELS	45 - 64			0		0.00%
12	Small	COBBLES	64 - 90			0		0.00%
13	Small	COBBLES	90 - 128			0		0.00%
14	Large	COBBLES	128 - 180			0		0.00%
15	Large	COBBLES	180 - 256			0		0.00%
16	Small	BOULDERS	256 - 362			0		0.00%
17	Small	BOULDERS	362 - 512			0		0.00%
18	Medium	BOULDERS	512 - 1024			0		0.00%
19	Large	BOULDERS	1024 - 2048			0		0.00%
20	Bedrock	BOULDERS	> 2048			0		0.00%
21	Total # Samples			0	0	0	0.00%	

Pebble Count Data Entry Form

Revision 3/2003

Stream Reach Assessment Form

Station ID: M12 DR BNROY Date: 6-17-03 Site Visit Code: 03-0712

Waterbody: Dearborn River Reach Length: 1/2 mi

Waterbody Seg ID: _____ Personnel: Landau / Bowman

Station ID's on reach: _____

Question 1, Stream Incisement:

8 = channel stable, no active downcutting occurring; old downcutting apparent but a new, stable riparian area has formed within the incised channel. There is perennial riparian vegetation will established in the riparian area. (Stage 1 and 5, Schumm's model)

6 = channel has evidence of old downcutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling bands, solid disturbance evident. (Stage 4).

4 = small headcut, in early stage, is present. Immediate action may prevent further degradation (early Stage 2).

2 = unstable, channel incised, actively widening, limited new riparian area/floodplain, floodplain not well vegetated. The vegetation that is present is mainly pioneer species. Bank failure is common. (Stage 3)

0 = channel deeply incised, resembling a gully, little or no riparian area, active downcutting is clearly occurring. Only occasional or rare flood events access the flood plain. Tributaries will also exhibit downcutting/headcuts. (Stage 2)

The presence of active headcuts should nearly always keep the stream reach from being rated sustainable.

Actual Score: 7 Potential Score: 8

Comments _____

Question 2, Percent of Streambanks with Active Lateral Cutting:

6 = the lateral bank erosion is in balance with the stream and its setting

4 = there is a minimal amount of active lateral bank erosion occurring

2 = there is a moderate amount of active lateral bank erosion occurring

0 = there is excessive lateral bank erosion occurring

Actual Score: 4 Potential Score: 6

Comments _____

Question 3, The Stream is in Balance with the Water and Sediment Being Supplied by the Watershed:

6 = the stream exhibits no excess sediment/bedload deposition, sediment occurs on point bars and other locations as would be expected in a stable, dynamic system

4 = sediment clogged gravel's are apparent in riffles or pools, or other evidence of excess sediment apparent

2 = mid-channel bars are common

0 = stream is braided (except naturally occurring braided systems), having at least 3 active channels

Actual Score: 6 Potential Score: 6

Comments _____

1 SRAF xls

Question 4, Sufficient Soil Present to Hold Water and Act as a Rooting Medium:

3 = more than 85% of the riparian area with sufficient soil to hold water and act as a rooting medium

2 = 65% to 85% of the riparian area with sufficient soil to hold water and act as a rooting medium

1 = 35% to 65% of the riparian area with sufficient soil to hold water and act as a rooting medium

0 = 35% or less of the riparian area with sufficient soil to hold water and act as a rooting medium

Actual Score: 3 Potential Score: 3

Comments

Question 5, Percent of Streambank with Vegetation having a Deep, Binding Rootmass: (see Appendix I for stability ratings for most riparian, and other, species)

6 = more than 80% of the streambank comprised of plant species with deep, binding root masses

4 = 60% to 80% of the streambank comprised of plant species with deep, binding root masses

2 = 30% to 60% of the streambank comprised of plant species with deep binding root masses

0 = less than 30% of the streambank comprised of plant species with deep binding root masses

Actual Score: 4 Potential Score: 5

grasses are different to veg to good

Comments

Question 6, Weeds :

3 = No noxious weeds are present

2 = 0-1% of the riparian area has noxious weeds

1 = 1%-5% of the riparian area has noxious weeds

0 = over 5% of the riparian area has noxious weeds

Actual Score: 2 Potential Score: 3

Comments

Question 7, Disturbance-Caused Undesirable Plants:

3 = 1% or less of the riparian area has undesirable plants

2 = 1%-5% of the riparian area has undesirable plants

1 = 5%-10% of the riparian area has undesirable plants

0 = over 10% of the riparian area has undesirable plants

Actual Score: 2 Potential Score: 3

Comments

SRAF.xls

Question 8, Woody Species Establishment and Regeneration: (Note: Skip this question if the riparian area has no potential for woody species)

8 = all age classes of native woody riparian species present (see table, Fig 2)

6 = one age class of native woody riparian species clearly absent, all others well represented. For sites with potential for trees and shrubs, there may be one age class of each absent. Often, it will be the middle age group(s) that is (are) lacking. Having mature individuals and a young age class present indicate potential for recovery.

4 = two age classes of native riparian shrubs and/or two age classes of riparian trees clearly absent, other(s) well represented, or the stand is comprised of mainly mature, decadent or dead plants

2 = disturbance induced, (i.e., facultative, facultative upland species such as rose, or snowberry) or non-riparian species dominate. Re-evaluate Question 1, incisement, if this has happened.

0 = some woody species present (>10% cover), but herbaceous species dominate (at this point, the site potential should be re-evaluated to ensure that it has potential for woody vegetation). OR, the site has at least 5% cover of Russian olive and/or salt cedar

Actual Score: 7 Potential Score: 8

Comments: more riparian veg upstream

Question 9, Utilization of Trees and Shrubs: (Note: Skip this question if the riparian area has no potential for woody species)

4 = 0-5% of the available second year and older stems are browsed

3 = 5%-25% of the available second year and older stems are browsed

2 = 25%-50% of the available second year and older stems are browsed.

1 = more than 50% of the available second year and older stems are browsed. Many of the shrubs have either a "clubbed" growth form, or they are high-lined or umbrella shaped.

0 = there is noticeable use (10% or more) of unpalatable and normally unused woody species.

Actual Score: 4 Potential Score: 4

Comments:

Question 10, Riparian/Wetland Vegetative Cover in the Riparian Area/Floodplain and Streambank:

8 = 85% or more of the riparian/wetland plant cover has a stability rating ≥ 6

6 = 75%-85% of the riparian/wetland plant cover has a stability rating ≥ 6

4 = 65%-75% of the riparian/wetland plant cover has a stability rating ≥ 6

2 = 55%-65% of the riparian/wetland plant cover has a stability rating ≥ 6

0 = less than 55% of the riparian/wetland plant cover has a stability rating ≥ 6

Actual Score: 6 Potential Score: 8

Comments: mostly grass
extensive wetland

3 SRAF v1e

Question 11, Riparian Area/Floodplain Characteristics are Adequate to Dissipate Energy and Trap Sediment.

6 = active flood or overflow channels, large rock, or woody material present and adequate to dissipate energy and trap sediment. There is little surface erosion and no evidence of long, continuous erosional areas on floodplain/riparian area or streambank. There are no headcuts where either overland flow and/or flood channel flows return to the main channel.

4 = rock and/or woody material is present, but generally of insufficient size to dissipate energy. Some sediment trapping occurring. Occasional evidence of surface erosion. Generally not severe enough to have developed channels.

2 = inadequate rock and/or woody material available for dissipation of energy or sediment trapping. There is surface erosion (scouring) and occasional headcuts where overland flows or flood channel flows return to the main channel.

0 = riparian area/floodplain lacking any of these attributes: 1)adequate flood or overflow channels, 2) large rock, or 3) woody material suitable for energy dissipation and sediment trapping. Erosional areas are long and continuous. Lacking vegetation or substrate materials adequate to resist further erosion. Surface erosion is obvious on the floodplain/riparian area. Headcuts are present that have the potential to create meander cut-offs.

Actual Score: 6 Potential Score: 6

Comments

SUMMARY

		Actual Score	Possible Points	Potential Score
QUESTION 1:	Stream Incisement	0	0, 2, 4, 6, 8	0
QUESTION 2:	Lateral Cutting	0	0, 2, 4, 6	0
QUESTION 3:	Stream Balance	0	0, 2, 4, 6	0
QUESTION 4:	Sufficient Soil	0	N/A, 0, 1, 2, 3	0
QUESTION 5:	Rootmass	0	N/A, 0, 2, 4, 6	0
QUESTION 6:	Weeds	0	0, 1, 2, 3	0
QUESTION 7:	Undesirable Plants	0	0, 1, 2, 3	0
QUESTION 8:	Woody Species Establishment	0	N/A, 0, 2, 4, 6, 8	0
QUESTION 9:	Browse Utilization	0	N/A, 0, 1, 2, 3, 4	0
QUESTION 10:	Riparian/Wetland Vegetative Cover *	0	N/A, 0, 2, 4, 6, 8	0
QUESTION 11:	Riparian Area/Floodplain Characteristics *	0	N/A, 0, 2, 4, 6	0
	Total	0	61	0
Potential Score for most Bedrock or Boulder streams (questions 1, 2, 3, 6, 7, 11)		0	(32)	0
Potential Score for most low energy "E" streams (questions 1 – 7, 10, 11)		0	(49)	0

RATING: = $\frac{\text{Actual Score}}{\text{Potential Score}}$ X 100 = % rating #DIV/0!

80-100% = SUSTAINABLE
50-80% = AT RISK
LESS THAN 50% = NOT SUSTAINABLE

* Only in certain, specific situations can both of these receive an "N/A".

Montana Department of Environmental Quality Supplemental Questions

The score for these questions does not have an effect on the rating above.
Note: Answers to these questions must consider the potential of the stream.

Question 12. Fisheries Habitat / Stream Complexity Note: the answers to question 12 will be averaged

12a. Adult and Juvenile Holding/Escape Cover

8 = Abundant deep pools, wood, debris, overhanging vegetation, boulders, root wads, undercut banks and/or aquatic

6 = Fish habitat is common (see above).

4 = Fish habitat is noticeably reduced. Most pools are shallow and/or woody debris, undercut banks, overhanging vegetation, boulders, root wads and/or aquatic vegetation are of limited supply.

2 = Pools and habitat features are sparse or non-existent or there are fish barriers.

0 = There is not enough water to support a fishery

N/A = Stream would not support fish under natural conditions

Actual Score: 6 Potential Score: 6

Comments: many people fish here. Little overhanging veg

12b. Habitat Complexity

6 = A mixture of juvenile and adult cover types is present. High flow juvenile and adult refugia are present.

3 = Primarily adult or juvenile cover types are present. High flow refugia are reduced.

0 = High flow refugia are lacking.

N/A = Stream would not support fish under natural conditions

Actual Score: 3 Potential Score: 6

Comments: many lots of deep pools + pockets

12c. Spawning Habitat (salmonid streams only)

8 = Areal extent of spawning substrate, morphology of spawning areas, and composition of spawning substrate are excellent.

4 = Areal extent of spawning substrate, morphology of spawning areas, and/or quality of spawning substrate reduced.

0 = Areal extent of spawning substrate, morphology of spawning areas, and/or quality of spawning substrate greatly reduced.

N/A = Stream would not support fish under natural conditions.

Actual Score: 8 Potential Score: 8

Comments: lots of cobble gravel

5 SRAF.xls

12d. Fish Passsage

8 = No potential fish passage barriers apparent.

0 = Potential fish passage barriers present.

N/A = Stream would not support fish under natural conditions.

Actual Score: 8 Potential Score: 8

Comments

12e. Entrainment

8 = Entrainment of fish into water diversions not an issue.

4 = Entrainment of fish into water diversions may be a moderate issue.

0 = Entrainment of fish into water diversions may be a major issue.

Actual Score: 8 Potential Score: 8

Comments

12a-e Avg. Score Actual Score 0 Potential Score 0

Question 13. Solar Radiation

6 = More than 75% of the stream reach is adequately shaded by vegetation.

4 = 50-75% of the stream reach does not have adequate shading or the water temperature is probably elevated by irrigation,

3 = Approximately 25-50% of the stream does not have adequate shade.

0 = More than 75% of the stream reach does not have adequate shade by vegetation or the water temperature is probably drastically altered by irrigation, etc.

Actual Score: 3 Potential Score: 4

Comments

Question 14. Algae growth / Nutrients

6 = Algae not apparent. Rocks are slippery.

4 = in small patches or along channel edge

2 = in large patches or discontinuous mats

0 = Mats cover bottom (hyper enriched conditions) or plants not apparent and rocks not slippery (toxic conditions)

N/A = No water

Actual Score: 6 Potential Score: 6

rocks very slippery

Comments

SRAF.xls

Question 15. Surface oils, turbidity, salinization, precipitants on stream bottom and/or water odor

6 = none

4 = Slight

2 = Moderate

0 = Extensive

N/A = No water

Actual Score: 6 Potential Score: 6

Comments

Question 16. Bacteria

4 = There are no known anthropogenic sources of bacteria

2 = Likely sources of bacteria are present. Wastewater or concentrated livestock operations are the most common sources.

0 = Feedlots are common or raw sewage is entering the stream

Actual Score: 4 Potential Score: 4

Comments

Question 17. Macroinvertebrates

4 = The stream has a healthy and diverse community of macroinvertebrates. Stream riffles usually have an abundance of may flies, caddis flies and/or stone flies.

2 = The stream is dominated by pollution tolerant taxa such as fly and midge larva.

0 = Macroinvertebrates are rare or absent

N/A = Stream reach is ephemeral

Actual Score: 4 Potential Score: 4

Comments

7 SRAF.xls

Question 18. Irrigation impacts (Assess during critical low flow periods or you may need to inquire locally about this. Evaluate effects from de-watering or inter-basin transfer of water.)

8 = There are no noticeable impacts from irrigation

6 = Changes in flow resulting from irrigation practices are noticeable, however flows are adequate to support aquatic organisms.

4 = Flows support aquatic organisms, but habitat, especially riffles are drastically reduced or impacted.

2 = The flow is low enough to severely impair aquatic organisms

0 = All of the water has been diverted from the stream

N/A = Stream reach is ephemeral.

Actual Score: 8 Potential Score: 8

Comments

Question 19. Landuse activities – Sources

8 = Landuse practices do not appear to significantly impact water quality or the riparian vegetation. Any impacts that occur appear to be natural.

6 = There are some signs of impact from landuse activities such as grazing, dryland agriculture, irrigation, feedlots, mining, timber harvesting, urban, roads, etc.

4 = Impacts from landuse activities are obvious and occur throughout most of the stream reach. For example, there are obvious signs of human induced erosion, saline seeps or overgrazing within the watershed.

2 = Landuse impacts are significant and widespread. Visual observation and photo documentation would provide overwhelming evidence that the stream is impaired.

0 = Land use impacts are so intrusive that the stream has lost most of its natural features. The stream does not appear to be capable to support most forms of aquatic life

Actual Score: 7 Potential Score: 8

fishing access pull nearby

Comments

Total Actual 0 Total Potential 0

RATING $\frac{\text{Total}}{\text{Potential}} \times 100$ #DIV/0!

OVERALL RATING $\frac{\text{(Total NRCS Actual + Total MT Supplement Actual)}}{\text{(Total NRCS Potential + Total MT Supplement Potential)}} \times 100$ #DIV/0!

75-100% = SUSTAINABLE
50-75% = AT RISK
LESS THAN 50% = NOT SUSTAINABLE

SRAF v8

Site ID: _____
Site Description: _____

CROSS-SECTIONAL PROFILE FIELD DATA SHEET

Page _____ of _____
Date: _____
Basin: _____

	REFERENCE		CHANNEL MEASUREMENTS								
			LONGITUDINAL OR X-SECTION		WATER LEVEL		BANKFULL		BANK HEIGHT		
STA	BS (+)	HI	FS (-)	ELEV	FS (-)	ELEV	FS (-)	ELEV	FS (-)	ELEV	NOTES
10'											
28'	6.19	LBFE									L BF Edge
39.6'	6.88	side									
49.0	6.38	Bar1									Bottom of side channel
63.0'	6.8	Bar2									Point Bar
79.0	5.49	Top Bar									
96.0'	5.88	Bar3									Top of Point Bar
110.0	9.07	Left Ed									Point Bar
120.0	11.07										H2O Depth = 0
125.0	11.22	Thalweg									H2O Depth = 0.15
134.0	10.64										Thalweg H2O Depth 0.35
150.0	10.40										H2O Depth = 1.74
162.0	10.30										H2O Depth 1.75
172.0	10.20										H2O Depth 1.83
180.0	9.36	Right edge									H2O Depth 1.20
181.0	8.05										H2O Depth .38
195.0'	7.35										Top of bank
204.8'	6.55	RBEFL									
205.0'											Right bankfull edge

STA = Station
HI = Height of Instrument (Elevation + BS)

BS = Backsight (Shot to a known elevation)
ELEV = If actual elevation (Datum) is unknown, use 100' to begin profile.

FS = Foresight (Shot to new point with unknown elevation)
RP = Reference Point

M12DRBNR05	Date- 7/24/2003	15:17
Dearborn River below confluence with Falls Creek, above Flat Creek Diversion		

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope		
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	77	mm
Percentage of Fines (<2mm)	*4.92*	*%*
Stream Type		
Discharge	*105.06*	*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)		%
Stream Reach Assessment Score (MT adjusted)		%
Macroinvertabrate Habitat Assessment Score	**94.6**	%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)		
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		6 min 50'

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*105.06*	*cfs*
Temperature, water	13.44	degree C
pH	8.41	
Specific Conductance	0.27	mS/cm
Dissolved Oxygen	9.94	mg/L
Dissolved Oxygen, % Saturation	95.1	%
Turbidity	0.76	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	0.6	mg/m^3	0.1
Benthic Chlorophyll a	19.7	mg/m^3	0.1
Total Phosphorus, TP	0.056	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

Macroinvertabrate Data Results		
parameter	*value*	*units*
TOTAL SCORE (max =18)	15	score
PERCENT OF MAX SCORE	83	%
IMPAIRMENT CLASSIFICATION	NON IMPAIRED	
USE SUPPORT	FULL SUPPORT	

		Pebble Count Data			
	Mean size	*Particle Size (mm)*	*Sum*	*% Total*	*Cum. Total*
S/C	0.5	<1	2	*1.64*	*1.64*
S	1.5	1-2	4	*3.28*	*4.92*
FG	3	2-4		*0.00*	*4.92*
FG	5	4-6	3	*2.46*	*7.38*
FG	7	6-8	2	*1.64*	*9.02*
MG	10	8-12	6	*4.92*	*13.93*
MG	14	12-16	4	*3.28*	*17.21*
CG	18	16-22	6	*4.92*	*22.13*
CG	27	22-32	10	*8.20*	*30.33*
CG	38.5	32-45	7	*5.74*	*36.07*
CG	54.5	45-64	11	*9.02*	*45.08*
SC	77	64-90	15	*12.30*	*57.38*
SC	109	90-128	20	*16.39*	*73.77*
MC	154	128-180	23	*18.85*	*92.62*
LC	218	180-256	5	*4.10*	*96.72*
LC	309	256-362	3	*2.46*	*99.18*
SB	437	362-512	1	*0.82*	*100.00*
MB	768	512-1024		*0.00*	*100.00*
LB	1536	1024-2048		*0.00*	*100.00*
BR		>2048		*0.00*	*100.00*
		TOTALS	122	*100.00*	*100.00*
		D50 particle size (mm)	77		
		% Fines (<2mm)	***4.92***		
	M12DRBNR05	**Date-**	**7/24/2003**	**15:17**	
	Dearborn River below confluence with Falls Creek, above Flat Creek Diversion				

M12DRBRNR04	Date-	7/22/2003	18:45
Dearborn River at Hwy 287			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width	*75.00*	*Ft*
Mean Depth	*2.60*	*Ft*
Bnkfull X-sect area	*195.13*	*Sq Ft*
Width/Depth	*28.83*	
Max Depth	*3.49*	*Ft*
Flood prone width	*238.00*	*Ft*
Entrenchement Ratio	*3.17*	
Water slope	*0.0010*	
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	38.5	mm
Percentage of Fines (<2mm)	*10.89*	*%*
Stream Type	C4	*border C4c due to low slope*
Discharge	*38.00*	*cfs*

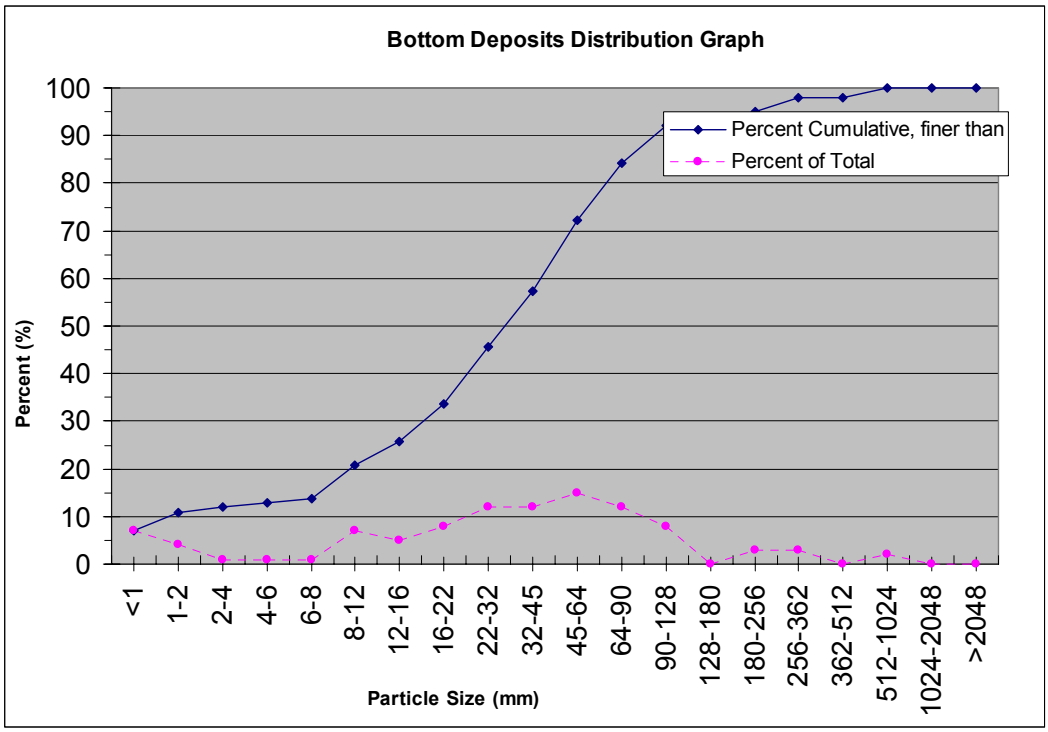
Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)	**85**	%
Stream Reach Assessment Score (MT adjusted)	**91**	%
Macroinvertabrate Habitat Assessment Score	**91.5**	%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)	**Non Impaired, Fully Supporting**	
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		4.5 min 120'

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*38.00*	*cfs*
Temperature, water	26.94	degree C
pH	8.21	
Specific Conductance	0.285	mS/cm
Dissolved Oxygen	7.55	mg/L
Dissolved Oxygen, % Saturation	94.8	%
Turbidity	1.39	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	1.8	mg/m^3	0.1
Benthic Chlorophyll a	10.5	mg/m^3	0.1
Total Phosphorus, TP	0.018	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

Macroinvertabrate Data Results		
parameter	*value*	*units*
TOTAL SCORE (max =18)	9	score
PERCENT OF MAX SCORE	50	%
IMPAIRMENT CLASSIFICATION	MODERATE IMPAIRMENT	
USE SUPPORT	PARTIAL SUPPORT	

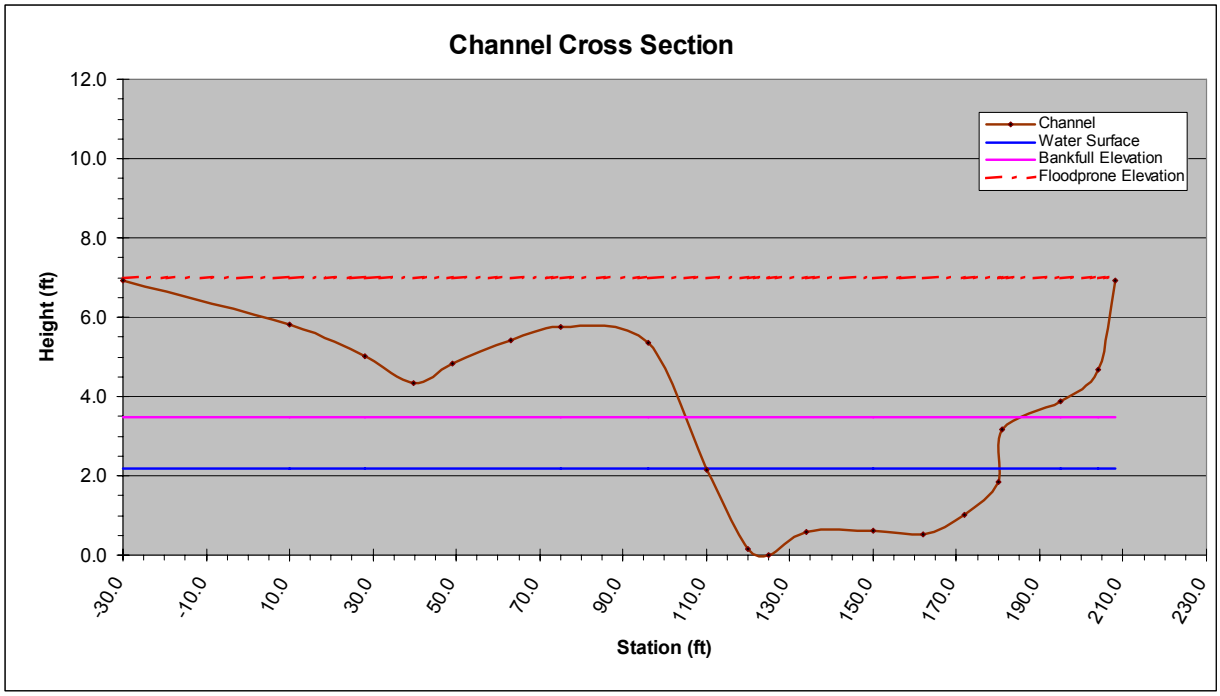
		Pebble Count Data			
	Mean size	*Particle Size (mm)*	*Sum*	*% Total*	*Cum. Total*
S/C	0.5	<1	7	*6.93*	*6.93*
S	1.5	1-2	4	*3.96*	*10.89*
FG	3	2-4	1	*0.99*	*11.88*
FG	5	4-6	1	*0.99*	*12.87*
FG	7	6-8	1	*0.99*	*13.86*
MG	10	8-12	7	*6.93*	*20.79*
MG	14	12-16	5	*4.95*	*25.74*
CG	18	16-22	8	*7.92*	*33.66*
CG	27	22-32	12	*11.88*	*45.54*
CG	38.5	32-45	12	*11.88*	*57.43*
CG	54.5	45-64	15	*14.85*	*72.28*
SC	77	64-90	12	*11.88*	*84.16*
SC	109	90-128	8	*7.92*	*92.08*
MC	154	128-180		*0.00*	*92.08*
LC	218	180-256	3	*2.97*	*95.05*
LC	309	256-362	3	*2.97*	*98.02*
SB	437	362-512		*0.00*	*98.02*
MB	768	512-1024	2	*1.98*	*100.00*
LB	1536	1024-2048		*0.00*	*100.00*
BR		>2048		*0.00*	*100.00*
		TOTALS	101	*100.00*	*100.00*
		D50 particle size (mm)	32-45		
		% Fines (<2mm)	***10.89***		
	M12DRBRNR04	**Date-**	**7/22/2003**	**18:45**	
	Dearborn River at Hwy 287				



	BEHI Field Measures			BEHI Calculated Values		
	Parameter	Value	Units	Parameter	Value	Units
Longitudinal Information				Slope	0.0010	
	Rod reading @ Upstream Edge of Water	10.47	feet	Sinuousity		
				Max Depth	3.49	feet
	Rod reading @ Downstream Edge of Water	11.07	feet	Floodprone Height	6.98	feet
	Stream Distance	625.00	feet	Mean Depth	2.60	feet
	Straightline Distance		feet	Bankfull Width	75.00	feet
Cross-Sectional Information	Left Edge of Bankfull	110.00	feet	Floodplrone Width	238.00	feet
	Right Edge of Bankfull	185.00	feet	Bankfull Area	195.13	ft^2
	Rod reading @ Thalweg	11.22	feet	FloodproneArea		ft^2
	Rod reading @ Bankfull Depth	7.73	feet	W/D Ratio	28.83	
	Rod reading @ Floodplain Depth	4.24	feet	Cross Sectional Area	195.13	ft^2
	Left Edge of Floodprone depth	-30.00	feet	Entrenchment Ratio	3.17	
	Right Edge of Floodprone depth	208.00	feet			
BEHI Information	Bank Height		feet			
	Bankfull Height		feet	Bank Ht/Bankfull Ht		
	Root Depth		feet	Root Depth/Bank Ht		
	Root Density		%	Root Density		%
	Bank Angle		Degrees	Bank Angle		degrees
	Surface Protection		%	Surface Protection		%
Near Bank Stress Information	Velocity at thalweg		ft/sec	Velocity Gradient		ft/sec/ft
	Tape reading at thalweg		feet	Near Bank stress / Mean Shear stress		
	velocity at left bank		ft/sec			
	tape reading at left bank		feet	A nb / A		
	Near bank stress					
	Mean shear stress					
	Near bank x-sectional area		ft^2			

M12DRBRNR04	Date- 7/22/2003	18:45
Dearborn River at Hwy 287		

BEHI Associated Index Value (from form)		Possible Adjustment Factors
Bank Ht/Bankfull Ht		Bank Materials
Root Depth/Bank Ht		Bedrock is always Very Low
Root Density		Boulders are always Low
Bank Angle		Cobble decrease the category by one unless the mixture of Sand/Gravel is over 50%
Surface Protection		
Total Index Value		Gravel- adjust the values up 5-10 pts depending on sand composition
Numeric Adjustments:		
Bank Materials Index adjustment:		Sand- adjust the values up 10 pts
		silt/clay- no adjustment
		Stratification
Bank Stratification Index adjustment:		5-10 pts upward depending on position of unstable layers relative to bankfull stage
Total adjusted Index Value:		
Bank Erosion Potential Rating:		


Channel Cross Section
Height (ft)
12.0
10.0
8.0
6.0
4.0
2.0
0.0
-30.0
-10.0
10.0
30.0
50.0
70.0
90.0
110.0
130.0
150.0
170.0
190.0
210.0
230.0
Station (ft)
Channel
Water Surface
Bankfull Elevation
Floodprone Elevation

M12DRBNR06	Date- 7/24/2003	11:00
Dearborn River below confluence with Flat Creek on Dearborn Ranch		

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope		
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50		mm
Percentage of Fines (<2mm)		*%*
Stream Type		
Discharge	*43.10*	*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)		%
Stream Reach Assessment Score (MT adjusted)		%
Macroinvertabrate Habitat Assessment Score	**92.3**	%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)		
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		3.5 min 60'

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*43.10*	*cfs*
Temperature, water	19.5	degree C
pH	8.4	
Specific Conductance	0.275	mS/cm
Dissolved Oxygen	9.02	mg/L
Dissolved Oxygen, % Saturation	98.3	%
Turbidity	1.11	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	ND	mg/m^3	0.1
Benthic Chlorophyll a	23.9	mg/m^3	0.1
Total Phosphorus, TP	0.098	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

Macroinvertabrate Data Results		
parameter	*value*	*units*
TOTAL SCORE (max =18)	9	score
PERCENT OF MAX SCORE	50	%
IMPAIRMENT CLASSIFICATION	MODERATE IMPAIRMENT	
USE SUPPORT	PARTIAL SUPPORT	

M12DRBRNR04	Date-	6/17/2003	18;00
Dearborn River at Hwy 287			

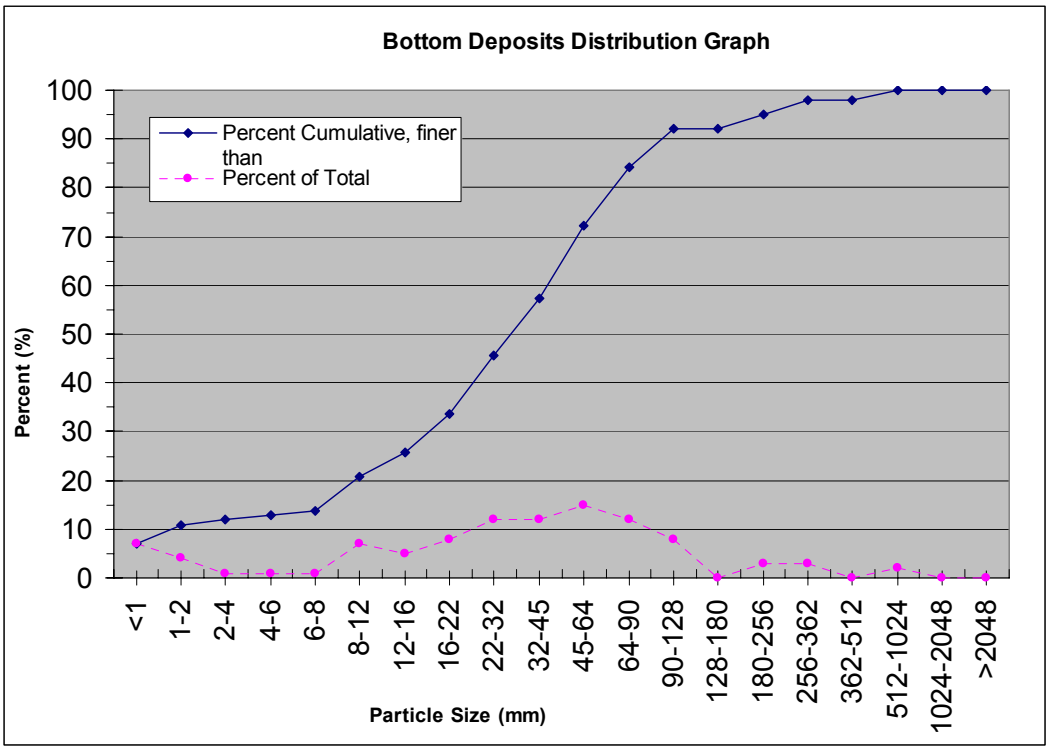
Geomorphology Data		
parameter	*value*	*units*
Bankfull Width	*75.00*	*Ft*
Mean Depth	*2.60*	*Ft*
Bnkfull X-sect area	*195.13*	*Sq Ft*
Width/Depth	*28.83*	
Max Depth	*3.49*	*Ft*
Flood prone width	*238.00*	*Ft*
Entrenchement Ratio	*3.17*	
Water slope	*0.0010*	
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	38.5	mm
Percentage of Fines (<2mm)	*10.89*	*%*
Stream Type		
Discharge	*202.00*	*cfs*

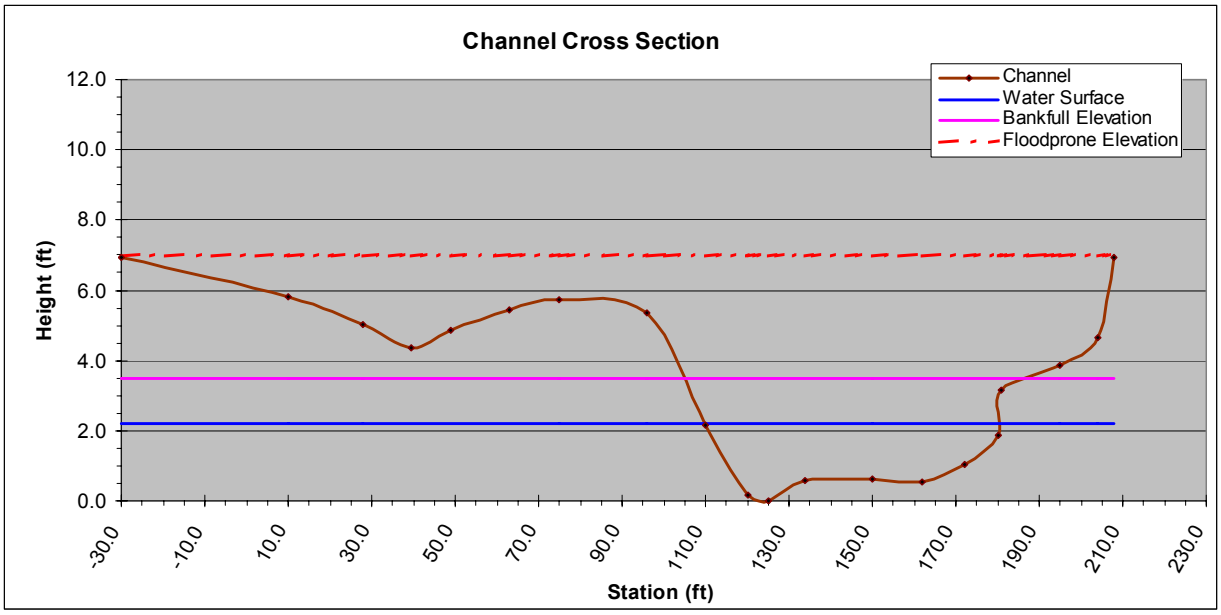
Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)	**85**	%
Stream Reach Assessment Score (MT adjusted)	**91**	%
Macroinvertabrate Habitat Assessment Score		%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)	**Non Impaired, Fully Supporting**	
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*202.00*	*cfs*
Temperature, water	17	degree C
pH		
Specific Conductance		mS/cm
Dissolved Oxygen		mg/L
Dissolved Oxygen, % Saturation		%
Turbidity		NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	ND	mg/m^3	0.1
Benthic Chlorophyll a	12.3	mg/m^3	0.1
Total Phosphorus, TP	ND	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

		Pebble Count Data			
	Mean size	*Particle Size (mm)*	*Sum*	*% Total*	*Cum. Total*
S/C	0.5	<1	7	*6.93*	*6.93*
S	1.5	1-2	4	*3.96*	*10.89*
FG	3	2-4	1	*0.99*	*11.88*
FG	5	4-6	1	*0.99*	*12.87*
FG	7	6-8	1	*0.99*	*13.86*
MG	10	8-12	7	*6.93*	*20.79*
MG	14	12-16	5	*4.95*	*25.74*
CG	18	16-22	8	*7.92*	*33.66*
CG	27	22-32	12	*11.88*	*45.54*
CG	38.5	32-45	12	*11.88*	*57.43*
CG	54.5	45-64	15	*14.85*	*72.28*
SC	77	64-90	12	*11.88*	*84.16*
SC	109	90-128	8	*7.92*	*92.08*
MC	154	128-180		*0.00*	*92.08*
LC	218	180-256	3	*2.97*	*95.05*
LC	309	256-362	3	*2.97*	*98.02*
SB	437	362-512		*0.00*	*98.02*
MB	768	512-1024	2	*1.98*	*100.00*
LB	1536	1024-2048		*0.00*	*100.00*
BR		>2048		*0.00*	*100.00*
		TOTALS	101	*100.00*	*100.00*
		D50 particle size (mm)	32-45		
		% Fines (<2mm)	***10.89***		
	M12DRBRNR04	**Date-**	**6/17/2003**	**18;00**	





	BEHI Field Measures			BEHI Calculated Values		
	Parameter	***Value***	***Units***	***Parameter***	***Value***	***Units***
Longitudinal Information	Rod reading @ Upstream Edge of Water	10.47	feet	*Slope*	*0.0010*	
				Sinuousity		
	Rod reading @ Downstream Edge of Water	11.07	feet	*Max Depth*	*3.49*	feet
				Floodprone Height	*6.98*	feet
	Stream Distance	625.00	feet	*Mean Depth*	*2.60*	feet
	Straightline Distance		feet	*Bankfull Width*	*75.00*	feet
Cross-Sectional Information	Left Edge of Bankfull	110.00	feet	*Floodplrone Width*	*238.00*	feet
	Right Edge of Bankfull	185.00	feet	*Bankfull Area*	*195.13*	ft^2
	Rod reading @ Thalweg	*11.22*	feet	*FloodproneArea*		ft^2
	Rod reading @ Bankfull Depth	*7.73*	feet	*W/D Ratio*	*28.83*	
	Rod reading @ Floodplain Depth	*4.24*	feet	*Cross Sectional Area*	*195.13*	ft^2
	Left Edge of Floodprone depth	-30.00	feet	*Entrenchment Ratio*	*3.17*	
	Right Edge of Floodprone depth	208.00	feet			
BEHI Information	Bank Height		feet			
	Bankfull Height		feet	*Bank Ht/Bankfull Ht*		
	Root Depth		feet	*Root Depth/Bank Ht*		
	Root Density		%	*Root Density*		%
	Bank Angle		Degrees	*Bank Angle*		*degrees*
	Surface Protection		%	*Surface Protection*		%
Near Bank Stress Information	Velocity at thalweg		ft/sec	*Velocity Gradient*		*ft/sec/ft*
	Tape reading at thalweg		feet	*Near Bank stress / Mean Shear stress*		
	velocity at left bank		ft/sec			
	tape reading at left bank		feet	*A nb / A*		
	Near bank stress					
	Mean shear stress					
	Near bank x-sectional area		ft^2			

MIDDLE FORK DEARBORN RIVER

03 – 0720 – __

Site Visit Form

(One Station per page)

STORET Project ID: TMDL M/2

Trip ID: 2003-DRBRN Date: 6 19 03

Personnel: [illegible]

Waterbody Name Middle Fork Dearborn County [illegible] HUC 10030103

Station ID MIDMFDRB04 Visit # ____ Location Below Ingersoll's Road

Lat 47°11'34.5" Long 112°17'28.0" Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84

Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☒	03-0720	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☐	Macroinvertebrate Habitat Asmt. ☐		KICK HESS OTHER:
Algae/Macrophytes	☐	Aquatic Plant Form ☐		PERI-1 OTHER:
Chlorophyll a	☒		03-0720C (benthic + water)	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☐			
Field Notes	☐			
Other				

Measurements:	Time: 12:30	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 15.69	A
pH:	8.11	
SC: (mS/cm)	.246 mS/cm	
SC x 1000 =		µmho/cm
DO: (mg/L)	8.88 / 89.5	
TUR: Clear ☒ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments:	2.73 NTU B	
	2.93 NTU R	

Macroinvertebrate Kick Duration: Kick Length (Ft.):

Site Visit Comments:

great site

no bank erosion; spring in reach

Revised 1/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 6-19-03 Site Visit Code: 03-0720

Waterbody: Middle Fork Dearborn Station ID: MYDMFNAR04

Personnel: Landrum Bowman

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	12' LEW	0.4	Ø			
2	13'	0.55	0.10			
3	14	0.85	0.10			
4	15	0.75	0.62			
5	16	0.90	0.88			
6	17 Thalweg	0.90	0.96			
7	18	0.85	1.19			
8	19	0.8	1.09			
9	20	0.5	1.24			
10	21	0.5	1.22			
11	22	0.5	1.43			
12	23	0.5	1.53			
13	24	0.4	1.54			
14	25	0.5	1.54			
15	26	0.6	1.38			
16	27	0.65	1.30			
17	28	0.70	1.27			
18	29	0.85	1.06			
19	30	0.80	1.12			
20	31	0.60	0.91			
21	32	0.50	0.60			
22	33	0.30	0.46			
23	34' REW	Ø	Ø			
24						
25						
26						
27						
28						
29						
30						

Page 1 of 2 Data Mgmt. Approved

Stream Classification

Revised 3/2003

Date: 6-19-03 **Site Visit Code:** 03-0700

Waterbody: Middle Fork Dearborn - Tepee Falls **Station ID:** MIDMFDBR204

Personnel: Landon Bowman

Bankfull Width (W_{bkf}) _____ Ft.
WIDTH of the stream channel, at bankfull stage elevation, in a riffle section

Mean DEPTH (d_{bkf}) _____ Ft.
Mean DEPTH of the stream channel cross-section, at bankfull stage elevation, in a riffle section.

Bnkfl. X-Section AREA (A_{bkf}) _____ Sq. Ft.
AREA of the stream channel cross-section, at bankfull stage elevation, in a riffle section.

Width/Depth RATIO (W_{bkf} / d_{bkf}) _____
Bankfull WIDTH divided by bankfull mean DEPTH, in a riffle section.

Maximum DEPTH (d_{mbkf}) _____ Ft.
Maximum depth of the bankfull channel cross-section, or distance between the bankfull stage and thalweg elevations, in a riffle section

WIDTH of Flood-Prone Area (W_{fpa}) _____ Ft.
Twice maximum DEPTH, or (2 x d_{mbkf}) = the stage/elevation at which flood-prone area WIDTH is determined. (riffle section)

Entrenchment Ratio (ER) _____
The ratio of flood-prone area WIDTH divided by bankfull channel WIDTH. (W_{fpa} / W_{bkf}) (riffle section)

Channel Materials (Particle Size Index) D50 _____ mm.

The D50 particle size index represents the median diameter of channel materials, as sampled from the channel surface, between the bankfull stage and thalweg elevations.

Water Surface SLOPE (S) _____ Ft./Ft.
Channel slope = "rise" over "run" for a reach approximately 20-30 bankfull channel widths in length, with the "riffle to riffle" water surface slope representing the gradient at bankfull stage.

Slope Downstream
Length: 136
Height: 6.90
Upstream Length
147.5
Height: 4.60

Channel SINUOSITY (K) _____
Sinuosity is an index of channel pattern, determined from a ratio of stream length divided by valley length (SL/VL); or estimated from a ratio of valley slope divided by channel slope (VS/S).

Stream Type _____

Comments:

Data Mgmt. Approved

Revised 3/2003 DMA

SUBSTRATE DEQ/MDM

Date: 6-19-03 Site Visit Code: 03-07[illegible]

Waterbody: Middle Fork Dearborn STORET Station ID: [illegible]

Personnel: [illegible]

PEBBLE COUNT

Row ID	Particle Category		Size (mm)	Riffle Count	(Other) Count	Characteristic Group: PEBL-CNT		
						Sum	% of Total	Cum. Total
1	Silt / Clay		< 1			0		0.00%
2	Sand		1 - 2			0		0.00%
3	Very Fine	GRAVELS	2 - 4			0		0.00%
4	Fine		4 - 6			0		0.00%
5	Fine		6 - 8			0		0.00%
6	Medium		8 - 12			0		0.00%
7	Medium		12 - 16			0		0.00%
8	Coarse		16 - 22			0		0.00%
9	Coarse		22 - 32			0		0.00%
10	Very Coarse		32 - 45			0		0.00%
11	Very Coarse		45 - 64			0		0.00%
12	Small	COBBLES	64 - 90			0		0.00%
13	Small		90 - 128			0		0.00%
14	Large		128 - 180			0		0.00%
15	Large		180 - 256			0		0.00%
16	Small	BOULDERS	256 - 362			0		0.00%
17	Small		362 - 512			0		0.00%
18	Medium		512 - 1024			0		0.00%
19	Large		1024 - 2048			0		0.00%
20	Bedrock		> 2048			0		0.00%
21	Total # Samples			0	0	0	0.00%	

Silt along banks associated w/vegetation

Pebble Count Data Entry Form

Revision 3/2003

Stream Reach Assessment Form

Station ID: M12MFD[illegible]04 Date: 6-19-03 Site Visit Code: 03-0720

Waterbody: Middle Fork Dearborn - Below Ingersolls Reach Length: ¼ mile

Waterbody Seg ID: _____ Personnel: Ladhw / Bowman

Station ID's on reach: _____

Question 1, Stream Incisement:

8 = channel stable, no active downcutting occurring; old downcutting apparent but a new, stable riparian area has formed within the incised channel. There is perennial riparian vegetation will established in the riparian area. (Stage 1 and 5, Schumm's model)

6 = channel has evidence of old downcutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling bands, solid disturbance evident. (Stage 4).

4 = small headcut, in early stage, is present. Immediate action may prevent further degradation (early Stage 2).

2 = unstable, channel incised, actively widening, limited new riparian area/floodplain, floodplain not well vegetated. The vegetation that is present is mainly pioneer species. Bank failure is common. (Stage 3)

0 = channel deeply incised, resembling a gully, little or no riparian area, active downcutting is clearly occurring. Only occasional or rare flood events access the flood plain. Tributaries will also exhibit downcutting/headcuts. (Stage 2)

The presence of active headcuts should nearly always keep the stream reach from being rated sustainable.

Actual Score: 8 Potential Score: 8

Comments _____

Question 2, Percent of Streambanks with Active Lateral Cutting:

6 = the lateral bank erosion is in balance with the stream and its setting

4 = there is a minimal amount of active lateral bank erosion occurring

2 = there is a moderate amount of active lateral bank erosion occurring

0 = there is excessive lateral bank erosion occurring

Actual Score: _____ Potential Score: _____

Comments _____

Question 3, The Stream is in Balance with the Water and Sediment Being Supplied by the Watershed:

6 = the stream exhibits no excess sediment/bedload deposition, sediment occurs on point bars and other locations as would be expected in a stable, dynamic system

4 = sediment clogged gravel's are apparent in riffles or pools, or other evidence of excess sediment apparent

2 = mid-channel bars are common

0 = stream is braided (except naturally occurring braided systems), having at least 3 active channels

Actual Score: 6 Potential Score: 6

Comments _____

1 SRAF.xls

Question 4, Sufficient Soil Present to Hold Water and Act as a Rooting Medium:

3 = more than 85% of the riparian area with sufficient soil to hold water and act as a rooting medium

2 = 65% to 85% of the riparian area with sufficient soil to hold water and act as a rooting medium

1 = 35% to 65% of the riparian area with sufficient soil to hold water and act as a rooting medium

0 = 35% or less of the riparian area with sufficient soil to hold water and act as a rooting medium

Actual Score: 3 Potential Score: 3

Comments

Question 5, Percent of Streambank with Vegetation having a Deep, Binding Rootmass: (see Appendix I for stability ratings for most riparian, and other, species)

6 = more than 80% of the streambank comprised of plant species with deep, binding root masses

4 = 60% to 80% of the streambank comprised of plant species with deep, binding root masses

2 = 30% to 60% of the streambank comprised of plant species with deep binding root masses

0 = less than 30% of the streambank comprised of plant species with deep binding root masses

Actual Score: 6 Potential Score: 6

Comments

Question 6, Weeds :

3 = No noxious weeds are present

2 = 0-1% of the riparian area has noxious weeds

1 = 1%-5% of the riparian area has noxious weeds

0 = over 5% of the riparian area has noxious weeds

Actual Score: 3 Potential Score: 3

Comments

Question 7, Disturbance-Caused Undesirable Plants:

3 = 1% or less of the riparian area has undesirable plants

2 = 1%-5% of the riparian area has undesirable plants

1 = 5%-10% of the riparian area has undesirable plants

0 = over 10% of the riparian area has undesirable plants

Actual Score: 3 Potential Score: 3

Comments

2 SRAF.xls

Question 8, Woody Species Establishment and Regeneration: (Note: Skip this question if the riparian area has no potential for woody species)

8 = all age classes of native woody riparian species present (see table, Fig 2)

6 = one age class of native woody riparian species clearly absent, all others well represented. For sites with potential for trees and shrubs, there may be one age class of each absent. Often, it will be the middle age group(s) that is (are) lacking. Having mature individuals and a young age class present indicate potential for recovery.

4 = two age classes of native riparian shrubs and/or two age classes of riparian trees clearly absent, other(s) well represented, or the stand is comprised of mainly mature, decadent or dead plants

2 = disturbance induced, (i.e., facultative, facultative upland species such as rose, or snowberry) or non-riparian species dominate. Re-evaluate Question 1, incisement, if this has happened.

0 = some woody species present (>10% cover), but herbaceous species dominate (at this point, the site potential should be re-evaluated to ensure that it has potential for woody vegetation). OR, the site has at least 5% cover of Russian olive and/or salt cedar

Actual Score: 8 Potential Score: 8

Comments

Question 9, Utilization of Trees and Shrubs: (Note: Skip this question if the riparian area has no potential for woody species)

4 = 0-5% of the available second year and older stems are browsed

3 = 5%-25% of the available second year and older stems are browsed

2 = 25%-50% of the available second year and older stems are browsed.

1 = more than 50% of the available second year and older stems are browsed. Many of the shrubs have either a "clubbed" growth form, or they are high-lined or umbrella shaped.

0 = there is noticeable use (10% or more) of unpalatable and normally unused woody species.

Actual Score: 4 Potential Score: 4

good buffer between ag land + stream

Comments

Question 10, Riparian/Wetland Vegetative Cover in the Riparian Area/Floodplain and Streambank:

8 = 85% or more of the riparian/wetland plant cover has a stability rating ≥ 6

6 = 75%-85% of the riparian/wetland plant cover has a stability rating ≥ 6

4 = 65%-75% of the riparian/wetland plant cover has a stability rating ≥ 6

2 = 55%-65% of the riparian/wetland plant cover has a stability rating ≥ 6

0 = less than 55% of the riparian/wetland plant cover has a stability rating ≥ 6

Actual Score: 8 Potential Score: 8

Comments

3 SRAF.xls

Question 11, Riparian Area/Floodplain Characteristics are Adequate to Dissipate Energy and Trap Sediment.

6 = active flood or overflow channels, large rock, or woody material present and adequate to dissipate energy and trap sediment. There is little surface erosion and no evidence of long, continuous erosional areas on floodplain/riparian area or streambank. There are no headcuts where either overland flow and/or flood channel flows return to the main channel.

4 = rock and/or woody material is present, but generally of insufficient size to dissipate energy. Some sediment trapping occurring. Occasional evidence of surface erosion. Generally not severe enough to have developed channels.

2 = inadequate rock and/or woody material available for dissipation of energy or sediment trapping. There is surface erosion (scouring) and occasional headcuts where overland flows or flood channel flows return to the main channel.

0 = riparian area/floodplain lacking any of these attributes: 1)adequate flood or overflow channels, 2) large rock, or 3) woody material suitable for energy dissipation and sediment trapping. Erosional areas are long and continuous. Lacking vegetation or substrate materials adequate to resist further erosion. Surface erosion is obvious on the floodplain/riparian area. Headcuts are present that have the potential to create meander cut-offs.

Actual Score: 6 Potential Score: 6

Comments

SUMMARY

		Actual Score	Possible Points	Potential Score
QUESTION 1:	Stream Incisement	0	0, 2, 4, 6, 8	0
QUESTION 2:	Lateral Cutting	0	0, 2, 4, 6	0
QUESTION 3:	Stream Balance	0	0, 2, 4, 6	0
QUESTION 4:	Sufficient Soil	0	N/A, 0, 1, 2, 3	0
QUESTION 5:	Rootmass	0	N/A, 0, 2, 4, 6	0
QUESTION 6:	Weeds	0	0, 1, 2, 3	0
QUESTION 7:	Undesirable Plants	0	0, 1, 2, 3	0
QUESTION 8:	Woody Species Establishment	0	N/A, 0, 2, 4, 6, 8	0
QUESTION 9:	Browse Utilization	0	N/A, 0, 1, 2, 3, 4	0
QUESTION 10:	Riparian/Wetland Vegetative Cover *	0	N/A, 0, 2, 4, 6, 8	0
QUESTION 11:	Riparian Area/Floodplain Characteristics *	0	N/A, 0, 2, 4, 6	0
	Total	0	61	0
Potential Score for most Bedrock or Boulder streams (questions 1, 2, 3, 6, 7, 11)		0	(32)	0
Potential Score for most low energy "E" streams (questions 1 – 7, 10, 11)		0	(49)	0

RATING: = $\frac{\text{Actual Score}}{\text{Potential Score}}$ X 100 = % rating #DIV/0!

80-100% = SUSTAINABLE
50-80% = AT RISK
LESS THAN 50% = NOT SUSTAINABLE

* Only in certain, specific situations can both of these receive an "N/A".

4 SRAF.xls

Montana Department of Environmental Quality Supplemental Questions

The score for these questions does not have an effect on the rating above.
Note: Answers to these questions must consider the potential of the stream.

Question 12. Fisheries Ha itat / Stream Complexity Note: the answers to question 12 will be averaged

12a. Adult and Juvenile H lding/Escape Cover

8 = Abundant deep pools, woody debris, overhanging vegetation, boulders, root wads, undercut banks and/or aquatic

6 = Fish habitat is common (see above).

4 = Fish habitat is noticeably reduced. Most pools are shallow and/or woody debris, undercut banks, overhanging vegetation, boulders, root wads and/or aquatic vegetation are of limited supply.

2 = Pools and habitat features are sparse or non-existent or there are fish barriers.

0 = There is not enough water to support a fishery

N/A = Stream would not support fish under natural conditions

Actual Score: 8 Potential Score: 8

Comments

12b. Habitat Complexity

6 = A mixture of juvenile and adult cover types is present. High flow juvenile and adult refugia are present.

3 = Primarily adult or juvenile cover types are present. High flow refugia are reduced.

0 = High flow refugia are lacking.

N/A = Stream would not support fish under natural conditions

Actual Score: 6 Potential Score: 6

Comments

12c. Spawning Habitat (salmonid streams only)

8 = Areal extent of spawning substrate, morphology of spawning areas, and composition of spawning substrate are excellent.

4 = Areal extent of spawning substrate, morphology of spawning areas, and/or quality of spawning substrate reduced.

0 = Areal extent of spawning substrate, morphology of spawning areas, and/or quality of spawning substrate greatly reduced.

N/A = Stream would not support fish under natural conditions.

Actual Score: 8 Potential Score: 8

Comments

5 SRAF.xls

12d. Fish Passsage

8 = No potential fish passage barriers apparent.

0 = Potential fish passage barriers present.

N/A = Stream would not support fish under natural conditions.

Actual Score: 8 Potential Score: 8

Comments

12e. Entrainment

8 = Entrainment of fish into water diversions not an issue.

4 = Entrainment of fish into water diversions may be a moderate issue.

0 = Entrainment of fish into water diversions may be a major issue.

Actual Score: 8 Potential Score: 8

Comments

12a-e Avg. Score Actual Score 0 Potential Score 0

Question 13. Solar Radiation

6 = More than 75% of the stream reach is adequately shaded by vegetation.

4 = 50-75% of the stream reach does not have adequate shading or the water temperature is probably elevated by irrigation,

3 = Approximately 25-50% of the stream does not have adequate shade.

0 = More than 75% of the stream reach does not have adequate shade by vegetation or the water temperature is probably drastically altered by irrigation, etc.

Actual Score: 4 Potential Score: 4

Comments

Question 14. Algae growth / Nutrients

6 = Algae not apparent. Rocks are slippery.

4 = in small patches or along channel edge

2 = in large patches or discontinuous mats

0 = Mats cover bottom (hyper enriched conditions) or plants not apparent and rocks not slippery (toxic conditions)

N/A = No water

Actual Score: 5 Potential Score: 6

some algae on rocks in shallow sections

Comments

Question 15. Surface oils, turbidity, salinization, precipitants on stream bottom and/or water odor

6 = none

4 = Slight

2 = Moderate

0 = Extensive

N/A = No water

Actual Score: 6 Potential Score: 6

Comments

Question 16. Bacteria

4 = There are no known anthropogenic sources of bacteria

2 = Likely sources of bacteria are present. Wastewater or concentrated livestock operations are the most common sources.

0 = Feedlots are common or raw sewage is entering the stream

Actual Score: 4 Potential Score: 4

Comments

Question 17. Macroinvertebrates

4 = The stream has a healthy and diverse community of macroinvertebrates. Stream riffles usually have an abundance of may flies, caddis flies and/or stone flies.

2 = The stream is dominated by pollution tolerant taxa such as fly and midge larva.

0 = Macroinvertebrates are rare or absent

N/A = Stream reach is ephemeral

Actual Score: 4 Potential Score: 4

Comments

7 SRAF.xls

Question 18. Irrigation in acts (Assess during critical low flow periods or you may need to inquire locally about this. Evaluate effects from de-watering or inter-basin transfer of water.)

8 = There are no noticeable impacts from irrigation

6 = Changes in flow resulting from irrigation practices are noticeable, however flows are adequate to support aquatic organisms.

4 = Flows support aquatic organisms, but habitat, especially riffles are drastically reduced or impacted.

2 = The flow is low enough to severely impair aquatic organisms

0 = All of the water has been diverted from the stream

N/A = Stream reach is ephemeral.

Actual Score: 8 Potential Score: 8

Comments

Question 19. Landuse activities – Sources

8 = Landuse practices do not appear to significantly impact water quality or the riparian vegetation. Any impacts that occur appear to be natural.

6 = There are some signs of impact from landuse activities such as grazing, dryland agriculture, irrigation, feedlots, mining, timber harvesting, urban, roads, etc.

4 = Impacts from landuse activities are obvious and occur throughout most of the stream reach. For example, there are obvious signs of human induced erosion, saline seeps or overgrazing within the watershed.

2 = Landuse impacts are significant and widespread. Visual observation and photo documentation would provide overwhelming evidence that the stream is impaired.

0 = Land use impacts are so intrusive that the stream has lost most of its natural features. The stream does not appear to be capable to support most forms of aquatic life

Actual Score: 8 Potential Score: 8

Comments

Total Actual 0 Total Potential 0

RATING $\frac{\text{Total}}{\text{Potential}} \times 100$ #DIV/0!

OVERALL RATING $\frac{\text{(Total NRCS Actual + Total MT Supplement Actual)}}{\text{(Total NRCS Potential + Total MT Supplement Potential)}} \times 100$ #DIV/0!

75-100% = SUSTAINABLE
50-75% = AT RISK
LESS THAN 50% = NOT SUSTAINABLE

8 SRAF.xls

Site ID: _____
Site Description: _____

CROSS-SECTIONAL PROFILE FIELD DATA SHEET

Page _____ of _____
Date: _____
Basin: _____

STA	REFERENCE BS (+)	REFERENCE HI	LONGITUDINAL OR X-SECTION FS (-)	LONGITUDINAL OR X-SECTION ELEV	[illegible] FS (-)	[illegible] ELEV	BANKFULL FS (-)	BANKFULL ELEV	BANK HEIGHT FS (-)	BANK HEIGHT ELEV	NOTES
27	6.63'		LBFE								
26.0	6.67		BF								
48.2	8.35'		Thalweg	DTW = 1.3							
48.7	6.68		RBFE								
											BFA
14.3'	3.33		LFE								BF depth = 1.69'
138'	3.33		RFE								Flood depth = 3.38'
											BF width = 27.0'
											Flood width = 123.7

STA = Station
HI = Height of Instrument (Elevation + BS)

BS = Backsight (Shot to a known elevation)
ELEV = If actual elevation (Datum) is unknown, use 100' to begin profile.

FS = Foresight (Shot to new point with unknown elevation)
RP = Reference Point

03 – 0727 – __

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-M12

Trip ID: 2003-DRBRN Date: 7-23-03

Personnel: Ladlaw / Bowman

Waterbody Name Middle Fork Dearborn County Lewis + Clark HUC 10030102

Station ID M12MEDBR01 Visit # ____ Location Middle Fork at Rogers Pass

Lat ____ Long ____ Verified? ☐ By ____ GPS Datum (Circle One): (NAD 27) NAD 83 WGS84

Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☒	03-0727W	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☒	Macroinvertebrate Habitat Asmt. ☐	03-0727M	KICK HESS OTHER:
Algae/Macrophytes	☒	Aquatic Plant Form ☐	03-0727A	PERI-1 OTHER:
Chlorophyll a	☒		03-0727C	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☒			
Field Notes	☐			
Other				

Measurements:	Time: 1130	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 7.86°C	A
pH:	8.38	
SC: (mS/cm)	.241	
SC x 1000 =		µmho/cm
DO: (mg/L)	10.81 mg/L / 95.5%	
TUR: Clear ☒ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments: 0.23 & 0.68		

Macroinvertebrate Kick Duration: 3 minutes Kick Length (Ft.): 35

Site Visit Comments:

Upstream of [illegible] might have been source of increased turbidity

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 7/23/03 Site Visit Code: 03-0727

Waterbody: MFD @ Rogers Pass Station ID: M12MFDBR01

Personnel:

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	0.8 LEW	0.10	0			
2	1.0	0.10	0			
3	1.5	0.20	0.04			
4	2.0	0.20	0.08			
5	2.5	0.20	0.40			
6	3.0	0.30	0.34			
7	3.5	0.30	0.41			
8	4.0	0.30	0.48			
9	4.5	0.25	0.31			
10	5.0	0.25	0.78			
11	5.5	0.25	0.60			
12	6.0	0.25	0.56			
13	6.5	0.20	0.18			
14	7.0	0.20	.23			
15	7.5 REW	0.10	0			
16						
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30						

Page 1 of 2 Data Mgmt. Approved

21.1.1.12

MACROINVERTEBRATE HABITAT ASSESSMENT FIELD FORM RIFFLE/RUN PREVALENCE

Date: 7/23/03 Site Visit Code: 03-0727

Waterbody: MFD @ Rogers Pass Site: M12MFDBR01

Personnel:

HABITAT PARAMETER	OPTIMAL	SUB-OPTIMAL	MARGINAL	POOR
1A. Riffle Development	Well-developed riffle; riffle as wide as stream & extends two times width of stream.	Riffle as wide as stream but length less than two times width.	Reduced riffle area that is not as wide as stream & its length less than two times width.	Riffles virtually non-existent
1A. score:	9-10 10	6-8	3-5	0-2
Comments:				
1B. Benthic Substrate	Diverse substrate dominated by cobble.	Substrate diverse with abundant cobble, but bedrock, boulders, fine gravel, or sand prevalent.	Substrate dominated by bedrock, boulders, sand, or silt; cobble present.	Monotonous fine gravel, sand, silt, or bedrock substrate.
1B. score:	9-10 10	6-8	3-5	0-2
Comments:				
2. Embeddedness	Gravel, cobble, or boulder particles are between 0-25% surrounded by fine sediment (particles less than 6.35 mm [.25"]).	Gravel, cobble, or boulder particles are between 25-50 % surrounded by fine sediment.	Gravel, cobble, or boulder particles are between 50-75% surrounded by fine sediment.	Gravel, cobble, or boulder particles are over 75% surrounded by fine sediment.
2. score:	16-20 M	11-15	6-10	0-5
Comments:				
3. Channel Alteration (channelization, straightening, dredging, other alterations)	Channel alterations absent or minimal; stream pattern apparently in natural state.	Some channelization present, usually in areas of crossings, etc. Evidence of past alterations (before past 20 years) may be resent, but more recent channel alteration is not present.	New embankments present on both banks; 40-80% of the stream reach channelized & disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized & disrupted.
3. score:	16-20 M	11-15	6-10	0-5
Comments:				
4. Sediment Deposition	Little or no enlargement of bars & less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from coarse gravel; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, coarse sand on old & new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, & bends; moderate deposition in pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
4. score:	16-20 M	11-15	6-10	0-5
Comments:				

5. Channel Flow Status	Water fills baseflow channel; minimal amount of channel substrate exposed.	Water fills > 75% of the baseflow channel; < 25% channel substrate exposed.	Water fills 25-75% of the baseflow channel; riffle substrates mostly exposed.	Very little water in channel, & mostly present as standing pools.
5. score:	16-20 19	11-15	6-10	0-5
Comments:				
6. Bank Stability (score each bank) NOTE: Determine left or right side while facing downstream.	Banks stable; no evidence of erosion or bank failure; little apparent potential for future problems.	Moderately stable; infrequent, small areas of erosion mostly healed over.	Moderately unstable; moderate frequency & size of erosional areas; up to 60% of banks in reach have erosion; high erosion potential during high flow.	Unstable; many eroded areas; "raw" areas frequent along straight sections & bends; obvious bank sloughing; 60-100% of banks have erosion scars on sideslopes.
6. score:	9-10 10	6-8	3-5	0-2
	Left Side 10	Average: 10		
	Right Side 10	Comments:		
7. Bank Vegetation Protection (score each bank) NOTE: reduce scores for annual crops & weeds which do not hold soil well (e.g. knapweed).	Over 90% of the streambank surfaces covered by stabilizing vegetation; vegetative disruption minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by vegetation; disruption evident, but not affecting full plant growth potential to any great extent; more than one-half of potential plant height evident.	50-70% of the streambank surfaces covered in vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of potential plant height remaining.	Less than 50% of the streambank surfaces covered by vegetation; extensive disruption of vegetation; vegetation removed to 2 inches or less.
7. score:	9-10	6-8	3-5	0-2
	Left Side 10	Average: 10		
	Right Side 10	Comments:		
8. Vegetated Zone Width (score each side)	Width of vegetated zone > 100 feet.	Width of vegetated zone 30-100 feet.	Width of vegetated zone 10-30 feet.	Width of vegetated zone < 10 feet.
8. score:	9-10	6-8	3-5	0-2
	Left Side 9	Average: 9.5		
	Right Side 10	Comments:		

TOTAL SCORE: Score compared to maximum possible:

03 – 0729 – ___

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-M12

Trip ID: 2003-DRBEN Date: 7/23/03

Personnel: Landrum / Brown

Waterbody Name: Middle Fork Dearborn County: Lewis & Clark HUC: 10030102

Station ID: M12MFDR02 Visit #: 2 Location: Below Hwy 434

Lat: — Long: — Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84

Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☐ Metals ☐ Commons ☐	03-0729-O	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☒	Macroinvertebrate Habitat Asmt. ☐	03-0729M	KICK HESS OTHER:
Algae/Macrophytes	☒	Aquatic Plant Form ☐	03-0729A	PERI-1 OTHER:
Chlorophyll a	☒		03-0729C	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☐			
Field Notes	☐			
Other				

Measurements:	Time: 1415	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 20.58°C	A
pH:	8.27	
SC: (mS/cm)	.311	
SC x 1000 =		µmho/cm
DO: (mg/L)	9.23	102.8%
TUR: Clear ☒ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments:	1.23 NTU	
	1.24 NTU	

Macroinvertebrate Kick Duration: 1 min 42 sec Kick Length (Ft.): 25'

Site Visit Comments:

macroalgae

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 7-23-03 Site Visit Code: 03-0729

Waterbody: Middle Fork Dearborn Below 434 Station ID: M12MFDBR02

Personnel: Landon Bowman

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	2' LEW	0	0			
2	3'	0.20	0			
3	4'	0.3	0.05			
4	5'	0.45	0.75			
5	6	0.3	0.80			
6	7.0	0.5	1.00			
7	8.0	0.45	0.67			
8	9.0	0.50	0.50			
9	10.0	0.45	0			
10	11.0	0.40	0.29			
11	12.0	0.40	0.62			
12	13.0	0.40	0.61			
13	14.0	0.40	0.92			
14	15.0	0.45	0.91			
15	16.0	0.45	1.09			
16	17.0	0.50	1.17			
17	18.0	0.47	0.98			
18	19.0	0.50	0.93			
19	20.0	0.35	0.66			
20	21.0	0.35	0.81			
21	22.0	0.30	0.48			
22	23.0	0.30	0.48			
23	24.0	0.20	0.36			
24	25.0	0.15	0.11			
25	26.0	0.10	0.01			
26	26.7 REW	0	0			
27						
28						
29						
30						

Page 1 of 2 Data Mgmt. Approved

21.1.1.12

MACROINVERTEBRATE HABITAT ASSESSMENT FIELD FORM RIFFLE/RUN PREVALENCE

Date: 7/23/03 Site Visit Code: 03-0729

Waterbody: MFD @ Murphy's btw Hwy 434 Site: M12MFDBR02

Personnel:

HABITAT PARAMETER	OPTIMAL	SUB-OPTIMAL	MARGINAL	POOR
1A. Riffle Development	Well-developed riffle; riffle as wide as stream & extends two times width of stream.	Riffle as wide as stream but length less than two times width.	Reduced riffle area that is not as wide as stream & its length less than two times width.	Riffles virtually non-existent
1A. score:	9-10 9	6-8	3-5	0-2
Comments:				
1B. Benthic Substrate	Diverse substrate dominated by cobble.	Substrate diverse with abundant cobble, but bedrock, boulders, fine gravel, or sand prevalent.	Substrate dominated by bedrock, boulders, sand, or silt; cobble present.	Monotonous fine gravel, sand, silt, or bedrock substrate.
1B. score:	9-10	6-8 8	3-5	0-2
Comments:				
2. Embeddedness	Gravel, cobble, or boulder particles are between 0-25% surrounded by fine sediment (particles less than 6.35 mm [.25"]).	Gravel, cobble, or boulder particles are between 25-50 % surrounded by fine sediment.	Gravel, cobble, or boulder particles are between 50-75% surrounded by fine sediment.	Gravel, cobble, or boulder particles are over 75% surrounded by fine sediment.
2. score:	16-20 17	11-15	6-10	0-5
Comments:				
3. Channel Alteration (channelization, straightening, dredging, other alterations)	Channel alterations absent or minimal; stream pattern apparently in natural state.	Some channelization present, usually in areas of crossings, etc. Evidence of past alterations (before past 20 years) may be resent, but more recent channel alteration is not present.	New embankments present on both banks; 40-80% of the stream reach channelized & disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized & disrupted.
3. score:	16-20 18	11-15	6-10	0-5
Comments:				
4. Sediment Deposition	Little or no enlargement of bars & less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from coarse gravel; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, coarse sand on old & new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, & bends; moderate deposition in pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
4. score:	16-20	11-15 13	6-10	0-5
Comments:				

5. Channel Flow Status	Water fills baseflow channel; minimal amount of channel substrate exposed.	Water fills > 75% of the baseflow channel; < 25% channel substrate exposed.	Water fills 25-75% of the baseflow channel; riffle substrates mostly exposed.	Very little water in channel, & mostly present as standing pools.
5. score:	16-20 17	11-15	6-10	0-5
Comments:				
6. Bank Stability (score each bank) NOTE: Determine left or right side while facing downstream.	Banks stable; no evidence of erosion or bank failure; little apparent potential for future problems.	Moderately stable; infrequent, small areas of erosion mostly healed over.	Moderately unstable; moderate frequency & size of erosional areas; up to 60% of banks in reach have erosion; high erosion potential during high flow.	Unstable; many eroded areas; "raw" areas frequent along straight sections & bends; obvious bank sloughing; 60-100% of banks have erosion scars on sideslopes.
6. score:	9-10	6-8	3-5	0-2
	Left Side 8	Average: 8		
	Right Side 8	Comments:		
7. Bank Vegetation Protection (score each bank) NOTE: reduce scores for annual crops & weeds which do not hold soil well (e.g. knapweed).	Over 90% of the streambank surfaces covered by stabilizing vegetation; vegetative disruption minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by vegetation; disruption evident, but not affecting full plant growth potential to any great extent; more than one-half of potential plant height evident.	50-70% of the streambank surfaces covered in vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of potential plant height remaining.	Less than 50% of the streambank surfaces covered by vegetation; extensive disruption of vegetation; vegetation removed to 2 inches or less.
7. score:	9-10 9	6-8	3-5	0-2
	Left Side 9	Average: 9		
	Right Side 9	Comments:		
8. Vegetated Zone Width (score each side)	Width of vegetated zone > 100 feet.	Width of vegetated zone 30-100 feet.	Width of vegetated zone 10-30 feet.	Width of vegetated zone < 10 feet.
8. score:	9-10	6-8	3-5	0-2
	Left Side ~~9~~ 8	Average: ~~9~~ 8,5		
	Right Side 9	Comments:		

TOTAL SCORE: Score compared to maximum possible:

03 – 0728 – __

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-MT2

Trip ID: 2003-DREW Date: 7/23/03

Personnel: Laidlaw/Bowman

Waterbody Name Middle Fork Dearborn River County Lewis & Clark HUC 10030102

Station ID MT2MF DBR04 Visit # 2 Location At Ingersolls Road

Lat — Long — Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84

Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☐ Metals ☐ Commons ☒	03.0728W	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☒	Macroinvertebrate Habitat Asmt. ☒	03-0728M	KICK HESS OTHER:
Algae/Macrophytes	☒	Aquatic Plant Form ☐	03-0728A	PERI-1 OTHER:
Chlorophyll a	☐			CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☐			
Field Notes	☐			
Other				

Measurements:	Time: 13:00	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 18.59	A
pH:	8.19	
SC: (mS/cm)	297	
SC x 1000 =		µmho/cm
DO: (mg/L)	9.64	/ 102.9%
TUR: Clear ☒ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments: .76 NTU + 1.24 NTU		

Macroinvertebrate Kick Duration: 2 min 40 sec Kick Length (Ft.): 40'

Site Visit Comments:

Spot duration of sampling st (collected some algae there)

Revised 3/2003 DWA

Revised 4/2003

TOTAL DISCHARGE:

Date: 7-23-03 **Site Visit Code:** 03-0708

Waterbody: Middle **Station ID:** M12MFDBR04

Personnel: Bowman/Loudon

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	2.0'	0	0	1		
2	3.0'	.4	.08	1		
3	4.0	.5	.50	1		
4	5.0	.5	.26			
5	6.0	.55	.63			
6	7.0	.58	.97			
7	8.0	.55	0			
8	9.0	.6	.81			
9	10.0	.65	.79			
10	11.0	.55	.95			
11	12.0	.65	1.01			
12	13.0	.52	1.17			
13	14.0	.4	1.10			
14	15.0	.3	.90			
15	16.0	.25	.88			
16	17.0	.30	.95			
17	18.0	.25	.67			
18	19.0	.20	.61			
19	20.0	.20	.70			
20	21.0	.20	.62			
21	22.0	.20	.28			
22	24.0	.10	.08			
23	25.8	0	0			
24						
25						
26						
27						
28						
29						
30						

Page 1 of 2 Data Mgmt. Approved

21.1.1.12

MACROINVERTEBRATE HABITAT ASSESSMENT FIELD FORM RIFFLE/RUN PREVALENCE

Date: 7-23-03 Site Visit Code: 03-0709

Waterbody: Middle Fork Dearborn @ Ingersolls Site: MIDDLEFDBROW

Personnel: Landau / Brosman

HABITAT PARAMETER	OPTIMAL	SUB-OPTIMAL	MARGINAL	POOR
1A. Riffle Development	Well-developed riffle; riffle as wide as stream & extends two times width of stream.	Riffle as wide as stream but length less than two times width.	Reduced riffle area that is not as wide as stream & its length less than two times width.	Riffles virtually non-existent
1A. score: 8	9-10	6-8	3-5	0-2
Comments:				
1B. Benthic Substrate	Diverse substrate dominated by cobble.	Substrate diverse with abundant cobble, but bedrock, boulders, fine gravel, or sand prevalent.	Substrate dominated by bedrock, boulders, sand, or silt; cobble present.	Monotonous fine gravel, sand, silt, or bedrock substrate.
1B. score: 8	9-10	6-8	3-5	0-2
Comments:				
2. Embeddedness	Gravel, cobble, or boulder particles are between 0-25% surrounded by fine sediment (particles less than 6.35 mm [.25"]).	Gravel, cobble, or boulder particles are between 25-50 % surrounded by fine sediment.	Gravel, cobble, or boulder particles are between 50-75% surrounded by fine sediment.	Gravel, cobble, or boulder particles are over 75% surrounded by fine sediment.
2. score:	16-20	11-15	6-10	0-5
Comments:				
3. Channel Alteration (channelization, straightening, dredging, other alterations)	Channel alterations absent or minimal; stream pattern apparently in natural state.	Some channelization present, usually in areas of crossings, etc. Evidence of past alterations (before past 20 years) may be resent, but more recent channel alteration is not present.	New embankments present on both banks; 40-80% of the stream reach channelized & disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized & disrupted.
3. score: 17	16-20	11-15	6-10	0-5
Comments:	upstream bridge			
4. Sediment Deposition	Little or no enlargement of bars & less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from coarse gravel; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, coarse sand on old & new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, & bends; moderate deposition in pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
4. score: 15	16-20	11-15	6-10	0-5
Comments:	deposition in glides + pools / approx 30% silt			

5. Channel Flow Status	Water fills baseflow channel; minimal amount of channel substrate exposed.	Water fills > 75% of the baseflow channel; < 25% channel substrate exposed.	Water fills 25-75% of the baseflow channel; riffle substrates mostly exposed.	Very little water in channel, & mostly present as standing pools.
5. score: 16	16-20	11-15	6-10	0-5
Comments:				
6. Bank Stability (score each bank) NOTE: Determine left or right side while facing downstream.	Banks stable; no evidence of erosion or bank failure; little apparent potential for future problems.	Moderately stable; infrequent, small areas of erosion mostly healed over.	Moderately unstable; moderate frequency & size of erosional areas; up to 60% of banks in reach have erosion; high erosion potential during high flow.	Unstable; many eroded areas; "raw" areas frequent along straight sections & bends; obvious bank sloughing; 60-100% of banks have erosion scars on sideslopes.
6. score: 9	9-10	6-8	3-5	0-2
	Left Side 9	Average:		
	Right Side 9	Comments:		
7. Bank Vegetation Protection (score each bank) NOTE: reduce scores for annual crops & weeds which do not hold soil well (e.g. knapweed).	Over 90% of the streambank surfaces covered by stabilizing vegetation; vegetative disruption minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by vegetation; disruption evident, but not affecting full plant growth potential to any great extent; more than one-half of potential plant height evident.	50-70% of the streambank surfaces covered in vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of potential plant height remaining.	Less than 50% of the streambank surfaces covered by vegetation; extensive disruption of vegetation; vegetation removed to 2 inches or less.
7. score: 9	9-10	6-8	3-5	0-2
	Left Side 9	Average:		
	Right Side 9	Comments:		
8. Vegetated Zone Width (score each side)	Width of vegetated zone > 100 feet.	Width of vegetated zone 30-100 feet.	Width of vegetated zone 10-30 feet.	Width of vegetated zone < 10 feet.
8. score: 9	9-10	6-8	3-5	0-2
	Left Side 9	Average:		
	Right Side 9	Comments:		

TOTAL SCORE: Score compared to maximum possible:

03 – 0718 –___

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-M12

Trip ID: 2003-DRBEN Date: 6-19-03

Personnel: Landau / Kawman

Waterbody Name Middle Fork Dearborn County Lewis & Clark HUC 10030102

Station ID M12MFDDR02 Visit # _____ Location Downstream of Hwy 434

Lat 47° 17' 37.4" Long 112° 16' 31.6" Verified? ☐ By _____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84

Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? _____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☐	03-0718 W	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☐	Macroinvertebrate Habitat Asmt. ☐		KICK HESS OTHER:
Algae/Macrophytes	☐	Aquatic Plant Form ☐		PERI-1 OTHER:
Chlorophyll a	☒		03-0718 C (both + water)	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☒			
Field Notes	☐			
Other				

Measurements:	Time: 9:30	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 13.35	A
pH:	8.00	
SC: (mS/cm)	.208 mS/cm .267 mS/cm	
SC x 1000 =		µmho/cm
DO: (mg/L)	10.13 / 9.39	
TUR: Clear ☐ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments: 2.4 NTU		

Macroinvertebrate Kick Duration: Kick Length (Ft.):

Site Visit Comments:

samples taken at 9:45

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: Dec 19-03 **Site Visit Code:** 03-0716

Waterbody: Middle Fork **Station ID:** MIDMFDBR

Personnel: (a dlow) Bowman

	**Distance from initial point	**Depth	**Velocity (1 point)	**Width	**Area	**Discharge
1	18' LEW	0	0			
2	19.5	.25	0.39			
3	21.0	.40	0.98			
4	22.5	.70	1.11			
5	24.0	.70	1.05			
6	25.5	.60	0.98			
7	27.0	.40	1.07			
8	28.5	.60	1.33			
9	30.0	.65	1.55			
10	31.5	.70	1.26			
11	33.0	.60	1.34			
12	34.5	.60	1.30			
13	36.0	.60	1.11			
14	37.5	.60	1.19			
15	39.0	.50	0.23			
16	40.5	.45	0.57			
17	42.0	.45	0.24			
18	43.5	.35	0			
19	FILL ABEM	0	0			
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

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Revised 3/2003 DMA

SUBSTRATE DEQ/MDM

Date: 6-19-03 Site Visit Code: 03-0718

Waterbody: Middle Fork Dearborn STORET Station ID: M1DMT DB102

Personnel: Landau Bruman

PEBBLE COUNT

Row ID	Particle Category		Size (mm)	Riffle Count	(Other) Count	Characteristic Group: PEBL-CNT		
						Sum	% of Total	Cum. Total
1	Silt / Clay		< 1			0		0.00%
2	Sand		1 - 2			0		0.00%
3	Very Fine	GRAVELS	2 - 4			0		0.00%
4	Fine	GRAVELS	4 - 6			0		0.00%
5	Fine	GRAVELS	6 - 8			0		0.00%
6	Medium	GRAVELS	8 - 12			0		0.00%
7	Medium	GRAVELS	12 - 16			0		0.00%
8	Coarse	GRAVELS	16 - 22			0		0.00%
9	Coarse	GRAVELS	22 - 32			0		0.00%
10	Very Coarse	GRAVELS	32 - 45			0		0.00%
11	Very Coarse	GRAVELS	45 - 64			0		0.00%
12	Small	COBBLES	64 - 90			0		0.00%
13	Small	COBBLES	90 - 128			0		0.00%
14	Large	COBBLES	128 - 180			0		0.00%
15	Large	COBBLES	180 - 256			0		0.00%
16	Small	BOULDERS	256 - 362			0		0.00%
17	Small	BOULDERS	362 - 512			0		0.00%
18	Medium	BOULDERS	512 - 1024			0		0.00%
19	Large	BOULDERS	1024 - 2048			0		0.00%
20	Bedrock	BOULDERS	> 2048			0		0.00%
21	Total # Samples			0	0	0	0.00%	

Pebble Count Data Entry Form

Revision 3/2003

Stream Reach Assessment Form

Station ID: MIDMFD3R02 Date: 6-19-03 Site Visit Code: 03-0718

Waterbody: Middle Fork Dearborn - D.S. Hwy 434 Reach Length: 1/4 mile

Waterbody Seg ID: _____ Personnel: _____

Station ID's on reach: _____

Question 1, Stream Incisement:

8 = channel stable, no active downcutting occurring; old downcutting apparent but a new, stable riparian area has formed within the incised channel. There is perennial riparian vegetation will established in the riparian area. (Stage 1 and 5, Schumm's model)

6 = channel has evidence of old downcutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling bands, solid disturbance evident. (Stage 4).

4 = small headcut, in early stage, is present. Immediate action may prevent further degradation (early Stage 2).

2 = unstable, channel incised, actively widening, limited new riparian area/floodplain, floodplain not well vegetated. The vegetation that is present is mainly pioneer species. Bank failure is common. (Stage 3)

0 = channel deeply incised, resembling a gully, little or no riparian area, active downcutting is clearly occurring. Only occasional or rare flood events access the flood plain. Tributaries will also exhibit downcutting/headcuts. (Stage 2)

The presence of active headcuts should nearly always keep the stream reach from being rated sustainable.

Actual Score: 8 Potential Score: 8

Comments _____

Question 2, Percent of Streambanks with Active Lateral Cutting:

6 = the lateral bank erosion is in balance with the stream and its setting

4 = there is a minimal amount of active lateral bank erosion occurring

2 = there is a moderate amount of active lateral bank erosion occurring

0 = there is excessive lateral bank erosion occurring

Actual Score: 4 Potential Score: 5

Comments _____

Question 3, The Stream is in Balance with the Water and Sediment Being Supplied by the Watershed:

6 = the stream exhibits no excess sediment/bedload deposition, sediment occurs on point bars and other locations as would be expected in a stable, dynamic system

4 = sediment clogged gravel's are apparent in riffles or pools, or other evidence of excess sediment apparent

2 = mid-channel bars are common

0 = stream is braided (except naturally occurring braided systems), having at least 3 active channels

Actual Score: 5 Potential Score: 6

Comments _____

1 SRAF.xls

Question 4, Sufficient Soil Present to Hold Water and Act as a Rooting Medium:

3 = more than 85% of the riparian area with sufficient soil to hold water and act as a rooting medium

2 = 65% to 85% of the riparian area with sufficient soil to hold water and act as a rooting medium

1 = 35% to 65% of the riparian area with sufficient soil to hold water and act as a rooting medium

0 = 35% or less of the riparian area with sufficient soil to hold water and act as a rooting medium

Actual Score: 3 Potential Score: 3

Comments

Question 5, Percent of Streambank with Vegetation having a Deep, Binding Rootmass: (see Appendix I for stability ratings for most riparian, and other, species)

6 = more than 80% of the streambank comprised of plant species with deep, binding root masses

4 = 60% to 80% of the streambank comprised of plant species with deep, binding root masses

2 = 30% to 60% of the streambank comprised of plant species with deep binding root masses

0 = less than 30% of the streambank comprised of plant species with deep binding root masses

Actual Score: 5 Potential Score: 6

Comments

Question 6, Weeds :

3 = No noxious weeds are present

2 = 0-1% of the riparian area has noxious weeds

1 = 1%-5% of the riparian area has noxious weeds

0 = over 5% of the riparian area has noxious weeds

Actual Score: 2 Potential Score: 3

Comments

Question 7, Disturbance-Caused Undesirable Plants:

3 = 1% or less of the riparian area has undesirable plants

2 = 1%-5% of the riparian area has undesirable plants

1 = 5%-10% of the riparian area has undesirable plants

0 = over 10% of the riparian area has undesirable plants

Actual Score: 2 Potential Score: 3

Comments

Question 8, Woody Species Establishment and Regeneration: (Note: Skip this question if the riparian area has no potential for woody species)

8 = all age classes of native woody riparian species present (see table, Fig 2)

6 = one age class of native woody riparian species clearly absent, all others well represented. For sites with potential for trees and shrubs, there may be one age class of each absent. Often, it will be the middle age group(s) that is (are) lacking. Having mature individuals and a young age class present indicate potential for recovery.

4 = two age classes of native riparian shrubs and/or two age classes of riparian trees clearly absent, other(s) well represented, or the stand is comprised of mainly mature, decadent or dead plants

2 = disturbance induced, (i.e., facultative, facultative upland species such as rose, or snowberry) or non-riparian species dominate. Re-evaluate Question 1, incisement, if this has happened.

0 = some woody species present (>10% cover), but herbaceous species dominate (at this point, the site potential should be re-evaluated to ensure that it has potential for woody vegetation). OR, the site has at least 5% cover of Russian olive and/or salt cedar

Actual Score: 7 Potential Score: 8

Comments: Right & Left Banks very different

Question 9, Utilization of Trees and Shrubs: (Note: Skip this question if the riparian area has no potential for woody species)

4 = 0-5% of the available second year and older stems are browsed

3 = 5%-25% of the available second year and older stems are browsed

2 = 25%-50% of the available second year and older stems are browsed.

1 = more than 50% of the available second year and older stems are browsed. Many of the shrubs have either a "clubbed" growth form, or they are high-lined or umbrella shaped.

0 = there is noticeable use (10% or more) of unpalatable and normally unused woody species.

Actual Score: 2 Potential Score: 4

Comments:

Question 10, Riparian/Wetland Vegetative Cover in the Riparian Area/Floodplain and Streambank:

8 = 85% or more of the riparian/wetland plant cover has a stability rating ≥ 6

6 = 75%-85% of the riparian/wetland plant cover has a stability rating ≥ 6

4 = 65%-75% of the riparian/wetland plant cover has a stability rating ≥ 6

2 = 55%-65% of the riparian/wetland plant cover has a stability rating ≥ 6

0 = less than 55% of the riparian/wetland plant cover has a stability rating ≥ 6

Actual Score: 6 Potential Score: 8

Comments: needs more willows instead of grasses

3 SRAF.xls

Question 11, Riparian Area/Floodplain Characteristics are Adequate to Dissipate Energy and Trap Sediment.

6 = active flood or overflow channels, large rock, or woody material present and adequate to dissipate energy and trap sediment. There is little surface erosion and no evidence of long, continuous erosional areas on floodplain/riparian area or streambank. There are no headcuts where either overland flow and/or flood channel flows return to the main channel.

4 = rock and/or woody material is present, but generally of insufficient size to dissipate energy. Some sediment trapping occurring. Occasional evidence of surface erosion. Generally not severe enough to have developed channels.

2 = inadequate rock and/or woody material available for dissipation of energy or sediment trapping. There is surface erosion (scouring) and occasional headcuts where overland flows or flood channel flows return to the main channel.

0 = riparian area/floodplain lacking any of these attributes: 1)adequate flood or overflow channels, 2) large rock, or 3) woody material suitable for energy dissipation and sediment trapping. Erosional areas are long and continuous. Lacking vegetation or substrate materials adequate to resist further erosion. Surface erosion is obvious on the floodplain/riparian area. Headcuts are present that have the potential to create meander cut-offs.

Actual Score: 5 Potential Score: 6

Comments

SUMMARY

		Actual Score	Possible Points	Potential Score
QUESTION 1:	Stream Incisement	0	0, 2, 4, 6, 8	0
QUESTION 2:	Lateral Cutting	0	0, 2, 4, 6	0
QUESTION 3:	Stream Balance	0	0, 2, 4, 6	0
QUESTION 4:	Sufficient Soil	0	N/A, 0, 1, 2, 3	0
QUESTION 5:	Rootmass	0	N/A, 0, 2, 4, 6	0
QUESTION 6:	Weeds	0	0, 1, 2, 3	0
QUESTION 7:	Undesirable Plants	0	0, 1, 2, 3	0
QUESTION 8:	Woody Species Establishment	0	N/A, 0, 2, 4, 6, 8	0
QUESTION 9:	Browse Utilization	0	N/A, 0, 1, 2, 3, 4	0
QUESTION 10:	Riparian/Wetland Vegetative Cover *	0	N/A, 0, 2, 4, 6, 8	0
QUESTION 11:	Riparian Area/Floodplain Characteristics *	0	N/A, 0, 2, 4, 6	0
	Total	0	61	0
Potential Score for most Bedrock or Boulder streams (questions 1, 2, 3, 6, 7, 11)		0	(32)	0
Potential Score for most low energy "E" streams (questions 1 – 7, 10, 11)		0	(49)	0

RATING: = $\frac{\text{Actual Score}}{\text{Potential Score}}$ X 100 = % rating #DIV/0!

80-100% = SUSTAINABLE
50-80% = AT RISK
LESS THAN 50% = NOT SUSTAINABLE

* Only in certain, specific situations can both of these receive an "N/A".

4 SRAF v4

Montana Department of Environmental Quality Supplemental Questions

The score for these questions does not have an effect on the rating above.
Note: Answers to these questions must consider the potential of the stream.

Question 12. Fisheries Habitat / Stream Complexity Note: the answers to question 12 will be averaged

12a. Adult and Juvenile Holding/Escape Cover
8 = Abundant deep pools, woody debris, overhanging vegetation, boulders, root wads, undercut banks and/or aquatic

6 = Fish habitat is common (see above).

4 = Fish habitat is noticeably reduced. Most pools are shallow and/or woody debris, undercut banks, overhanging vegetation, boulders, root wads and/or aquatic vegetation are of limited supply.

2 = Pools and habitat features are sparse or non-existent or there are fish barriers.

0 = There is not enough water to support a fishery

N/A = Stream would not support fish under natural conditions

Actual Score: 3 Potential Score: 4

Comments

12b. Habitat Complexity
6 = A mixture of juvenile and adult cover types is present. High flow juvenile and adult refugia are present.

3 = Primarily adult or juvenile cover types are present. High flow refugia are reduced.

0 = High flow refugia are lacking.

N/A = Stream would not support fish under natural conditions

Actual Score: 3 Potential Score: 3

Comments

12c. Spawning Habitat (salmonid streams only)
8 = Areal extent of spawning substrate, morphology of spawning areas, and composition of spawning substrate are excellent.

4 = Areal extent of spawning substrate, morphology of spawning areas, and/or quality of spawning substrate reduced.

0 = Areal extent of spawning substrate, morphology of spawning areas, and/or quality of spawning substrate greatly reduced.

N/A = Stream would not support fish under natural conditions.

Actual Score: 5 Potential Score: 6

Comments

5 SRAF.xls

12d. Fish Passsage

8 = No potential fish passage barriers apparent.

0 = Potential fish passage barriers present.

N/A = Stream would not support fish under natural conditions.

Actual Score: 8 Potential Score: 8

Comments

12e. Entrainment

8 = Entrainment of fish into water diversions not an issue.

4 = Entrainment of fish into water diversions may be a moderate issue.

0 = Entrainment of fish into water diversions may be a major issue.

Actual Score: 8 Potential Score: 8

Comments

12a-e Avg. Score Actual Score 0 Potential Score 0

Question 13. Solar Radiation

6 = More than 75% of the stream reach is adequately shaded by vegetation.

4 = 50-75% of the stream reach does not have adequate shading or the water temperature is probably elevated by irrigation,

3 = Approximately 25-50% of the stream does not have adequate shade.

0 = More than 75% of the stream reach does not have adequate shade by vegetation or the water temperature is probably drastically altered by irrigation, etc.

Actual Score: 3 Potential Score: 4

Comments

Question 14. Algae growth / Nutrients

6 = Algae not apparent. Rocks are slippery.

4 = in small patches or along channel edge

2 = in large patches or discontinuous mats

0 = Mats cover bottom (hyper enriched conditions) or plants not apparent and rocks not slippery (toxic conditions)

N/A = No water

Actual Score: 5 Potential Score: 6

Comments

Question 15. Surface oils, turbidity, salinization, precipitants on stream bottom and/or water odor

6 = none

4 = Slight

2 = Moderate

0 = Extensive

N/A = No water

Actual Score: 6 Potential Score: 6

Comments

Question 16. Bacteria

4 = There are no known anthropogenic sources of bacteria

2 = Likely sources of bacteria are present. Wastewater or concentrated livestock operations are the most common sources.

0 = Feedlots are common or raw sewage is entering the stream

Actual Score: 3 Potential Score: 4

Comments

Question 17. Macroinvertebrates

4 = The stream has a healthy and diverse community of macroinvertebrates. Stream riffles usually have an abundance of may flies, caddis flies and/or stone flies.

2 = The stream is dominated by pollution tolerant taxa such as fly and midge larva.

0 = Macroinvertebrates are rare or absent

N/A = Stream reach is ephemeral

Actual Score: 3 Potential Score: 4

Comments

7 SRAF.xls

Question 18. Irrigation impacts (Assess during critical low flow periods or you may need to inquire locally about this. Evaluate effects from de-watering or inter-basin transfer of water.)

8 = There are no noticeable impacts from irrigation

6 = Changes in flow resulting from irrigation practices are noticeable, however flows are adequate to support aquatic organisms.

4 = Flows support aquatic organisms, but habitat, especially riffles are drastically reduced or impacted.

2 = The flow is low enough to severely impair aquatic organisms

0 = All of the water has been diverted from the stream

N/A = Stream reach is ephemeral.

Actual Score: 8 Potential Score: 8

Comments: Ditch nearby parallels stream

Question 19. Landuse activities – Sources

8 = Landuse practices do not appear to significantly impact water quality or the riparian vegetation. Any impacts that occur appear to be natural.

6 = There are some signs of impact from landuse activities such as grazing, dryland agriculture, irrigation, feedlots, mining, timber harvesting, urban, roads, etc.

4 = Impacts from landuse activities are obvious and occur throughout most of the stream reach. For example, there are obvious signs of human induced erosion, saline seeps or overgrazing within the watershed.

2 = Landuse impacts are significant and widespread. Visual observation and photo documentation would provide overwhelming evidence that the stream is impaired.

0 = Land use impacts are so intrusive that the stream has lost most of its natural features. The stream does not appear to be capable to support most forms of aquatic life

Actual Score: 6 Potential Score: 8

Comments: grazing

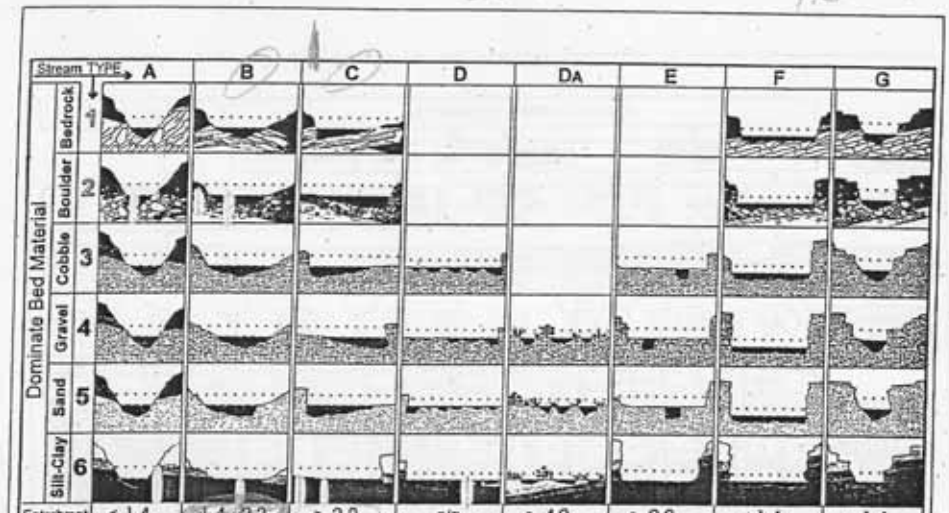
Total Actual 0 Total Potential 0

RATING $\frac{\text{Total}}{\text{Potential}} \times 100$ #DIV/0!

OVERALL RATING $\frac{\text{(Total NRCS Actual + Total MT Supplement Actual)}}{\text{(Total NRCS Potential + Total MT Supplement Potential)}} \times 100$ #DIV/0!

75-100% = SUSTAINABLE
50-75% = AT RISK
LESS THAN 50% = NOT SUSTAINABLE

8 SRAF v4



	A	B	C	D	DA	E	F	G
Entrchmnt	< 1.4	1.4-2.2	> 2.2	n/a	> 4.0	> 2.2	< 1.4	< 1.4
W/D Ratio	< 12	> 12	> 12	> 40	< 40	< 12	> 12	< 12
Sinuosity	1 - 1.2	> 1.2	> 1.2	n/a	variable	>1.5	> 1.2	>1.2
Slope	.04-.099	.02-.039	< .02	< .04	< .005	< .02	< .02	.02-.039

Figure 1.2 Rosgen's representation of longitudinal, cross sectional, and plan views of major stream types. From Rosgen, 1996.

03 – 0721 – __

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-MT2
Trip ID: 2003-DRBKN Date: 6/19/03
Personnel: Laidlaw / Bowman

Waterbody Name Middle Fork Dearborn County Lewis + Clark HUC 10030102
Station ID MT2MFDRB01 Visit # ____ Location Near Rogers Pass
Lat 47°00' 109" Long 112°01' 114" Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84
Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☐	03-0721W	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☐	Macroinvertebrate Habitat Asmt. ☐		KICK HESS OTHER:
Algae/Macrophytes	☐	Aquatic Plant Form ☐		PERI-1 OTHER:
Chlorophyll a	☒		03-0721C (bottle 4 water)	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☒	Pebble Count ☒ % Fines ☐		
Transect	☐			
Photographs	☒			
Field Notes	☒			
Other				

Measurements:	Time: 15:20	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 10.29	A
pH:	8.40	
SC: (mS/cm)	.200	EC = .144
SC x 1000 =		µmho/cm
DO: (mg/L)	10.25 mg/L – 91.0%	
TUR: Clear ☒ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments:	2.36 NTU	
	1.58 NTU	

Macroinvertebrate Kick Duration: Kick Length (Ft.):

Site Visit Comments:

Turned during site visit

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 6-19-03 **Site Visit Code:** 03-0721

Waterbody: Middle Fork Dearborn near Augusta **Station ID:** MTDMFDBR01

Personnel: Lindhorst/Bateman

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	16 (RW)	.30	.70			
2	17	.35	.75			
3	18	.35	.78			
4	21	.35	1.13			
5	20	.35	1.33			
6	22	.35	.90			
7	23	.35	.89			
8	23.4 (RW)	Ø	Ø			
9						
10						
11						
12						
13						
14						
15		lightning storm that flows quickly				
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Page 1 of 2 Data Mgmt. #

M12MFDBR01	Date-	7/23/2003	11:30
Middle Fork Dearborn, Upstream near Roger's Pass			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope	*0.0259*	
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	27	mm
Percentage of Fines (<2mm)		*%*
Stream Type		
Discharge	*0.56*	*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)		%
Stream Reach Assessment Score (MT adjusted)		%
Macroinvertabrate Habitat Assessment Score	**96.5**	%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)		
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		2 min 25'

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*0.56*	*cfs*
Temperature, water	9.86	degree C
pH	8.38	
Specific Conductance	0.241	mS/cm
Dissolved Oxygen	10.81	mg/L
Dissolved Oxygen, % Saturation	95.5	%
Turbidity	0.46	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	0.3	mg/m^3	0.1
Benthic Chlorophyll a	11.6	mg/m^3	0.1
Total Phosphorus, TP	0.033	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	0.09	mg/L	0.01
Total Nitrogen, TN		mg/L	

Macroinvertabrate Data Results		
parameter	*value*	*units*
TOTAL SCORE (max =18)	16	score
PERCENT OF MAX SCORE	89	%
IMPAIRMENT CLASSIFICATION	NON IMPAIRED	
USE SUPPORT	FULL SUPPORT	

M12MFDBR04	Date- 7/23/2003	13:00
Middle Fork Dearborn, Below Ingersoll's Rd.		

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width	*27.00*	*Ft*
Mean Depth	*0.65*	*Ft*
Bnkfull X-sect area	*17.60*	*Sq Ft*
Width/Depth	*41.42*	
Max Depth	*1.69*	*Ft*
Flood prone width	*123.70*	*Ft*
Entrenchement Ratio	*4.58*	
Water slope	*0.0068*	
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	27	mm
Percentage of Fines (<2mm)		*%*
Stream Type	C4	
Discharge	*5.98*	*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)	**100**	%
Stream Reach Assessment Score (MT adjusted)	**99.3**	%
Macroinvertabrate Habitat Assessment Score	**86.9**	%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)	**Non Impaired, Fully Supporting**	
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

2.75 min
40'

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*5.98*	*cfs*
Temperature, water	18.59	degree C
pH	8.19	
Specific Conductance	0.297	mS/cm
Dissolved Oxygen	9.64	mg/L
Dissolved Oxygen, % Saturation	102.9	%
Turbidity	1	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	2.1	mg/m^3	0.1
Benthic Chlorophyll a	34.9	mg/m^3	0.1
Total Phosphorus, TP	0.031	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

Macroinvertabrate Data Results		
parameter	*value*	*units*
TOTAL SCORE (max =18)	11	score
PERCENT OF MAX SCORE	61	%
IMPAIRMENT CLASSIFICATION	SLIGHT IMPAIRMENT	
USE SUPPORT	PARTIAL SUPPORT	

M12MFDBR02	Date-	7/23/2003	14:15
Middle Fork Dearborn, Downstream of Hwy 434			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width	*34.50*	*Ft*
Mean Depth	*2.20*	*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth	*15.68*	
Max Depth	*2.40*	*Ft*
Flood prone width	*72.50*	*Ft*
Entrenchement Ratio	*2.10*	
Water slope	*0.0074*	
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	27	mm
Percentage of Fines (<2mm)		*%*
Stream Type	B4c	*almost a C*
Discharge	*5.94*	*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)	**85**	%
Stream Reach Assessment Score (MT adjusted)	**86.8**	%
Macroinvertabrate Habitat Assessment Score	**82.7**	%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)	**Non Impaired, Fully Supporting, threatened**	
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

1.75 min
25'

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*5.94*	*cfs*
Temperature, water	20.5	degree C
pH	8.27	
Specific Conductance	0.311	mS/cm
Dissolved Oxygen	9.23	mg/L
Dissolved Oxygen, % Saturation	102.8	%
Turbidity	1.24	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	1.3	mg/m^3	0.1
Benthic Chlorophyll a	14.7	mg/m^3	0.1
Total Phosphorus, TP	0.028	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

Macroinvertabrate Data Results		
parameter	*value*	*units*
TOTAL SCORE (max =18)	11	score
PERCENT OF MAX SCORE	61	%
IMPAIRMENT CLASSIFICATION	SLIGHT IMPAIRMENT	
USE SUPPORT	PARTIAL SUPPORT	

	BEHI Field Measures			BEHI Calculated Values		
	Parameter	Value	Units	Parameter	Value	Units
Longitudinal Information				Slope	0.0074	
	Rod reading @ Upstream Edge of Water	6.08	feet	Sinuousity		
	Rod reading @ Downstream Edge of Water	9.18	feet	Max Depth	2.40	feet
				Floodprone Height	4.80	feet
	Stream Distance	420.00	feet	Mean Depth	2.20	feet
	Straightline Distance		feet	Bankfull Width	34.50	feet
Cross-Sectional Information	Left Edge of Bankfull	0.00	feet	Floodplrone Width	72.50	feet
	Right Edge of Bankfull	34.50	feet	Bankfull Area		ft^2
	Rod reading @ Thalweg	4.80	feet	FloodproneArea		ft^2
	Rod reading @ Bankfull Depth	2.40	feet	W/D Ratio	15.68	
	Rod reading @ Floodplain Depth	0.00	feet	Cross Sectional Area	0.00	ft^2
	Left Edge of Floodprone depth	0.00	feet	Entrenchment Ratio	2.10	
	Right Edge of Floodprone depth	72.50	feet			
BEHI Information	Bank Height		feet			
	Bankfull Height	2.40	feet	Bank Ht/Bankfull Ht	0.00	
	Root Depth		feet	Root Depth/Bank Ht		
	Root Density		%	Root Density		%
	Bank Angle		Degrees	Bank Angle		degrees
	Surface Protection		%	Surface Protection		%
Near Bank Stress Information	Velocity at thalweg		ft/sec	Velocity Gradient		ft/sec/ft
	Tape reading at thalweg		feet	Near Bank stress / Mean Shear stress		
	velocity at left bank		ft/sec			
	tape reading at left bank		feet	A nb / A		
	Near bank stress					
	Mean shear stress					
	Near bank x-sectional area		ft^2			

M12MFDBR02	Date-	7/23/2003	14:15
Middle Fork Dearborn, Downstream of Hwy 434			

M12MFDBR01	Date-	6/19/2003	15:20
Middle Fork Dearborn, Upstream near Roger's Pass			

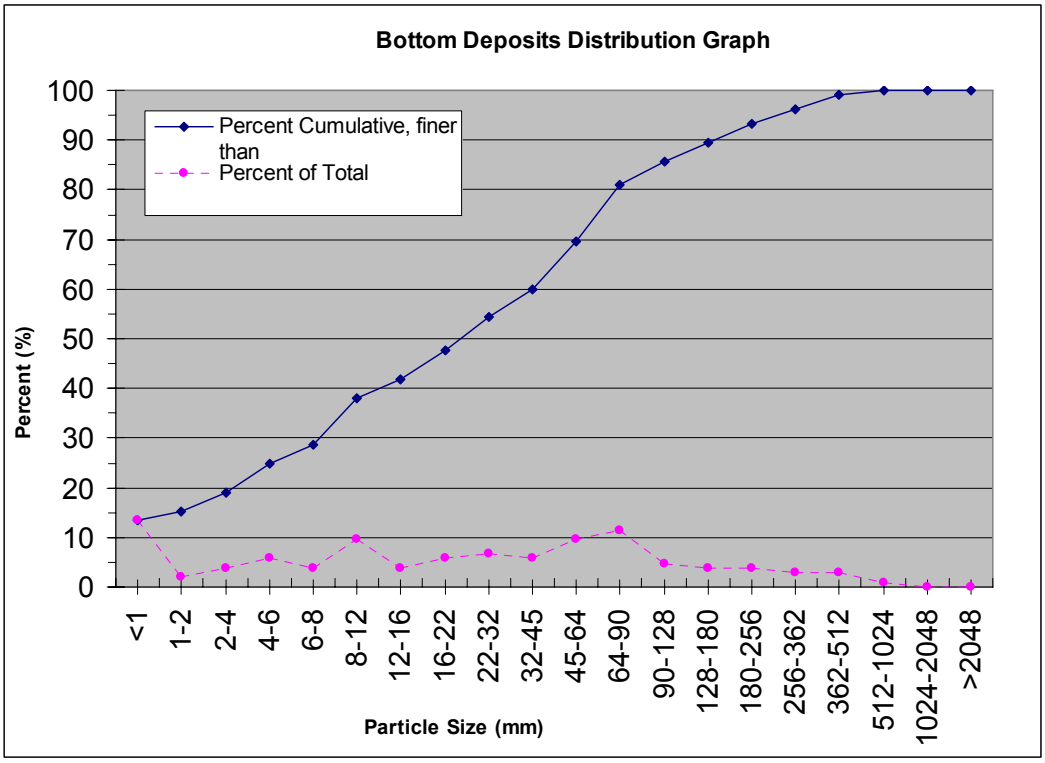
Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope	*0.0259*	
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	27	mm
Percentage of Fines (<2mm)	*15.24*	*%*
Stream Type		
Discharge	*2.40*	*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)		%
Stream Reach Assessment Score (MT adjusted)		%
Macroinvertabrate Habitat Assessment Score		%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)		
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*2.40*	*cfs*
Temperature, water	10.29	degree C
pH	8.4	
Specific Conductance	0.2	mS/cm
Dissolved Oxygen	10.25	mg/L
Dissolved Oxygen, % Saturation	91	%
Turbidity	1.97	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	0.6	mg/m^3	0.1
Benthic Chlorophyll a	9.2	mg/m^3	0.1
Total Phosphorus, TP	0.005	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	0.04	mg/L	0.01
Total Nitrogen, TN		mg/L	

		Pebble Count Data			
	Mean size	*Particle Size (mm)*	*Sum*	*% Total*	*Cum. Total*
S/C	0.5	<1	14	*13.33*	*13.33*
S	1.5	1-2	2	*1.90*	*15.24*
FG	3	2-4	4	*3.81*	*19.05*
FG	5	4-6	6	*5.71*	*24.76*
FG	7	6-8	4	*3.81*	*28.57*
MG	10	8-12	10	*9.52*	*38.10*
MG	14	12-16	4	*3.81*	*41.90*
CG	18	16-22	6	*5.71*	*47.62*
CG	27	22-32	7	*6.67*	*54.29*
CG	38.5	32-45	6	*5.71*	*60.00*
CG	54.5	45-64	10	*9.52*	*69.52*
SC	77	64-90	12	*11.43*	*80.95*
SC	109	90-128	5	*4.76*	*85.71*
MC	154	128-180	4	*3.81*	*89.52*
LC	218	180-256	4	*3.81*	*93.33*
LC	309	256-362	3	*2.86*	*96.19*
SB	437	362-512	3	*2.86*	*99.05*
MB	768	512-1024	1	*0.95*	*100.00*
LB	1536	1024-2048		*0.00*	*100.00*
BR		>2048		*0.00*	*100.00*
		TOTALS	105	*100.00*	*100.00*
		D50 particle size (mm)	22-32		
		% Fines (<2mm)	**15.24**		
	M12MFDBR01	**Date-**	**6/19/2003**	**15:20**	
	Middle Fork Dearborn, Upstream near Roger's Pass				



M12MFDBR04	Date-	6/19/2003	12:30
Middle Fork Dearborn, Below Ingersoll's Rd.			

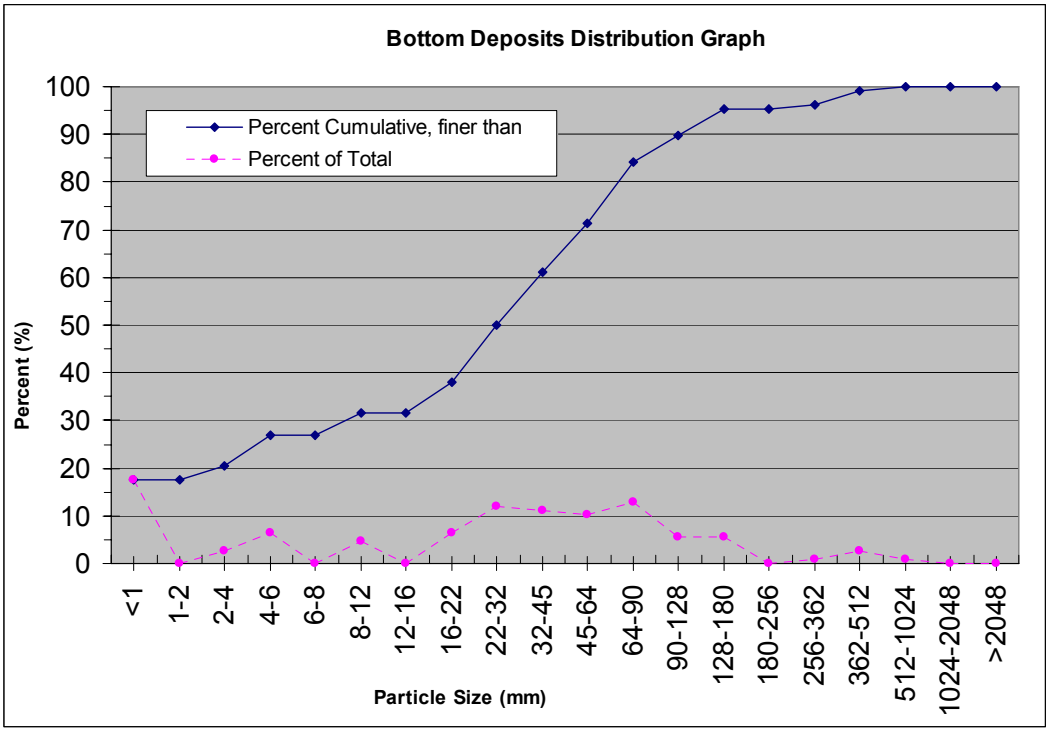
Geomorphology Data		
parameter	*value*	*units*
Bankfull Width	*27.00*	*Ft*
Mean Depth	*0.65*	*Ft*
Bnkfull X-sect area	*17.60*	*Sq Ft*
Width/Depth	*41.42*	
Max Depth	*1.69*	*Ft*
Flood prone width	*123.70*	*Ft*
Entrenchement Ratio	*4.58*	
Water slope	*0.0068*	
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	27	mm
Percentage of Fines (<2mm)	*17.59*	*%*
Stream Type		
Discharge	*13.58*	*cfs*

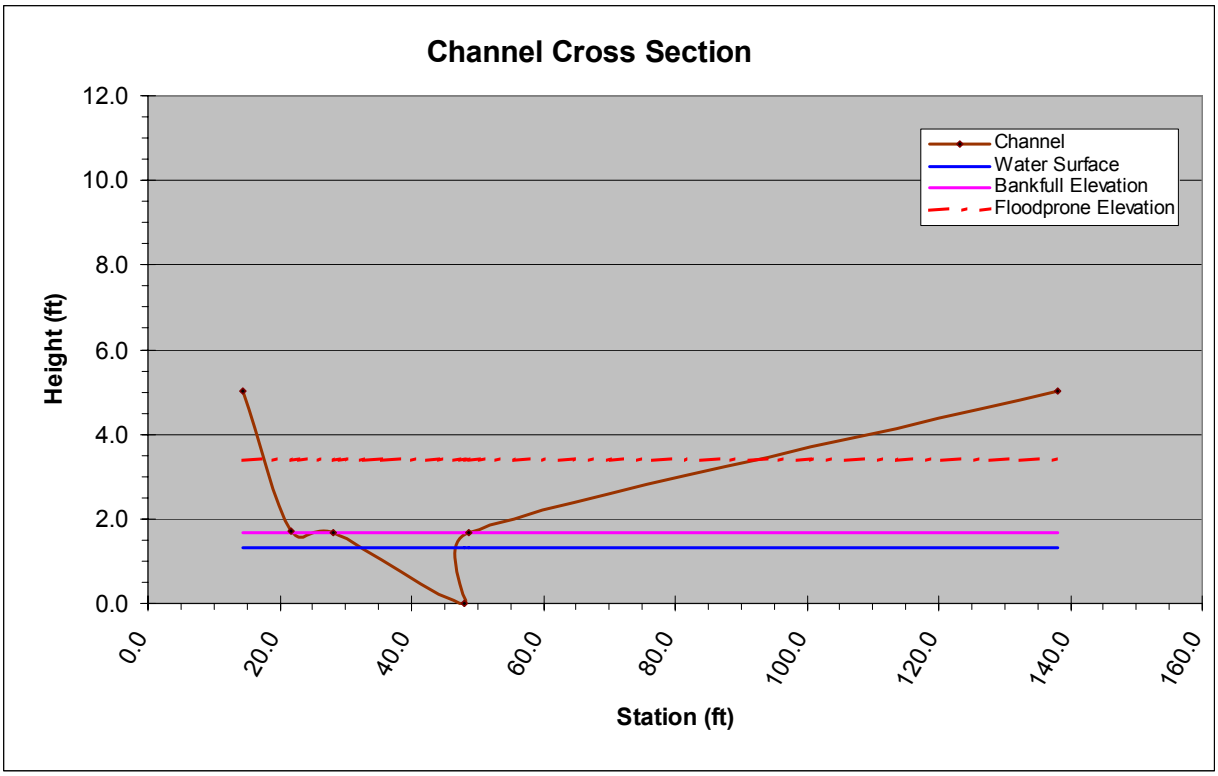
Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)	**100**	%
Stream Reach Assessment Score (MT adjusted)	**99.3**	%
Macroinvertabrate Habitat Assessment Score		%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)	**Non Impaired, Fully Supporting**	
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*13.58*	*cfs*
Temperature, water	15.69	degree C
pH	8.11	
Specific Conductance	0.246	mS/cm
Dissolved Oxygen	8.88	mg/L
Dissolved Oxygen, % Saturation	89.5	%
Turbidity	2.85	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	0.6	mg/m^3	0.1
Benthic Chlorophyll a	16.8	mg/m^3	0.1
Total Phosphorus, TP	ND	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

		Pebble Count Data			
	Mean size	*Particle Size (mm)*	*Sum*	*% Total*	*Cum. Total*
S/C	0.5	<1	19	*17.59*	*17.59*
S	1.5	1-2		*0.00*	*17.59*
FG	3	2-4	3	*2.78*	*20.37*
FG	5	4-6	7	*6.48*	*26.85*
FG	7	6-8		*0.00*	*26.85*
MG	10	8-12	5	*4.63*	*31.48*
MG	14	12-16		*0.00*	*31.48*
CG	18	16-22	7	*6.48*	*37.96*
CG	27	22-32	13	*12.04*	*50.00*
CG	38.5	32-45	12	*11.11*	*61.11*
CG	54.5	45-64	11	*10.19*	*71.30*
SC	77	64-90	14	*12.96*	*84.26*
SC	109	90-128	6	*5.56*	*89.81*
MC	154	128-180	6	*5.56*	*95.37*
LC	218	180-256		*0.00*	*95.37*
LC	309	256-362	1	*0.93*	*96.30*
SB	437	362-512	3	*2.78*	*99.07*
MB	768	512-1024	1	*0.93*	*100.00*
LB	1536	1024-2048		*0.00*	*100.00*
BR		>2048		*0.00*	*100.00*
		TOTALS	108	*100.00*	*100.00*
		D50 particle size (mm)	22-32		
		% Fines (<2mm)	**17.59**		
	M12MFDBR04	**Date-**	**6/19/2003**	**12:30**	
	Middle Fork Dearborn, Below Ingersoll's Rd.				





	BEHI Field Measures			BEHI Calculated Values		
	Parameter	***Value***	***Units***	***Parameter***	***Value***	***Units***
Longitudinal Information	Rod reading @ Upstream Edge of Water	4.60	feet	*Slope*	*0.0068*	
				Sinuousity		
	Rod reading @ Downstream Edge of Water	6.40	feet	*Max Depth*	*1.69*	feet
				Floodprone Height	*3.38*	feet
	Stream Distance	263.50	feet	*Mean Depth*	*0.65*	feet
	Straightline Distance		feet	*Bankfull Width*	*27.00*	feet
Cross-Sectional Information	Left Edge of Bankfull	21.70	feet	*Floodplrone Width*	*123.70*	feet
	Right Edge of Bankfull	48.70	feet	*Bankfull Area*	*17.60*	ft^2
	Rod reading @ Thalweg	*8.35*	feet	*FloodproneArea*		ft^2
	Rod reading @ Bankfull Depth	*6.66*	feet	*W/D Ratio*	*41.42*	
	Rod reading @ Floodplain Depth	*4.97*	feet	*Cross Sectional Area*	*17.60*	ft^2
	Left Edge of Floodprone depth	14.30	feet	*Entrenchment Ratio*	*4.58*	
	Right Edge of Floodprone depth	138.00	feet			
BEHI Information	Bank Height		feet			
	Bankfull Height		feet	*Bank Ht/Bankfull Ht*		
	Root Depth		feet	*Root Depth/Bank Ht*		
	Root Density		%	*Root Density*		%
	Bank Angle		Degrees	*Bank Angle*		*degrees*
	Surface Protection		%	*Surface Protection*		%
Near Bank Stress Information	Velocity at thalweg		ft/sec	*Velocity Gradient*		*ft/sec/ft*
	Tape reading at thalweg		feet	*Near Bank stress / Mean Shear stress*		
	velocity at left bank		ft/sec			
	tape reading at left bank		feet	*A nb / A*		
	Near bank stress					
	Mean shear stress					
	Near bank x-sectional area		ft^2			

M12MFDBR02	Date-	6/19/2003	9:30
Middle Fork Dearborn, Downstream of Hwy 434			

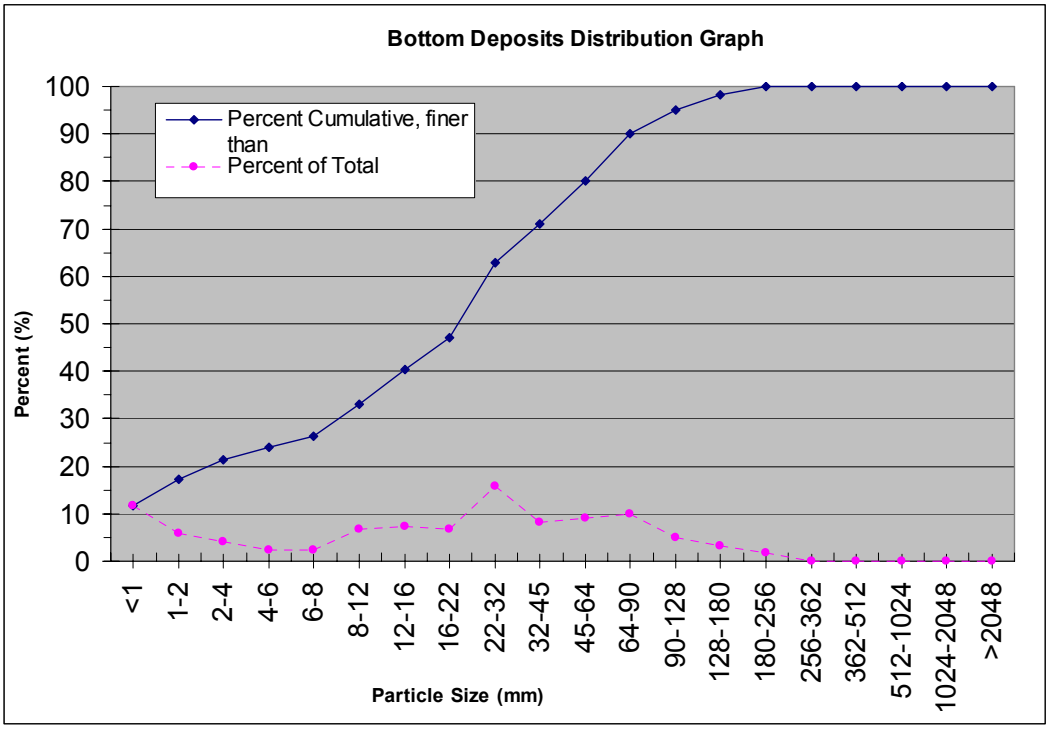
Geomorphology Data		
parameter	*value*	*units*
Bankfull Width	*34.50*	*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth	*2.40*	*Ft*
Flood prone width	*72.50*	*Ft*
Entrenchement Ratio	*2.10*	
Water slope	*0.0074*	
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50		mm
Percentage of Fines (<2mm)	*17.36*	*%*
Stream Type		
Discharge	*13.72*	*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)	**85**	%
Stream Reach Assessment Score (MT adjusted)	**86.8**	%
Macroinvertabrate Habitat Assessment Score		%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)	**Non Impaired, Fully Supporting, threatened**	
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*13.72*	*cfs*
Temperature, water	13.35	degree C
pH	8	
Specific Conductance	0.208	mS/cm
Dissolved Oxygen	9.39	mg/L
Dissolved Oxygen, % Saturation	90.2	%
Turbidity	2.8	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	0.6	mg/m^3	0.1
Benthic Chlorophyll a	22.2	mg/m^3	0.1
Total Phosphorus, TP	ND	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

		Pebble Count Data			
	Mean size	*Particle Size (mm)*	*Sum*	*% Total*	*Cum. Total*
S/C	0.5	<1	14	*11.57*	*11.57*
S	1.5	1-2	7	*5.79*	*17.36*
FG	3	2-4	5	*4.13*	*21.49*
FG	5	4-6	3	*2.48*	*23.97*
FG	7	6-8	3	*2.48*	*26.45*
MG	10	8-12	8	*6.61*	*33.06*
MG	14	12-16	9	*7.44*	*40.50*
CG	18	16-22	8	*6.61*	*47.11*
CG	27	22-32	19	*15.70*	*62.81*
CG	38.5	32-45	10	*8.26*	*71.07*
CG	54.5	45-64	11	*9.09*	*80.17*
SC	77	64-90	12	*9.92*	*90.08*
SC	109	90-128	6	*4.96*	*95.04*
MC	154	128-180	4	*3.31*	*98.35*
LC	218	180-256	2	*1.65*	*100.00*
LC	309	256-362		*0.00*	*100.00*
SB	437	362-512		*0.00*	*100.00*
MB	768	512-1024		*0.00*	*100.00*
LB	1536	1024-2048		*0.00*	*100.00*
BR		>2048		*0.00*	*100.00*
		TOTALS	121	*100.00*	*100.00*
		D50 particle size (mm)			
		% Fines (<2mm)	**17.36**		
	M12MFDBR02	**Date-**	**6/19/2003**	**9:30**	
	Middle Fork Dearborn, Downstream of Hwy 434				



	BEHI Field Measures			BEHI Calculated Values		
	Parameter	***Value***	***Units***	***Parameter***	***Value***	***Units***
Longitudinal Information	Rod reading @ Upstream Edge of Water	6.08	feet	*Slope*	*0.0074*	
				Sinuousity		
	Rod reading @ Downstream Edge of Water	9.18	feet	*Max Depth*	*2.40*	feet
				Floodprone Height	*4.80*	feet
	Stream Distance	420.00	feet	*Mean Depth*		feet
	Straightline Distance		feet	*Bankfull Width*	*34.50*	feet
Cross-Sectional Information	Left Edge of Bankfull	0.00	feet	*Floodplrone Width*	*72.50*	feet
	Right Edge of Bankfull	34.50	feet	*Bankfull Area*		ft^2
	Rod reading @ Thalweg	*4.80*	feet	*FloodproneArea*		ft^2
	Rod reading @ Bankfull Depth	*2.40*	feet	*W/D Ratio*		
	Rod reading @ Floodplain Depth	*0.00*	feet	*Cross Sectional Area*	*0.00*	ft^2
	Left Edge of Floodprone depth	0.00	feet	*Entrenchment Ratio*	*2.10*	
	Right Edge of Floodprone depth	72.50	feet			
BEHI Information	Bank Height		feet			
	Bankfull Height		feet	*Bank Ht/Bankfull Ht*		
	Root Depth		feet	*Root Depth/Bank Ht*		
	Root Density		%	*Root Density*		*%*
	Bank Angle		Degrees	*Bank Angle*		*degrees*
	Surface Protection		%	*Surface Protection*		*%*
Near Bank Stress Information	Velocity at thalweg		ft/sec	*Velocity Gradient*		*ft/sec/ft*
	Tape reading at thalweg		feet	*Near Bank stress / Mean Shear stress*		
	velocity at left bank		ft/sec			
	tape reading at left bank		feet	*A nb / A*		
	Near bank stress					
	Mean shear stress					
	Near bank x-sectional area		ft^2			

SOUTH FORK DEARBORN RIVER

03 – 0726 – __

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-MT2
Trip ID: 2003-DRBRN Date: 7/23/03
Personnel: Shel & Tim

Waterbody Name: S.F. Dearborn @ Mouth County: Lewis & Clark HUC: 10030102
Station ID: M12SFDBR04 Visit #: 2 Location: at DEARN Rim
Lat: — Long: — Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84
Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale?

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☐ Metals ☐ Commons ☐	03-0726	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☒	Macroinvertebrate Habitat Asmt. ☐	03-0726M	KICK HESS OTHER:
Algae/Macrophytes	☒	Aquatic Plant Form ☐	03-0726A	PERI-1 OTHER:
Chlorophyll a	☒		03-0726C	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☐			
Field Notes	☐			
Other				

Measurements:	Time: 9:45	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 16.72	A
pH:	8.40	
SC: (mS/cm)	8.319	
SC x 1000 =		µmho/cm
DO: (mg/L)	10.08	104%
TUR: Clear ☐ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments: 1.71 NTU 1.08 NTU		

Macroinvertebrate Kick Duration: 2 minutes Kick Length (Ft.): 35'

Site Visit Comments:

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 7/23/03 **Site Visit Code:** 03-0726

Waterbody: SFD @ Mouth **Station ID:** M12SF DBR04

Personnel: SKD/Tim

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	1.0 LEW	0	0			
2	2.0	0.20	0			
3	3.0	0.45	0.04			
4	4.0	0.52	0.09			
5	5.0	0.50	0.22			
6	6.0	0.40	0.17			
7	7.0	0.35	0.18			
8	8.0	0.25	0.18			
9	9.0	0.35	0.18			
10	10.0	0.30	0.19			
11	11.0	0.35	0.19			
12	12.0	0.35	0.06			
13	13.0	0.38	0			
14	14.0	0.35	0.08			
15	15.0	0.40	0.25			
16	16.0	0.40	0.19			
17	17.0	0.50	0.23			
18	18.0	0.50	0.18			
19	19.0	0.50	0.15			
20	20.0	0.45	0.11			
21	21.0	0.40	0.08			
22	22.0	0.20	0.13			
23	23.0 REW	0.15	0			
24						
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21.1.1.12

MACROINVERTEBRATE HABITAT ASSESSMENT FIELD FORM RIFFLE/RUN PREVALENCE

Date: 7/23/03 Site Visit Code: 03-0726

Waterbody: SFD @ mouth Site: M12SSDBR04

Personnel: Goldaw / Bowman

HABITAT PARAMETER	OPTIMAL	SUB-OPTIMAL	MARGINAL	POOR
1A. Riffle Development	Well-developed riffle; riffle as wide as stream & extends two times width of stream.	Riffle as wide as stream but length less than two times width.	Reduced riffle area that is not as wide as stream & its length less than two times width.	Riffles virtually non-existent
1A. score:	9/10 9-10	6-8	3-5	0-2
Comments:				
1B. Benthic Substrate	Diverse substrate dominated by cobble.	Substrate diverse with abundant cobble, but bedrock, boulders, fine gravel, or sand prevalent.	Substrate dominated by bedrock, boulders, sand, or silt; cobble present.	Monotonous fine gravel, sand, silt, or bedrock substrate.
1B. score:	9-10	6-8	3-5	0-2
Comments:				
2. Embeddedness	Gravel, cobble, or boulder particles are between 0-25% surrounded by fine sediment (particles less than 6.35 mm [.25"]).	Gravel, cobble, or boulder particles are between 25-50 % surrounded by fine sediment.	Gravel, cobble, or boulder particles are between 50-75% surrounded by fine sediment.	Gravel, cobble, or boulder particles are over 75% surrounded by fine sediment.
2. score:	16-20 18	11-15	6-10	0-5
Comments:				
3. Channel Alteration (channelization, straightening, dredging, other alterations)	Channel alterations absent or minimal; stream pattern apparently in natural state.	Some channelization present, usually in areas of crossings, etc. Evidence of past alterations (before past 20 years) may be resent, but more recent channel alteration is not present.	New embankments present on both banks; 40-80% of the stream reach channelized & disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized & disrupted.
3. score:	16-20 18	11-15	6-10	0-5
Comments:	Road Crossings			
4. Sediment Deposition	Little or no enlargement of bars & less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from coarse gravel; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, coarse sand on old & new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, & bends; moderate deposition in pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
4. score:	16-20	11-15 18	6-10	0-5
Comments:	Some fines, not too bad			

5. Channel Flow Status	Water fills baseflow channel; minimal amount of channel substrate exposed.	Water fills > 75% of the baseflow channel; < 25% channel substrate exposed.	Water fills 25-75% of the baseflow channel; riffle substrates mostly exposed.	Very little water in channel, & mostly present as standing pools.
5. score:	16-20	11-15 15	6-10	0-5
Comments:				
6. Bank Stability (score each bank) NOTE: Determine left or right side while facing downstream.	Banks stable; no evidence of erosion or bank failure; little apparent potential for future problems.	Moderately stable; infrequent, small areas of erosion mostly healed over.	Moderately unstable; moderate frequency & size of erosional areas; up to 60% of banks in reach have erosion; high erosion potential during high flow.	Unstable; many eroded areas; "raw" areas frequent along straight sections & bends; obvious bank sloughing; 60-100% of banks have erosion scars on sideslopes.
6. score:	9-10 9	6-8	3-5	0-2
	Left Side 9	Average: 9		
	Right Side 9	Comments:		
7. Bank Vegetation Protection (score each bank) NOTE: reduce scores for annual crops & weeds which do not hold soil well (e.g. knapweed).	Over 90% of the streambank surfaces covered by stabilizing vegetation; vegetative disruption minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by vegetation; disruption evident, but not affecting full plant growth potential to any great extent; more than one-half of potential plant height evident.	50-70% of the streambank surfaces covered in vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of potential plant height remaining.	Less than 50% of the streambank surfaces covered by vegetation; extensive disruption of vegetation; vegetation removed to 2 inches or less.
7. score:	9-10 9	6-8	3-5	0-2
	Left Side 9	Average: 9		
	Right Side 9	Comments:		
8. Vegetated Zone Width (score each side)	Width of vegetated zone > 100 feet.	Width of vegetated zone 30-100 feet.	Width of vegetated zone 10-30 feet.	Width of vegetated zone < 10 feet.
8. score:	9-10 9	6-8	3-5	0-2
	Left Side 9	Average: 9		
	Right Side 9	Comments:		

TOTAL SCORE: Score compared to maximum possible:

03 – 0724 – ___

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-M12

Trip ID: 2003-DRBRN Date: 7/22/03

Personnel: Landow/Bowman

Waterbody Name South Fork Dearborn County Lewis + Clark HUC 10030102

Station ID M12SD802 Visit # 1 Location S Fork US Hwy 434

Lat 47°09'05.7" Long 112°13'33.0" Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84

Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☐	03-0724W	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☒	Macroinvertebrate Habitat Asmt. ☐	03-0724M	KICK HESS OTHER:
Algae/Macrophytes	☒	Aquatic Plant Form ☐	03-0724A	PERI-1 OTHER:
Chlorophyll a	☒		03-0724C	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☐			
Field Notes	☐			
Other				

Measurements:	Time: 15:45	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 24.16°C	A
pH:	8.43	
SC: (mS/cm)	.316	
SC x 1000 =		µmho/cm
DO: (mg/L)	8.67	103.2%
TUR: Clear ☒ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments: 0.95 0.65		

Macroinvertebrate Kick Duration: 1:30 minutes Kick Length (Ft.):

Site Visit Comments:

Revised 3/2001

Revised 4/2003

TOTAL DISCHARGE:

Date: 7-22-03 **Site Visit Code:** 03-0784

Waterbody: South fork Upstream Hwy 434 **Station ID:** M12SFDBR01

Personnel: Landis Bowman

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	10	0	0	0		
2	11	.25	0			
3	12	.2	.03			
4	13	.2	0			
5	14	.28	.78			
6	15	.4	.77			
7	16	.4	.46			
8	17	.38	1.01			
9	18	.38	.44			
10	19	.30	.57			
11	20	.35	.10			
12	21	.4	.67			
13	22	.38	.08			
14	23	.30	.18			
15	24	.25	.11			
16	25	.2	0			
17	26	0	0			
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Data Mgmt. Approved

21.1.1.12

MACROINVERTEBRATE HABITAT ASSESSMENT FIELD FORM RIFFLE/RUN PREVALENCE

Date: 7-22-03 Site Visit Code: 03-0704

Waterbody: South Fork Dearborn Site: M12SFDB1C03

Personnel:

HABITAT PARAMETER	OPTIMAL	SUB-OPTIMAL	MARGINAL	POOR
1A. Riffle Development	Well-developed riffle; riffle as wide as stream & extends two times width of stream.	Riffle as wide as stream but length less than two times width.	Reduced riffle area that is not as wide as stream & its length less than two times width.	Riffles virtually non-existent
1A. score:	9-10	6-8	3-5	0-2
Comments:				
1B. Benthic Substrate	Diverse substrate dominated by cobble.	Substrate diverse with abundant cobble, but bedrock, boulders, fine gravel, or sand prevalent.	Substrate dominated by bedrock, boulders, sand, or silt; cobble present.	Monotonous fine gravel, sand, silt, or bedrock substrate.
1B. score: 7	9-10	6-8	3-5	0-2
Comments:	cobble, gravel			
2. Embeddedness	Gravel, cobble, or boulder particles are between 0-25% surrounded by fine sediment (particles less than 6.35 mm [.25"]).	Gravel, cobble, or boulder particles are between 25-50 % surrounded by fine sediment.	Gravel, cobble, or boulder particles are between 50-75% surrounded by fine sediment.	Gravel, cobble, or boulder particles are over 75% surrounded by fine sediment.
2. score: 16	16-20	11-15	6-10	0-5
Comments:	Some but not greater than 25%			
3. Channel Alteration (channelization, straightening, dredging, other alterations)	Channel alterations absent or minimal; stream pattern apparently in natural state.	Some channelization present, usually in areas of crossings, etc. Evidence of past alterations (before past 20 years) may be resent, but more recent channel alteration is not present.	New embankments present on both banks; 40-80% of the stream reach channelized & disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized & disrupted.
3. score: 14	16-20	11-15	6-10	0-5
Comments:				
4. Sediment Deposition	Little or no enlargement of bars & less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from coarse gravel; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, coarse sand on old & new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, & bends; moderate deposition in pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
4. score: 16	16-20	11-15	6-10	0-5
Comments:				

5. Channel Flow Status	Water fills baseflow channel; minimal amount of channel substrate exposed.	Water fills > 75% of the baseflow channel; < 25% channel substrate exposed.	Water fills 25-75% of the baseflow channel; riffle substrates mostly exposed.	Very little water in channel, & mostly present as standing pools.
5. score: 15	16-20	11-15	6-10	0-5
Comments:				
6. Bank Stability (score each bank) NOTE: Determine left or right side while facing downstream.	Banks stable; no evidence of erosion or bank failure; little apparent potential for future problems.	Moderately stable; infrequent, small areas of erosion mostly healed over.	Moderately unstable; moderate frequency & size of erosional areas; up to 60% of banks in reach have erosion; high erosion potential during high flow.	Unstable; many eroded areas; "raw" areas frequent along straight sections & bends; obvious bank sloughing; 60-100% of banks have erosion scars on sideslopes.
6. score: 8.5	9-10	6-8	3-5	0-2
	Left Side 8	Average:		
	Right Side 9	Comments:		
7. Bank Vegetation Protection (score each bank) NOTE: reduce scores for annual crops & weeds which do not hold soil well (e.g. knapweed).	Over 90% of the streambank surfaces covered by stabilizing vegetation; vegetative disruption minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by vegetation; disruption evident, but not affecting full plant growth potential to any great extent; more than one-half of potential plant height evident.	50-70% of the streambank surfaces covered in vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of potential plant height remaining.	Less than 50% of the streambank surfaces covered by vegetation; extensive disruption of vegetation; vegetation removed to 2 inches or less.
7. score: 10	9-10	6-8	3-5	0-2
	Left Side	Average:		
	Right Side	Comments:		
8. Vegetated Zone Width (score each side)	Width of vegetated zone > 100 feet.	Width of vegetated zone 30-100 feet.	Width of vegetated zone 10-30 feet.	Width of vegetated zone < 10 feet.
8. score: 10	9-10	6-8	3-5	0-2
	Left Side	Average:		
	Right Side	Comments: cropland off to one side - large buffer		

TOTAL SCORE: Score compared to maximum possible:

03 – 0723 – __

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-M12

Trip ID: 2003-DEBEN Date: 7/22/03

Personnel: Laidlaw / Brownlee

Waterbody Name South Fork Dearborn County Lewis + Clark HUC 10030102

Station ID M12SFDB201 Visit # 2 Location Upstream of Sterkfall Park

Lat 47°07'15.5" Long 112°15'16.3" Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84

Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☒	03-0723AO	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☒	Macroinvertebrate Habitat Asmt. ☐	03-0723M	KICK HESS OTHER:
Algae/Macrophytes	☒	Aquatic Plant Form ☐	03-0723A	PERI-1 OTHER:
Chlorophyll a	☒		03-0723C	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☐			
Field Notes	☒			
Other				

Measurements:	Time: 1400	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 18.55°C	A
pH:	8.39	
SC: (mS/cm)	274	
SC x 1000 =	274	µmho/cm
DO: (mg/L)	9.36 mg/L 100%	
TUR: Clear ☒ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments:	8.5 NTU / 7.3 NTU	

Macroinvertebrate Kick Duration: 2 minutes Kick Length (Ft.): 50'

Site Visit Comments:

Revised 3/2003 DRA

Revised 4/2003

TOTAL DISCHARGE:

Date: 7-22-03 **Site Visit Code:** 03-0723

Waterbody: S Fork Dearborn US Blacktail Rock **Station ID:** M12SF08R01

Personnel: Landlaw Bowman

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	3.5	0	0	0		
2	4.5	.25	0	1		
3	5.5	.32	.20	1		
4	6.5	.50	.26	1		
5	7.5	.50	.50	1		
6	8.5	.85	.64	1		
7	9.5	.90	.65	1		
8	10.5	.95	.44	1		
9	11.5	1.0	.49	1		
10	12.5	1.0	.34	1		
11	13.5	.9	.34	1		
12	14.5	.85	.55			
13	15.5	.85	.54			
14	16.5	.85	.44			
15	17.5	.85	0			
16	18.5	.85	.30			
17	19.5	.95	.15			
18	20.5	1.05	.01			
19	21.5	.92	.01			
20	22.5	.50	0			
21	23.0	0	0			
22						
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21.1.1.12

MACROINVERTEBRATE HABITAT ASSESSMENT FIELD FORM RIFFLE/RUN PREVALENCE

Date: 7-22-03 Site Visit Code: 03-0703

Waterbody: S Fork Dearborn US Electrical Barrier Site: MT2-FDBR01

Personnel: Landrew Bauman

HABITAT PARAMETER	OPTIMAL	SUB-OPTIMAL	MARGINAL	POOR
1A. Riffle Development	Well-developed riffle; riffle as wide as stream & extends two times width of stream.	Riffle as wide as stream but length less than two times width.	Reduced riffle area that is not as wide as stream & its length less than two times width.	Riffles virtually non-existent
1A. score: 9	9-10	6-8	3-5	0-2
Comments:				
1B. Benthic Substrate	Diverse substrate dominated by cobble.	Substrate diverse with abundant cobble, but bedrock, boulders, fine gravel, or sand prevalent.	Substrate dominated by bedrock, boulders, sand, or silt; cobble present.	Monotonous fine gravel, sand, silt, or bedrock substrate.
1B. score: 7	9-10	6-8	3-5	0-2
Comments:	mix of cobble			
2. Embeddedness	Gravel, cobble, or boulder particles are between 0-25% surrounded by fine sediment (particles less than 6.35 mm [.25"]).	Gravel, cobble, or boulder particles are between 25-50 % surrounded by fine sediment.	Gravel, cobble, or boulder particles are between 50-75% surrounded by fine sediment.	Gravel, cobble, or boulder particles are over 75% surrounded by fine sediment.
2. score: 18	16-20	11-15	6-10	0-5
Comments:	looks great			
3. Channel Alteration (channelization, straightening, dredging, other alterations)	Channel alterations absent or minimal; stream pattern apparently in natural state.	Some channelization present, usually in areas of crossings, etc. Evidence of past alterations (before past 20 years) may be resent, but more recent channel alteration is not present.	New embankments present on both banks; 40-80% of the stream reach channelized & disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized & disrupted.
3. score: 20	16-20	11-15	6-10	0-5
Comments:				
4. Sediment Deposition	Little or no enlargement of bars & less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from coarse gravel; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, coarse sand on old & new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, & bends; moderate deposition in pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
4. score: 19	16-20	11-15	6-10	0-5
Comments:				

5. Channel Flow Status	Water fills baseflow channel; minimal amount of channel substrate exposed.	Water fills > 75% of the baseflow channel; < 25% channel substrate exposed.	Water fills 25-75% of the baseflow channel; riffle substrates mostly exposed.	Very little water in channel, & mostly present as standing pools.
5. score: 15	16-20	11-15	6-10	0-5
Comments:	lower flows than June but still good			
6. Bank Stability (score each bank) NOTE: Determine left or right side while facing downstream.	Banks stable; no evidence of erosion or bank failure; little apparent potential for future problems.	Moderately stable; infrequent, small areas of erosion mostly healed over.	Moderately unstable; moderate frequency & size of erosional areas; up to 60% of banks in reach have erosion; high erosion potential during high flow.	Unstable; many eroded areas; "raw" areas frequent along straight sections & bends; obvious bank sloughing; 60-100% of banks have erosion scars on sideslopes.
6. score: 9	9-10	6-8	3-5	0-2
	Left Side 10	Average: 9		
	Right Side 8	Comments: old cattle crossing		
7. Bank Vegetation Protection (score each bank) NOTE: reduce scores for annual crops & weeds which do not hold soil well (e.g. knapweed).	Over 90% of the streambank surfaces covered by stabilizing vegetation; vegetative disruption minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by vegetation; disruption evident, but not affecting full plant growth potential to any great extent; more than one-half of potential plant height evident.	50-70% of the streambank surfaces covered in vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of potential plant height remaining.	Less than 50% of the streambank surfaces covered by vegetation; extensive disruption of vegetation; vegetation removed to 2 inches or less.
7. score: 9	9-10	6-8	3-5	0-2
	Left Side 9	Average:		
	Right Side 10	Comments:		
8. Vegetated Zone Width (score each side)	Width of vegetated zone > 100 feet.	Width of vegetated zone 30-100 feet.	Width of vegetated zone 10-30 feet.	Width of vegetated zone < 10 feet.
8. score: 10	9-10	6-8	3-5	0-2
	Left Side 10	Average:		
	Right Side 10	Comments:		

TOTAL SCORE: Score compared to maximum possible:

* Reference Site

Place Sticker
03-0710-__

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-M12
Trip ID: 2003-DRBN1 Date: 6-17-03 11:20am
Personnel: Tim, Shad

Waterbody Name: South Fork Dearborn County: Lewis & Clark HUC: 10030102
Station ID: M12SFDBLD1 Visit #: ____ Location: Upstream side on Blackfoot Lane
Lat: 47° 07' 15.5" Long: 112° 15' 15.3" Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84
Lat/Long obtained by method other than GPS? Y ☐ N ☒ If Y what method used? If by map what is the map scale?

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☐	03-0710W	GRAB
Sediment	☒			SED-1
Macroinvertebrate	☐	Macroinvertebrate Habitat Asmt. ☐		KICK HESS OTHER:
Algae/Macrophytes	☐	Aquatic Plant Form ☐		PERI-1 OTHER:
Chlorophyll a	☒		03-0710C (both benthic & water column)	CHLPHL-2 OTHER:
Habitat Assessment	☒	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☒	Pebble Count ☒ % Fines ☒		
Transect	☐			
Photographs	☒			
Field Notes	☒			
Other				

Measurements:	Time: 11:15	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W	A
pH:		
SC: (mS/cm)		
SC x 1000 =		µmho/cm
DO: (mg/L)		
TUR: Clear ☒ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments:		

Macroinvertebrate Kick Duration: Kick Length (Ft.):

Site Visit Comments:

field measurements are taken b/c meter at 4th avenue

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 6-17-03 **Site Visit Code:** 03-0710

Waterbody: S Fork Dearborn upstream on Blackfeet **Station ID:** M12S DBR01

Personnel: L. Allan | Bowman

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	25.6 LEW	0.35	0.22			
2	26	0.6	0.53			
3	27	0.7	0.59			
4	28	0.9	1.18			
5	29	0.9	1.61			
6	30	1.1	1.29			
7	31	1.2	1.30			
8	32	1.3	0.80			
9	33	1.4	0.79			
10	34	1.25	0.55			
11	35	1.05	0.58			
12	36	1.13	0.61			
13	37	1.15	0.75			
14	38	1.17	0.79			
15	39	1.05	0.63			
16	40	1.00	0.69			
17	41	1.10	0.28			
18	42	1.10	0.13			
19	43	0.70	Ø			
20	44.2 REW	Ø	Ø			
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Page 1 of 2

Data Mgmt. Approved

Revised 3/2003 DMA

SUBSTRATE DEQ/MDM

Date: 6-17-03 Site Visit Code: 03-0710

Waterbody: S Fork Dearborn-Blackland STORET Station ID: M12SF001201

Personnel: Laidlaw / Bowman

PEBBLE COUNT

Row ID	Particle Category		Size (mm)	Riffle Count	(Other) Count	Characteristic Group: PEBL-CNT		
						Sum	% of Total	Cum. Total
1	Silt / Clay		< 1			0		0.00%
2	Sand		1 - 2 2			0		0.00%
3	Very Fine	GRAVELS	2 - 4 2.8 4			0		0.00%
4	Fine	GRAVELS	4 - 6 5.6			0		0.00%
5	Fine	GRAVELS	6 - 8 8			0		0.00%
6	Medium	GRAVELS	8 - 12 11			0		0.00%
7	Medium	GRAVELS	12 - 16 16			0		0.00%
8	Coarse	GRAVELS	16 - 22 22.6			0		0.00%
9	Coarse	GRAVELS	22 - 32 32			0		0.00%
10	Very Coarse	GRAVELS	32 - 45 45			0		0.00%
11	Very Coarse	GRAVELS	45 - 64 64			0		0.00%
12	Small	COBBLES	64 - 90 90			0		0.00%
13	Small	COBBLES	90 - 128 128			0		0.00%
14	Large	COBBLES	128 - 180 180			0		0.00%
15	Large	COBBLES	180 - 256			0		0.00%
16	Small	BOULDERS	256 - 362			0		0.00%
17	Small	BOULDERS	362 - 512			0		0.00%
18	Medium	BOULDERS	512 - 1024			0		0.00%
19	Large	BOULDERS	1024 - 2048			0		0.00%
20	Bedrock	BOULDERS	> 2048			0		0.00%
21	Total # Samples			0	0	0	0.00%	

Pebble Count Data Entry Form

Revision 3/2003

Stream Reach Assessment Form

Station ID: M12SFDBK01 Date: 6-17-03 Site Visit Code: 03-0710

Waterbody: South Fork Dearborn - Blackfoot Reach Length:

Waterbody Seg ID: Personnel:

Station ID's on reach:

Question 1, Stream Incisement:

8 = channel stable, no active downcutting occurring; old downcutting apparent but a new, stable riparian area has formed within the incised channel. There is perennial riparian vegetation will established in the riparian area. (Stage 1 and 5, Schumm's model)

6 = channel has evidence of old downcutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling bands, solid disturbance evident. (Stage 4).

4 = small headcut, in early stage, is present. Immediate action may prevent further degradation (early Stage 2).

2 = unstable, channel incised, actively widening, limited new riparian area/floodplain, floodplain not well vegetated. The vegetation that is present is mainly pioneer species. Bank failure is common. (Stage 3)

0 = channel deeply incised, resembling a gully, little or no riparian area, active downcutting is clearly occurring. Only occasional or rare flood events access the flood plain. Tributaries will also exhibit downcutting/headcuts. (Stage 2)

The presence of active headcuts should nearly always keep the stream reach from being rated sustainable.

Actual Score: 8 Potential Score: 8

Comments

Question 2, Percent of Streambanks with Active Lateral Cutting:

6 = the lateral bank erosion is in balance with the stream and its setting

4 = there is a minimal amount of active lateral bank erosion occurring

2 = there is a moderate amount of active lateral bank erosion occurring

0 = there is excessive lateral bank erosion occurring

Actual Score: 6 Potential Score: 6

Comments

Question 3, The Stream is in Balance with the Water and Sediment Being Supplied by the Watershed:

6 = the stream exhibits no excess sediment/bedload deposition, sediment occurs on point bars and other locations as would be expected in a stable, dynamic system

4 = sediment clogged gravel's are apparent in riffles or pools, or other evidence of excess sediment apparent

2 = mid-channel bars are common

0 = stream is braided (except naturally occurring braided systems), having at least 3 active channels

Actual Score: 6 Potential Score: 6

Comments

1 SRAF.xls

Question 4, Sufficient Soil Present to Hold Water and Act as a Rooting Medium:

3 = more than 85% of the riparian area with sufficient soil to hold water and act as a rooting medium

2 = 65% to 85% of the riparian area with sufficient soil to hold water and act as a rooting medium

1 = 35% to 65% of the riparian area with sufficient soil to hold water and act as a rooting medium

0 = 35% or less of the riparian area with sufficient soil to hold water and act as a rooting medium

Actual Score: 3 Potential Score: 3

Comments

Question 5, Percent of Streambank with Vegetation having a Deep, Binding Rootmass: (see Appendix I for stability ratings for most riparian, and other, species)

6 = more than 80% of the streambank comprised of plant species with deep, binding root masses

4 = 60% to 80% of the streambank comprised of plant species with deep, binding root masses

2 = 30% to 60% of the streambank comprised of plant species with deep binding root masses

0 = less than 30% of the streambank comprised of plant species with deep binding root masses

Actual Score: 6 Potential Score: 6

Comments

Question 6, Weeds :

3 = No noxious weeds are present

2 = 0-1% of the riparian area has noxious weeds

1 = 1%-5% of the riparian area has noxious weeds

0 = over 5% of the riparian area has noxious weeds

Actual Score: 3 Potential Score: 3

Comments

Question 7, Disturbance-Caused Undesirable Plants:

3 = 1% or less of the riparian area has undesirable plants

2 = 1%-5% of the riparian area has undesirable plants

1 = 5%-10% of the riparian area has undesirable plants

0 = over 10% of the riparian area has undesirable plants

Actual Score: 3 Potential Score: 3

Comments

Question 8, Woody Species Establishment and Regeneration: (Note: Skip this question if the riparian area has no potential for woody species)

8 = all age classes of native woody riparian species present (see table, Fig 2)

6 = one age class of native woody riparian species clearly absent, all others well represented. For sites with potential for trees and shrubs, there may be one age class of each absent. Often, it will be the middle age group(s) that is (are) lacking. Having mature individuals and a young age class present indicate potential for recovery.

4 = two age classes of native riparian shrubs and/or two age classes of riparian trees clearly absent, other(s) well represented, or the stand is comprised of mainly mature, decadent or dead plants

2 = disturbance induced, (i.e., facultative, facultative upland species such as rose, or snowberry) or non-riparian species dominate. Re-evaluate Question 1, incisement, if this has happened.

0 = some woody species present (>10% cover), but herbaceous species dominate (at this point, the site potential should be re-evaluated to ensure that it has potential for woody vegetation). OR, the site has at least 5% cover of Russian olive and/or salt cedar

Actual Score: 8 Potential Score: 8

Comments

Question 9, Utilization of Trees and Shrubs: (Note: Skip this question if the riparian area has no potential for woody species)

4 = 0-5% of the available second year and older stems are browsed

3 = 5%-25% of the available second year and older stems are browsed

2 = 25%-50% of the available second year and older stems are browsed.

1 = more than 50% of the available second year and older stems are browsed. Many of the shrubs have either a "clubbed" growth form, or they are high-lined or umbrella shaped.

0 = there is noticeable use (10% or more) of unpalatable and normally unused woody species.

Actual Score: 4 Potential Score: 4

Comments

Question 10, Riparian/Wetland Vegetative Cover in the Riparian Area/Floodplain and Streambank:

8 = 85% or more of the riparian/wetland plant cover has a stability rating ≥ 6

6 = 75%-85% of the riparian/wetland plant cover has a stability rating ≥ 6

4 = 65%-75% of the riparian/wetland plant cover has a stability rating ≥ 6

2 = 55%-65% of the riparian/wetland plant cover has a stability rating ≥ 6

0 = less than 55% of the riparian/wetland plant cover has a stability rating ≥ 6

Actual Score: 8 Potential Score: 8

Comments

3 SRAF.xls

Question 11, Riparian Area/Floodplain Characteristics are Adequate to Dissipate Energy and Trap Sediment.

6 = active flood or overflow channels, large rock, or woody material present and adequate to dissipate energy and trap sediment. There is little surface erosion and no evidence of long, continuous erosional areas on floodplain/riparian area or streambank. There are no headcuts where either overland flow and/or flood channel flows return to the main channel.

4 = rock and/or woody material is present, but generally of insufficient size to dissipate energy. Some sediment trapping occurring. Occasional evidence of surface erosion. Generally not severe enough to have developed channels.

2 = inadequate rock and/or woody material available for dissipation of energy or sediment trapping. There is surface erosion (scouring) and occasional headcuts where overland flows or flood channel flows return to the main channel.

0 = riparian area/floodplain lacking any of these attributes: 1)adequate flood or overflow channels, 2) large rock, or 3) woody material suitable for energy dissipation and sediment trapping. Erosional areas are long and continuous. Lacking vegetation or substrate materials adequate to resist further erosion. Surface erosion is obvious on the floodplain/riparian area. Headcuts are present that have the potential to create meander cut-offs.

Actual Score: 6 Potential Score: 6

Comments

SUMMARY

		Actual Score	Possible Points	Potential Score
QUESTION 1:	Stream Incisement	0	0, 2, 4, 6, 8	0
QUESTION 2:	Lateral Cutting	0	0, 2, 4, 6	0
QUESTION 3:	Stream Balance	0	0, 2, 4, 6	0
QUESTION 4:	Sufficient Soil	0	N/A, 0, 1, 2, 3	0
QUESTION 5:	Rootmass	0	N/A, 0, 2, 4, 6	0
QUESTION 6:	Weeds	0	0, 1, 2, 3	0
QUESTION 7:	Undesirable Plants	0	0, 1, 2, 3	0
QUESTION 8:	Woody Species Establishment	0	N/A, 0, 2, 4, 6, 8	0
QUESTION 9:	Browse Utilization	0	N/A, 0, 1, 2, 3, 4	0
QUESTION 10:	Riparian/Wetland Vegetative Cover *	0	N/A, 0, 2, 4, 6, 8	0
QUESTION 11:	Riparian Area/Floodplain Characteristics *	0	N/A, 0, 2, 4, 6	0
	Total	0	61	0
Potential Score for most Bedrock or Boulder streams (questions 1, 2, 3, 6, 7, 11)		0	(32)	0
Potential Score for most low energy "E" streams (questions 1 – 7, 10, 11)		0	(49)	0

RATING: = $\frac{\text{Actual Score}}{\text{Potential Score}}$ X 100 = % rating #DIV/0!

80-100% = SUSTAINABLE
50-80% = AT RISK
LESS THAN 50% = NOT SUSTAINABLE

* Only in certain, specific situations can both of these receive an "N/A".

4 SRAF.xls

Montana Department of Environmental Quality Supplemental Questions

The score for these questions does not have an effect on the rating above.
Note: Answers to these questions must consider the potential of the stream.

Question 12. Fisheries Habitat / Stream Complexity Note: the answers to question 12 will be averaged

12a. Adult and Juvenile Holding/Escape Cover
8 = Abundant deep pools, woody debris, overhanging vegetation, boulders, root wads, undercut banks and/or aquatic

6 = Fish habitat is common (see above).

4 = Fish habitat is noticeably reduced. Most pools are shallow and/or w ody debris, undercut banks, overhanging vegetation, boulders, root wads and/or aquatic vegetation are of limited supply.

2 = Pools and habitat features are sparse or non-existent or there are fish barriers.

0 = There is not enough water to support a fishery

N/A = Stream would not support fish under natural conditions

Actual Score: 6 Potential Score: 6

Comments: Shallow, high gradient, Deep pools not present but not characteristics

12b. Habitat Complexity
6 = A mixture of juvenile and adult cover types is present. High flow juvenile and adult refugia are present.

3 = Primarily adult or juvenile cover types are present. High flow refugia are reduced.

0 = High flow refugia are lacking.

N/A = Stream would not support fish under natural conditions

Actual Score: 3 Potential Score: 3

Comments

12c. Spawning Habitat (salmonid streams only)
8 = Areal extent of spawning substrate, morphology of spawning areas, and composition of spawning substrate are excellent.

4 = Areal extent of spawning substrate, morphology of spawning areas, and/or quality of spawning substrate reduced.

0 = Areal extent of spawning substrate, morphology of spawning areas, and/or quality of spawning substrate greatly reduced.

N/A = Stream would not support fish under natural conditions.

Actual Score: 8 Potential Score: 8

Comments

5 SRAF.xls

12d. Fish Passsage

8 = No potential fish passage barriers apparent.

0 = Potential fish passage barriers present.

N/A = Stream would not support fish under natural conditions.

Actual Score: 8 Potential Score: 8

Comments

12e. Entrainment

8 = Entrainment of fish into water diversions not an issue.

4 = Entrainment of fish into water diversions may be a moderate issue.

0 = Entrainment of fish into water diversions may be a major issue.

Actual Score: 8 Potential Score: 8

Comments

12a-e Avg. Score Actual Score 0 Potential Score 0

Question 13. Solar Radiation

6 = More than 75% of the stream reach is adequately shaded by vegetation.

4 = 50-75% of the stream reach does not have adequate shading or the water temperature is probably elevated by irrigation,

3 = Approximately 25-50% of the stream does not have adequate shade.

0 = More than 75% of the stream reach does not have adequate shade by vegetation or the water temperature is probably drastically altered by irrigation, etc.

Actual Score: 3 Potential Score: 4

Comments

Question 14. Algae growth / Nutrients

6 = Algae not apparent. Rocks are slippery.

4 = in small patches or along channel edge

2 = in large patches or discontinuous mats

0 = Mats cover bottom (hyper enriched conditions) or plants not apparent and rocks not slippery (toxic conditions)

N/A = No water

Actual Score: 6 Potential Score: 6

Comments

Question 15. Surface oils, turbidity, salinization, precipitants on stream bottom and/or water odor

6 = none

4 = Slight

2 = Moderate

0 = Extensive

N/A = No water

Actual Score: 6 Potential Score: 6

Comments

Question 16. Bacteria

4 = There are no known anthropogenic sources of bacteria

2 = Likely sources of bacteria are present. Wastewater or concentrated livestock operations are the most common sources.

0 = Feedlots are common or raw sewage is entering the stream

Actual Score: 4 Potential Score: 4

Comments

Question 17. Macroinvertebrates

4 = The stream has a healthy and diverse community of macroinvertebrates. Stream riffles usually have an abundance of may flies, caddis flies and/or stone flies.

2 = The stream is dominated by pollution tolerant taxa such as fly and midge larva.

0 = Macroinvertebrates are rare or absent

N/A = Stream reach is ephemeral

Actual Score: 4 Potential Score: 4

Comments

7 SRAF.xls

Question 18. Irrigation impacts (Assess during critical low flow periods or you may need to inquire locally about this. Evaluate effects from de-watering or inter-basin transfer of water.)

8 = There are no noticeable impacts from irrigation

6 = Changes in flow resulting from irrigation practices are noticeable, however flows are adequate to support aquatic organisms.

4 = Flows support aquatic organisms, but habitat, especially riffles are drastically reduced or impacted.

2 = The flow is low enough to severely impair aquatic organisms

0 = All of the water has been diverted from the stream

N/A = Stream reach is ephemeral.

Actual Score: 8 Potential Score: 8

Comments

Question 19. Landuse activities – Sources

8 = Landuse practices do not appear to significantly impact water quality or the riparian vegetation. Any impacts that occur appear to be natural.

6 = There are some signs of impact from landuse activities such as grazing, dryland agriculture, irrigation, feedlots, mining, timber harvesting, urban, roads, etc.

4 = Impacts from landuse activities are obvious and occur throughout most of the stream reach. For example, there are obvious signs of human induced erosion, saline seeps or overgrazing within the watershed.

2 = Landuse impacts are significant and widespread. Visual observation and photo documentation would provide overwhelming evidence that the stream is impaired.

0 = Land use impacts are so intrusive that the stream has lost most of its natural features. The stream does not appear to be capable to support most forms of aquatic life

Actual Score: 8 Potential Score: 8

Comments: some small scale logging & cattle grazing seasonally (small herd ESC)

Total Actual 0 Total Potential 0

RATING $\frac{\text{Total}}{\text{Potential}} \times 100$ #DIV/0!

OVERALL RATING $\frac{\text{(Total NRCS Actual + Total MT Supplement Actual)}}{\text{(Total NRCS Potential + Total MT Supplement Potential)}} \times 100$ #DIV/0!

75-100% = SUSTAINABLE
50-75% = AT RISK
LESS THAN 50% = NOT SUSTAINABLE

CDAE v4

Date: _____

Stream Name: _____

Cross-section #: Bank: (right/left)

BANK ERODIBILITY HAZARD INDEX

PHOTO POINTS	Camera #	Photo #
1. Downstream to x-section		
2. Left pin to right pin		
3. Right pin to left pin		
4. Mid-channel to left bank		
5. Mid-channel to right bank		

NOTES: BEHI at needed; minimal eroding banks

BANK EROSION POTENTIAL

CRITERIA	VERY LOW		LOW		MODERATE		HIGH		VERY HIGH		EXTREME		BEHI DATA: BANKFULL		BEHI DATA: FLOODPRONE	
	VALUE	INDEX	VALUE	INDEX	VALUE	INDEX	VALUE	INDEX	VALUE	INDEX	VALUE	INDEX	VALUE	INDEX	VALUE	INDEX
Bank Ht/BM Ht	1.0-1.1	1.0-1.9	1.1-1.19	2.0-3.9	1.2-1.5	4.0-5.9	1.6-2.0	6.0-7.9	2.1-2.9	8.0-9.0	>2.9	10				
Root Depth/Bank Ht	1.0-0.9	1.0-1.9	0.89-0.50	2.0-3.9	0.49-0.30	4.0-5.9	29-0.15	6.0-7.9	0.14-0.05	8.0-9.0	<0.05	10				
Root density (%)	100-80	1.0-1.9	79-55	2.0-3.9	54-30	4.0-5.9	29-15	6.0-7.9	14-5	8.0-9.0	<5.0	10				
Bank Angle (degrees)	0-20	1.0-1.9	21-60	2.0-3.9	61-80	4.0-5.9	81-90	6.0-7.9	91-119	8.0-9.0	>119	10				
(slope)	0-0.36		0.37-1.73		1.74-5.67		5.68-0.0		1.01-(-1.01)		<(-1.01)					
Surface Prot. (%)	100-80	1.0-1.9	79-55	2.0-3.9	54-30	4.0-5.9	29-15	6.0-7.9	15-10	8.0-9.0	<10	10				
TOTALS												Total				
		5-9.5		10-19.5		20-29.5		30-39.5		40-45		46-50				
Adjustments											Adjust					
Numerical											Numerical					

Conclusions for Bankfull BEHI

Bank Erosion Potential: _____

Near Bank Stress: _____

Estimated Bank Loss/yr: _____

Conclusions for Floodprone BEHI

Bank Erosion Potential: _____

Near Bank Stress: _____

Estimated Bank Loss/yr: _____

BANK MATERIALS: CIRCLE ONE

BEDROCK: Bank erosion potential always very low

BOULDERS: Bank erosion potential low

COBBLE: Decrease by one category unless mixture of Gravel/Sand is over 50%, then no adjustment

GRAVEL: Adjust values up by 5-10 points depending on composition of Sand

SAND: Adjust values up by 10 points

SILT/CLAY: No adjustment unless a part of unconsolidated bank, then adjust up to 10 points

STRATIFICATION: 5-10 points (upward) depending on position of unstable layers in relation to bankfull stage

Bank Profile Data (Rise and Run from Toe Pin)

RISE	RUN	NOTES

Bank Profile Sketch

NEAR BANK STRESS RATING	Amb/A**	Value
Low	0.32 or Less	
Moderate	0.33-0.41	
High	0.042-0.45	
Very High	0.046-0.50	
Extreme	0.51 or more	

03 – 0711 – __

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-1112

Trip ID: 2003-DRCEN Date: 6-17-03

Personnel: [illegible]

Waterbody Name South Fork @ Confluence w/ Dearborn County Lewis + Clark HUC 10030102

Station ID SFDBR-04 Visit # 1 Location At Confluence w/ Dearborn

Lat 47° 11' 36.6" Long 112° 11' 04.3" Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84

Lat/Long obtained by method other than GPS? Y ☐ N ☒ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☐	03-0711W	GRAB
Sediment	☒			SED-1
Macroinvertebrate	☐	Macroinvertebrate Habitat Asmt. ☐		KICK HESS OTHER:
Algae/Macrophytes	☐	Aquatic Plant Form ☐		PERI-1 OTHER:
Chlorophyll a	☒		03-0711C (water + benthic)	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☒			
Field Notes	☒			
Other				

Measurements:	Time: 1535	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W	A
pH:		
SC: (mS/cm)		
SC x 1000 =		µmho/cm
DO: (mg/L)		
TUR: Clear ☐ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments:		

Macroinvertebrate Kick Duration: Kick Length (Ft.):

Site Visit Comments:

Wtr. landowner

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 6-17-03 Site Visit Code: 03-0711

Waterbody: South Fork-confluence Station ID: MI05FDBR-01

Personnel: Cadlas Pfannkuch

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	14.3 LEW	.3	0			
2	15.3	.4	.39			
3	16.3	.65	.56			
4	17.3	.75	.79			
5	18.3	.70	.71			
6	19.3	.60	.68			
7	20.3	.55	.73			
8	21.3	.55	.77			
9	22.3	.55	.85			
10	23.3	.50	.81			
11	24.3	.50	.83			
12	25.3	.55	.78			
13	26.3	.60	.53			
14	27.3	.60	.68			
15	28.3	.50	.85			
16	29.3	.55	1.04			
17	30.3	.60	.76			
18	31.3	.65	.70			
19	32.3	.70	.63			
20	33.3	.59	.65			
21	34.3	.65	.55			
22	35.3	.55	.50			
23	36.3	.50	.46			
24	37.3	0	0			
25						
26						
27						
28						
29						
30						

Page 1 of 2 Data Mgmt. Approved

Revised 3/2003 DMA

SUBSTRATE DEC /MDM

Date: 6-17-03 Site Visit Code: 03-0711

Waterbody: South Fork Dearborn STORET Station ID: M1DSFDBR-04

Personnel: Lindsay Bowman

PEBBLE COUNT

Row ID	Particle Category		Size (mm)	Riffle Count	(Other) Count	Characteristic Group: PEBL-CNT		
						Sum	% of Total	Cum. Total
1	Silt / Clay		< 1			0		0.00%
2	Sand		1 - 2			0		0.00%
3	Very Fine	GRAVELS	2 - 4			0		0.00%
4	Fine		4 - 6			0		0.00%
5	Fine		6 - 8			0		0.00%
6	Medium		8 - 12			0		0.00%
7	Medium		12 - 16			0		0.00%
8	Coarse		16 - 22			0		0.00%
9	Coarse		22 - 32			0		0.00%
10	Very Coarse		32 - 45			0		0.00%
11	Very Coarse		45 - 64			0		0.00%
12	Small	COBBLES	64 - 90			0		0.00%
13	Small		90 - 128			0		0.00%
14	Large		128 - 180			0		0.00%
15	Large		180 - 256			0		0.00%
16	Small	BOULDERS	256 - 362			0		0.00%
17	Small		362 - 512			0		0.00%
18	Medium		512 - 1024			0		0.00%
19	Large		1024 - 2048			0		0.00%
20	Bedrock		> 2048			0		0.00%
21	Total # Samples			0	0	0	0.00%	

Nostoc algae

Pebble Count Data Entry Form

Revision 3/2003

Stream Reach Assessment Form

Station ID: 6-17-03 Date: 6-17-03 Site Visit Code: 03-0711

Waterbody: South Fork Dearborn - Confluence Reach Length:

Waterbody Seg ID: Personnel: Landlaw / Bowman

Station ID's on reach:

Question 1, Stream Incisement:

8 = channel stable, no active downcutting occurring; old downcutting apparent but a new, stable riparian area has formed within the incised channel. There is perennial riparian vegetation will established in the riparian area. (Stage 1 and 5, Schumm's model)

6 = channel has evidence of old downcutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling bands, solid disturbance evident. (Stage 4).

4 = small headcut, in early stage, is present. Immediate action may prevent further degradation (early Stage 2).

2 = unstable, channel incised, actively widening, limited new riparian area/floodplain, floodplain not well vegetated. The vegetation that is present is mainly pioneer species. Bank failure is common. (Stage 3)

0 = channel deeply incised, resembling a gully, little or no riparian area, active downcutting is clearly occurring. Only occasional or rare flood events access the flood plain. Tributaries will also exhibit downcutting/headcuts. (Stage 2)

The presence of active headcuts should nearly always keep the stream reach from being rated sustainable.

Actual Score: 8 Potential Score: 8

Comments

Question 2, Percent of Streambanks with Active Lateral Cutting:

6 = the lateral bank erosion is in balance with the stream and its setting

4 = there is a minimal amount of active lateral bank erosion occurring

2 = there is a moderate amount of active lateral bank erosion occurring

0 = there is excessive lateral bank erosion occurring

Actual Score: 6 Potential Score: 6

Comments

Question 3, The Stream is in Balance with the Water and Sediment Being Supplied by the Watershed:

6 = the stream exhibits no excess sediment/bedload deposition, sediment occurs on point bars and other locations as would be expected in a stable, dynamic system

4 = sediment clogged gravel's are apparent in riffles or pools, or other evidence of excess sediment apparent

2 = mid-channel bars are common

0 = stream is braided (except naturally occurring braided systems), having at least 3 active channels

Actual Score: 5 Potential Score: 6

Comments: Some fines in eddies & point bars material

1 SRAF.xls

Question 4, Sufficient Soil Present to Hold Water and Act as a Rooting Medium:

3 = more than 85% of the riparian area with sufficient soil to hold water and act as a rooting medium

2 = 65% to 85% of the riparian area with sufficient soil to hold water and act as a rooting medium

1 = 35% to 65% of the riparian area with sufficient soil to hold water and act as a rooting medium

0 = 35% or less of the riparian area with sufficient soil to hold water and act as a rooting medium

Actual Score: 3 Potential Score: 3

Comments

Question 5, Percent of Streambank with Vegetation having a Deep, Binding Rootmass: (see Appendix I for stability ratings for most riparian, and other, species)

6 = more than 80% of the streambank comprised of plant species with deep, binding root masses

4 = 60% to 80% of the streambank comprised of plant species with deep, binding root masses

2 = 30% to 60% of the streambank comprised of plant species with deep binding root masses

0 = less than 30% of the streambank comprised of plant species with deep binding root masses

Actual Score: 6 Potential Score: 6

Comments

Question 6, Weeds :

3 = No noxious weeds are present

2 = 0-1% of the riparian area has noxious weeds

1 = 1%-5% of the riparian area has noxious weeds

0 = over 5% of the riparian area has noxious weeds

Actual Score: 2 Potential Score: 3

Comments Knapweed at Dearborn

Question 7, Disturbance-Caused Undesirable Plants:

3 = 1% or less of the riparian area has undesirable plants

2 = 1%-5% of the riparian area has undesirable plants

1 = 5%-10% of the riparian area has undesirable plants

0 = over 10% of the riparian area has undesirable plants

Actual Score: 3 Potential Score: 3

Comments

Question 8, Woody Species Establishment and Regeneration: (Note: Skip this question if the riparian area has no potential for woody species)

8 = all age classes of native woody riparian species present (see table, Fig 2)

6 = one age class of native woody riparian species clearly absent, all others well represented. For sites with potential for trees and shrubs, there may be one age class of each absent. Often, it will be the middle age group(s) that is (are) lacking. Having mature individuals and a young age class present indicate potential for recovery.

4 = two age classes of native riparian shrubs and/or two age classes of riparian trees clearly absent, other(s) well represented, or the stand is comprised of mainly mature, decadent or dead plants

2 = disturbance induced, (i.e., facultative, facultative upland species such as rose, or snowberry) or non-riparian species dominate. Re-evaluate Question 1, incisement, if this has happened.

0 = some woody species present (>10% cover), but herbaceous species dominate (at this point, the site potential should be re-evaluated to ensure that it has potential for woody vegetation). OR, the site has at least 5% cover of Russian olive and/or salt cedar

Actual Score: 8 Potential Score: 8

Comments

Question 9, Utilization of Trees and Shrubs: (Note: Skip this question if the riparian area has no potential for woody species)

4 = 0-5% of the available second year and older stems are browsed

3 = 5%-25% of the available second year and older stems are browsed

2 = 25%-50% of the available second year and older stems are browsed.

1 = more than 50% of the available second year and older stems are browsed. Many of the shrubs have either a "clubbed" growth form, or they are high-lined or umbrella shaped.

0 = there is noticeable use (10% or more) of unpalatable and normally unused woody species.

Actual Score: 4 Potential Score: 4

Comments

Question 10, Riparian/Wetland Vegetative Cover in the Riparian Area/Floodplain and Streambank:

8 = 85% or more of the riparian/wetland plant cover has a stability rating $\geq$ 6

6 = 75%-85% of the riparian/wetland plant cover has a stability rating $\geq$ 6

4 = 65%-75% of the riparian/wetland plant cover has a stability rating $\geq$ 6

2 = 55%-65% of the riparian/wetland plant cover has a stability rating $\geq$ 6

0 = less than 55% of the riparian/wetland plant cover has a stability rating $\geq$ 6

Actual Score: 8 Potential Score: 8

Comments

3 SRAF.xls

Question 11, Riparian Area/Floodplain Characteristics are Adequate to Dissipate Energy and Trap Sediment.

6 = active flood or overflow channels, large rock, or woody material present and adequate to dissipate energy and trap sediment. There is little surface erosion and no evidence of long, continuous erosional areas on floodplain/riparian area or streambank. There are no headcuts where either overland flow and/or flood channel flows return to the main channel.

4 = rock and/or woody material is present, but generally of insufficient size to dissipate energy. Some sediment trapping occurring. Occasional evidence of surface erosion. Generally not severe enough to have developed channels.

2 = inadequate rock and/or woody material available for dissipation of energy or sediment trapping. There is surface erosion (scouring) and occasional headcuts where overland flows or flood channel flows return to the main channel.

0 = riparian area/floodplain lacking any of these attributes: 1)adequate flood or overflow channels, 2) large rock, or 3) woody material suitable for energy dissipation and sediment trapping. Erosional areas are long and continuous. Lacking vegetation or substrate materials adequate to resist further erosion. Surface erosion is obvious on the floodplain/riparian area. Headcuts are present that have the potential to create meander cut-offs.

Actual Score: 6 Potential Score: 6

Comments

SUMMARY

		Actual Score	Possible Points	Potential Score
QUESTION 1:	Stream Incisement	0	0, 2, 4, 6, 8	0
QUESTION 2:	Lateral Cutting	0	0, 2, 4, 6	0
QUESTION 3:	Stream Balance	0	0, 2, 4, 6	0
QUESTION 4:	Sufficient Soil	0	N/A, 0, 1, 2, 3	0
QUESTION 5:	Rootmass	0	N/A, 0, 2, 4, 6	0
QUESTION 6:	Weeds	0	0, 1, 2, 3	0
QUESTION 7:	Undesirable Plants	0	0, 1, 2, 3	0
QUESTION 8:	Woody Species Establishment	0	N/A, 0, 2, 4, 6, 8	0
QUESTION 9:	Browse Utilization	0	N/A, 0, 1, 2, 3, 4	0
QUESTION 10:	Riparian/Wetland Vegetative Cover *	0	N/A, 0, 2, 4, 6, 8	0
QUESTION 11:	Riparian Area/Floodplain Characteristics *	0	N/A, 0, 2, 4, 6	0
	Total	0	61	0
Potential Score for most Bedrock or Boulder streams (questions 1, 2, 3, 6, 7, 11)		0	(32)	0
Potential Score for most low energy "E" streams (questions 1 – 7, 10, 11)		0	(49)	0

RATING: = $\frac{\text{Actual Score}}{\text{Potential Score}}$ X 100 = % rating #DIV/0!

80-100% = SUSTAINABLE
50-80% = AT RISK
LESS THAN 50% = NOT SUSTAINABLE

* Only in certain, specific situations can both of these receive an "N/A".

4 SRAF v6

Montana Department of Environmental Quality Supplemental Questions

The score for these questions does not have an effect on the rating above.
Note: Answers to these questions must consider the potential of the stream.

Question 12. Fisheries Habitat / Stream Complexity Note: the answers to question 12 will be averaged

12a. Adult and Juvenile Holding/Escape Cover
8 = Abundant deep pools, woody debris, overhanging vegetation, boulders, root wads, undercut banks and/or aquatic

6 = Fish habitat is common (see above).

4 = Fish habitat is noticeably reduced. Most pools are shallow and/or woody debris, undercut banks, overhanging vegetation, boulders, root wads and/or aquatic vegetation are of limited supply.

2 = Pools and habitat features are sparse or non-existent or there are fish barriers.

0 = There is not enough water to support a fishery

N/A = Stream would not support fish under natural conditions

Actual Score: 8 Potential Score: 8

Comments

12b. Habitat Complexity
6 = A mixture of juvenile and adult cover types is present. High flow juvenile and adult refugia are present.

3 = Primarily adult or juvenile cover types are present. High flow refugia are reduced.

0 = High flow refugia are lacking.

N/A = Stream would not support fish under natural conditions

Actual Score: 6 Potential Score: 6

Comments

12c. Spawning Habitat (salmonid streams only)
8 = Areal extent of spawning substrate, morphology of spawning areas, and composition of spawning substrate are excellent.

4 = Areal extent of spawning substrate, morphology of spawning areas, and/or quality of spawning substrate reduced.

0 = Areal extent of spawning substrate, morphology of spawning areas, and/or quality of spawning substrate greatly reduced.

N/A = Stream would not support fish under natural conditions.

Actual Score: 7 Potential Score: 8

Comments

5 SRAF.xls

12d. Fish Passsage

8 = No potential fish passage barriers apparent.

0 = Potential fish passage barriers present.

N/A = Stream would not support fish under natural conditions.

Actual Score: 8 Potential Score: 8

Comments

12e. Entrainment

8 = Entrainment of fish into water diversions not an issue.

4 = Entrainment of fish into water diversions may be a moderate issue.

0 = Entrainment of fish into water diversions may be a major issue.

Actual Score: 8 Potential Score: 8

Comments

12a-e Avg. Score Actual Score 0 Potential Score 0

Question 13. Solar Radiation

6 = More than 75% of the stream reach is adequately shaded by vegetation.

4 = 50-75% of the stream reach does not have adequate shading or the water temperature is probably elevated by irrigation,

3 = Approximately 25-50% of the stream does not have adequate shade.

0 = More than 75% of the stream reach does not have adequate shade by vegetation or the water temperature is probably drastically altered by irrigation, etc.

Actual Score: 3 Potential Score: 4

Comments

Question 14. Algae growth / Nutrients

6 = Algae not apparent. Rocks are slippery.

4 = in small patches or along channel edge

2 = in large patches or discontinuous mats

0 = Mats cover bottom (hyper enriched conditions) or plants not apparent and rocks not slippery (toxic conditions)

N/A = No water

Actual Score: 5 Potential Score: 6

Moss in stream

Comments

Question 15. Surface oils, turbidity, salinization, precipitants on stream bottom and/or water odor

6 = none

4 = Slight

2 = Moderate

0 = Extensive

N/A = No water

Actual Score: 6 Potential Score: 6

Comments

Question 16. Bacteria

4 = There are no known anthropogenic sources of bacteria

2 = Likely sources of bacteria are present. Wastewater or concentrated livestock operations are the most common sources.

0 = Feedlots are common or raw sewage is entering the stream

Actual Score: 4 Potential Score: 4

Comments

Question 17. Macroinvertebrates

4 = The stream has a healthy and diverse community of macroinvertebrates. Stream riffles usually have an abundance of may flies, caddis flies and/or stone flies.

2 = The stream is dominated by pollution tolerant taxa such as fly and midge larva.

0 = Macroinvertebrates are rare or absent

N/A = Stream reach is ephemeral

Actual Score: 4 Potential Score: 4

Comments

7 SRAF.xls

Question 18. Irrigation impacts (Assess during critical low flow periods or you may need to inquire locally about this. Evaluate effects from de-watering or inter-basin transfer of water.)

8 = There are no noticeable impacts from irrigation

6 = Changes in flow resulting from irrigation practices are noticeable, however flows are adequate to support aquatic organisms.

4 = Flows support aquatic organisms, but habitat, especially riffles are drastically reduced or impacted.

2 = The flow is low enough to severely impair aquatic organisms

0 = All of the water has been diverted from the stream

N/A = Stream reach is ephemeral.

Actual Score: 8 Potential Score: 8

Comments: Irrigation upstream however - pumping & Riffles

Question 19. Landuse activities – Sources

8 = Landuse practices do not appear to significantly impact water quality or the riparian vegetation. Any impacts that occur appear to be natural.

6 = There are some signs of impact from landuse activities such as grazing, dryland agriculture, irrigation, feedlots, mining, timber harvesting, urban, roads, etc.

4 = Impacts from landuse activities are obvious and occur throughout most of the stream reach. For example, there are obvious signs of human induced erosion, saline seeps or overgrazing within the watershed.

2 = Landuse impacts are significant and widespread. Visual observation and photo documentation would provide overwhelming evidence that the stream is impaired.

0 = Land use impacts are so intrusive that the stream has lost most of its natural features. The stream does not appear to be capable to support most forms of aquatic life

Actual Score: 8 Potential Score: 8

Comments

Total Actual 0 Total Potential 0

RATING $\frac{\text{Total}}{\text{Potential}} \times 100$ #DIV/0!

OVERALL RATING $\frac{\text{(Total NRCS Actual + Total MT Supplement Actual)}}{\text{(Total NRCS Potential + Total MT Supplement Potential)}} \times 100$ #DIV/0!

75-100% = SUSTAINABLE
50-75% = AT RISK.
LESS THAN 50% = NOT SUSTAINABLE

M12SFDBR02	Date-	7/22/2003	15:45
South Fork of Dearborn at Thompsons Ranch, above Hwy 434			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope		
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	27	mm
Percentage of Fines (<2mm)	*25.64*	*%*
Stream Type		
Discharge	*1.85*	*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)		%
Stream Reach Assessment Score (MT adjusted)		%
Macroinvertabrate Habitat Assessment Score	**84.2**	%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)		
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

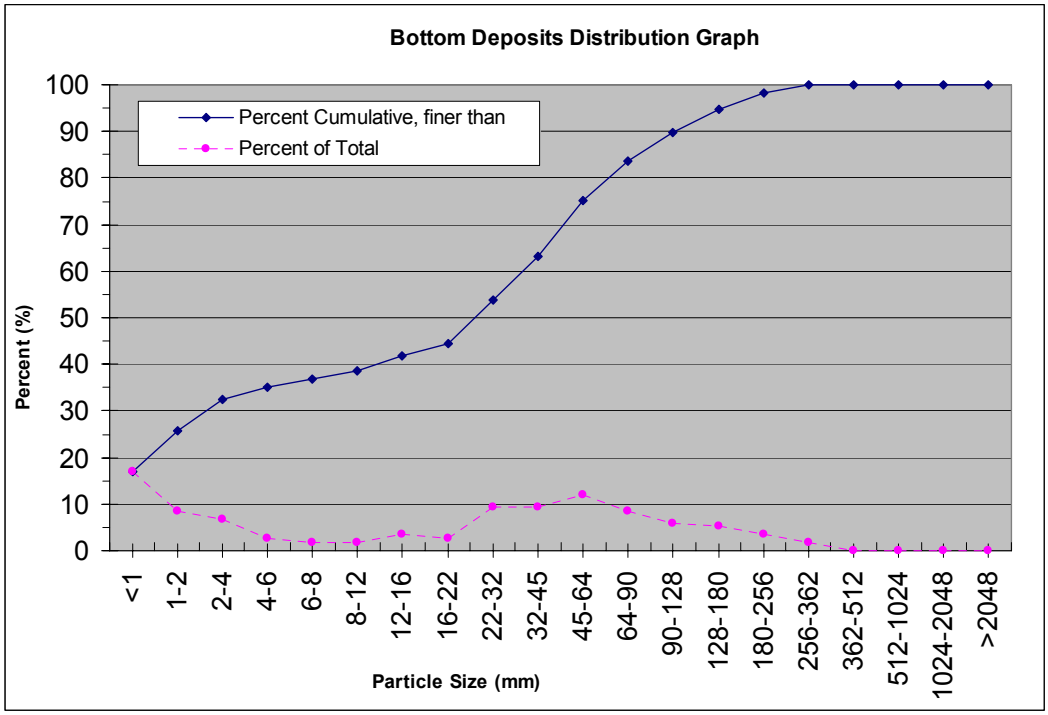
1.5 min
35'

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*1.85*	*cfs*
Temperature, water	24.16	degree C
pH	8.43	
Specific Conductance	0.316	mS/cm
Dissolved Oxygen	8.67	mg/L
Dissolved Oxygen, % Saturation	103.2	%
Turbidity	0.8	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	1.2		0.1
Benthic Chlorophyll a	25		0.1
Total Phosphorus, TP	0.019		0.004
Total Kiejdahl Notrogen, TKN	ND		0.5
Nitrate + Nitrite	ND		0.01
Total Nitrogen, TN			

Macroinvertabrate Data Results		
parameter	*value*	*units*
TOTAL SCORE (max =18)	13	score
PERCENT OF MAX SCORE	72	%
IMPAIRMENT CLASSIFICATION	SLIGHT IMPAIRMENT	
USE SUPPORT	PARTIAL SUPPORT	

		Pebble Count Data			
	Mean size	Particle Size (mm)	Sum	% Total	Cum. Total
S/C	0.5	<1	20	17.09	17.09
S	1.5	1-2	10	8.55	25.64
FG	3	2-4	8	6.84	32.48
FG	5	4-6	3	2.56	35.04
FG	7	6-8	2	1.71	36.75
MG	10	8-12	2	1.71	38.46
MG	14	12-16	4	3.42	41.88
CG	18	16-22	3	2.56	44.44
CG	27	22-32	11	9.40	53.85
CG	38.5	32-45	11	9.40	63.25
CG	54.5	45-64	14	11.97	75.21
SC	77	64-90	10	8.55	83.76
SC	109	90-128	7	5.98	89.74
MC	154	128-180	6	5.13	94.87
LC	218	180-256	4	3.42	98.29
LC	309	256-362	2	1.71	100.00
SB	437	362-512		0.00	100.00
MB	768	512-1024		0.00	100.00
LB	1536	1024-2048		0.00	100.00
BR		>2048		0.00	100.00
		TOTALS	117	100.00	100.00
		D50 particle size (mm)			
		% Fines (<2mm)	25.64		
	M12SFDBR02	Date-	7/22/2003	15:45	
	South Fork of Dearborn at Thompsons Ranch, above Hwy 434				



M12SFDBR04	Date-	7/23/2003	9:45
South Fork Dearborn, at Confluence with Dearborn River			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope		
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	18	mm
Percentage of Fines (<2mm)		*%*
Stream Type		
Discharge	*1.15*	*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)	**98.4**	%
Stream Reach Assessment Score (MT adjusted)	**97.1**	%
Macroinvertabrate Habitat Assessment Score	**84.6**	%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)	**Non Impaired, Fully Supporting**	
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		2 min 35'

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*1.15*	*cfs*
Temperature, water	16.72	degree C
pH	8.4	
Specific Conductance	0.319	mS/cm
Dissolved Oxygen	10.08	mg/L
Dissolved Oxygen, % Saturation	104	%
Turbidity	1.4	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	ND	mg/m^3	0.1
Benthic Chlorophyll a	15.4	mg/m^3	0.1
Total Phosphorus, TP	0.039	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

Macroinvertabrate Data Results		
parameter	*value*	*units*
TOTAL SCORE (max =18)	13	score
PERCENT OF MAX SCORE	72	%
IMPAIRMENT CLASSIFICATION	SLIGHT IMPAIRMENT	
USE SUPPORT	PARTIAL SUPPORT	

M12SFDBR01	Date-	7/22/2003	14:00
South Fork Dearborn, Upstream site on Blacktail Ranch			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope		
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	27	mm
Percentage of Fines (<2mm)		*%*
Stream Type		
Discharge	*4.84*	*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)	**100**	%
Stream Reach Assessment Score (MT adjusted)	**99.3**	%
Macroinvertabrate Habitat Assessment Score	**89.6**	%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)	**Non Impaired, Fully Supporting**	
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

2 min
50'

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*4.84*	*cfs*
Temperature, water	18.55	degree C
pH	8.39	
Specific Conductance	0.274	mS/cm
Dissolved Oxygen	9.36	mg/L
Dissolved Oxygen, % Saturation	100	%
Turbidity	1.28	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	ND	mg/m^3	0.1
Benthic Chlorophyll a	20.2	mg/m^3	0.1
Total Phosphorus, TP	0.078	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

Macroinvertabrate Data Results		
parameter	*value*	*units*
TOTAL SCORE (max =18)	10	score
PERCENT OF MAX SCORE	56	%
IMPAIRMENT CLASSIFICATION	SLIGHT IMPAIRMENT	
USE SUPPORT	PARTIAL SUPPORT	

M12SFDBR01	Date-	6/17/2003	11:15
South Fork Dearborn, Upstream site on Blacktail Ranch			

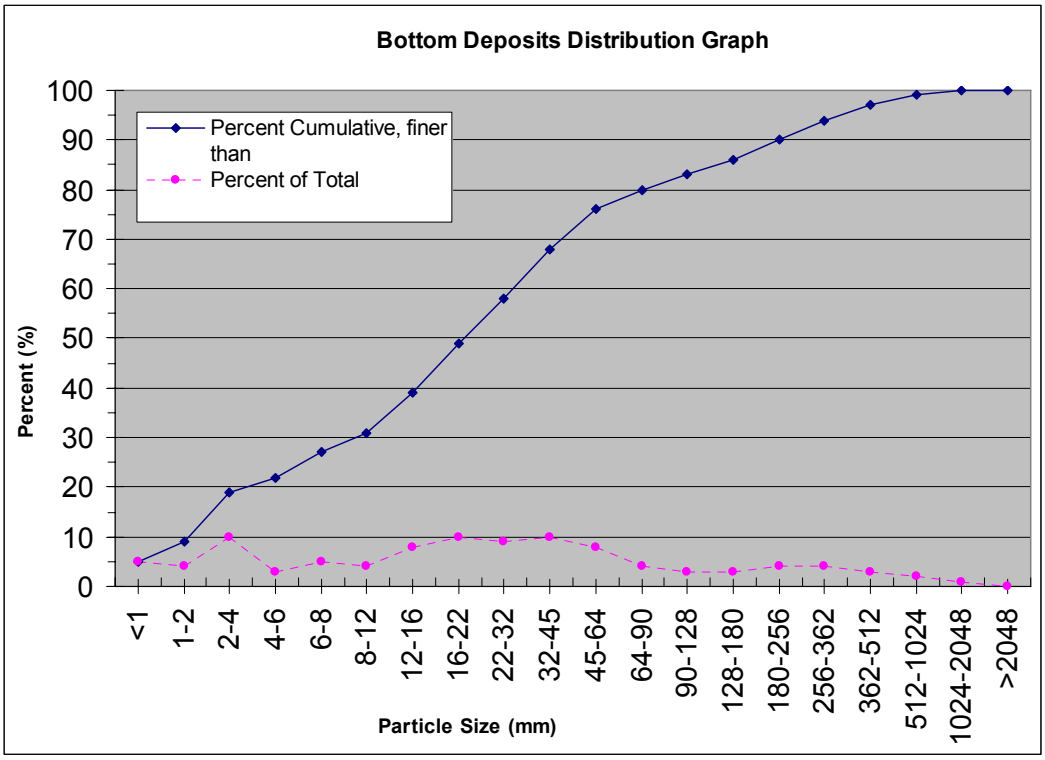
Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope		
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	27	mm
Percentage of Fines (<2mm)	*9.00*	*%*
Stream Type		
Discharge	*13.98*	*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)	**100**	%
Stream Reach Assessment Score (MT adjusted)	**99.3**	%
Macroinvertabrate Habitat Assessment Score		%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)	**Non Impaired, Fully Supporting**	
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*13.98*	*cfs*
Temperature, water		degree C
pH		
Specific Conductance		mS/cm
Dissolved Oxygen		mg/L
Dissolved Oxygen, % Saturation		%
Turbidity		NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	0.9	mg/m^3	0.1
Benthic Chlorophyll a	16.5	mg/m^3	0.1
Total Phosphorus, TP	ND	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

		Pebble Count Data			
	Mean size	*Particle Size (mm)*	*Sum*	*% Total*	*Cum. Total*
S/C	0.5	<1	5	*5.00*	*5.00*
S	1.5	1-2	4	*4.00*	*9.00*
FG	3	2-4	10	*10.00*	*19.00*
FG	5	4-6	3	*3.00*	*22.00*
FG	7	6-8	5	*5.00*	*27.00*
MG	10	8-12	4	*4.00*	*31.00*
MG	14	12-16	8	*8.00*	*39.00*
CG	18	16-22	10	*10.00*	*49.00*
CG	27	22-32	9	*9.00*	*58.00*
CG	38.5	32-45	10	*10.00*	*68.00*
CG	54.5	45-64	8	*8.00*	*76.00*
SC	77	64-90	4	*4.00*	*80.00*
SC	109	90-128	3	*3.00*	*83.00*
MC	154	128-180	3	*3.00*	*86.00*
LC	218	180-256	4	*4.00*	*90.00*
LC	309	256-362	4	*4.00*	*94.00*
SB	437	362-512	3	*3.00*	*97.00*
MB	768	512-1024	2	*2.00*	*99.00*
LB	1536	1024-2048	1	*1.00*	*100.00*
BR		>2048		*0.00*	*100.00*
		TOTALS	100	*100.00*	*100.00*
		D50 particle size (mm)	22-32		
		% Fines (<2mm)	**9.00**		
M12SFDBR01	**Date-**	**6/17/2003**	**11:15**		
South Fork Dearborn, Upstream site on Blacktail Ranch					



M12SFDBR04	Date-	6/17/2003	15:25
South Fork Dearborn, at Confluence with Dearborn River			

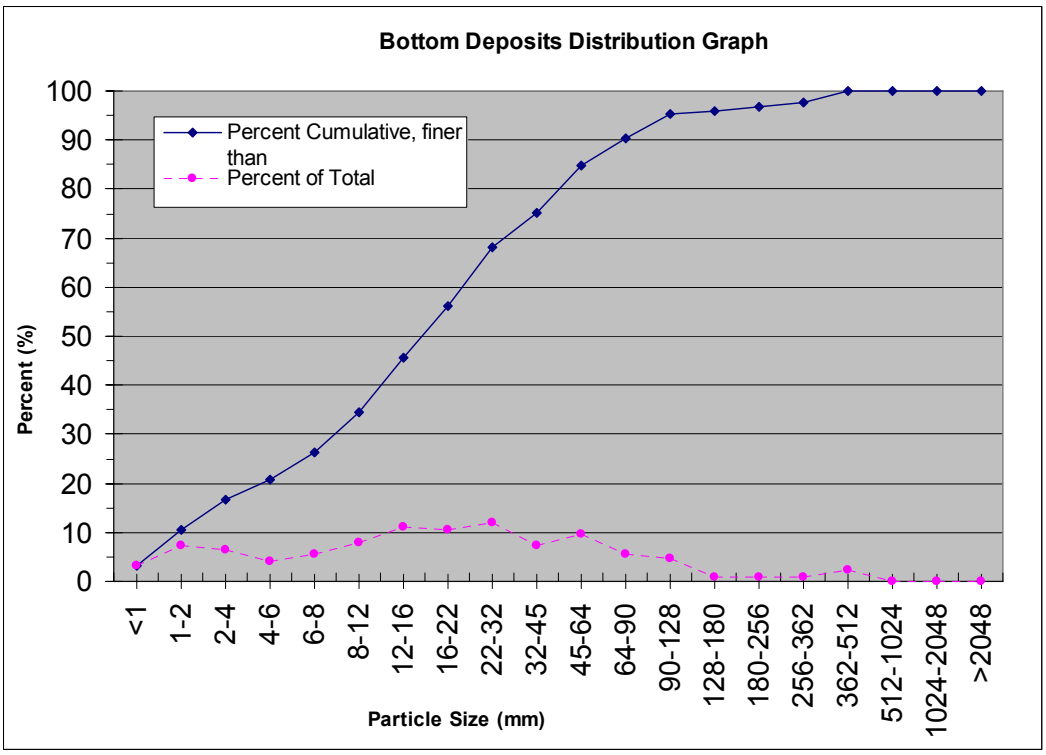
Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope		
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	18	mm
Percentage of Fines (<2mm)	*10.40*	*%*
Stream Type		
Discharge	*8.85*	*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)	**98.4**	%
Stream Reach Assessment Score (MT adjusted)	**97.1**	%
Macroinvertabrate Habitat Assessment Score		%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)	**Non Impaired, Fully Supporting**	
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*8.85*	*cfs*
Temperature, water		degree C
pH		
Specific Conductance		mS/cm
Dissolved Oxygen		mg/L
Dissolved Oxygen, % Saturation		%
Turbidity		NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	ND	mg/m^3	0.1
Benthic Chlorophyll a	27.6	mg/m^3	0.1
Total Phosphorus, TP	ND	mg/L	0.004
Total Kiejdahl Notrogen, TKN	0.5	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

		Pebble Count Data			
	Mean size	*Particle Size (mm)*	*Sum*	*% Total*	*Cum. Total*
S/C	0.5	<1	4	*3.20*	*3.20*
S	1.5	1-2	9	*7.20*	*10.40*
FG	3	2-4	8	*6.40*	*16.80*
FG	5	4-6	5	*4.00*	*20.80*
FG	7	6-8	7	*5.60*	*26.40*
MG	10	8-12	10	*8.00*	*34.40*
MG	14	12-16	14	*11.20*	*45.60*
CG	18	16-22	13	*10.40*	*56.00*
CG	27	22-32	15	*12.00*	*68.00*
CG	38.5	32-45	9	*7.20*	*75.20*
CG	54.5	45-64	12	*9.60*	*84.80*
SC	77	64-90	7	*5.60*	*90.40*
SC	109	90-128	6	*4.80*	*95.20*
MC	154	128-180	1	*0.80*	*96.00*
LC	218	180-256	1	*0.80*	*96.80*
LC	309	256-362	1	*0.80*	*97.60*
SB	437	362-512	3	*2.40*	*100.00*
MB	768	512-1024		*0.00*	*100.00*
LB	1536	1024-2048		*0.00*	*100.00*
BR		>2048		*0.00*	*100.00*
		TOTALS	125	*100.00*	*100.00*
		D50 particle size (mm)	16-22		
		% Fines (<2mm)	**10.40**		
	M12SFDBR04	**Date-**	**6/17/2003**	**15:25**	
	South Fork Dearborn, at Confluence with Dearborn River				



FLAT CREEK

03 – 0717 – ___

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-M12
Trip ID: 2003-DRBRD Date: 6/18/03
Personnel: Laidlaw / Bowman

Waterbody Name Flat Creek County Lewis + Clark HUC 10030102
Station ID M12 Flat Cr 7 Visit # ____ Location Flat Creek on Flat Creek Rd (near old DEQ F-1)
Lat 47° 19' 47.0" Long 112° 23' 00.2" Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84
Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☐	03-0717-12	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☐	Macroinvertebrate Habitat Asmt. ☐		KICK HESS OTHER:
Algae/Macrophytes	☐	Aquatic Plant Form ☐		PERI-1 OTHER:
Chlorophyll a	☐		03-0717-C (water + bank)	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☒			
Field Notes	☒			
Other				

Measurements:	Time: 20:30	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W	A
pH:		
SC: (mS/cm)		
SC x 1000 =		µmho/cm
DO: (mg/L)		
TUR: Clear ☐ Slight ☒ Turbid ☐ Opaque ☐		
Turbidity Comments: 7.29		

Macroinvertebrate Kick Duration: Kick Length (Ft.):

Site Visit Comments:
Sampled upstream of bridge

Revised 3/2003 DMA

Place Site Visit Label Here 03-0713

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-M12

Trip ID: 2003-DRBEN Date: 6/18/03

Personnel: Lindland / Bowman

Waterbody Name Flat Creek County Lewis + Clark HUC 10030102

Station ID M12 Flat Cr Visit # ____ Location Above confluence with Dearborn at mouth

Lat 47° 11' 47.3" Long 112° 01' 06.0" Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84

Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☐	03-07136	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☐	Macroinvertebrate Habitat Asmt. ☐		KICK HESS OTHER:
Algae/Macrophytes	☐	Aquatic Plant Form ☐		PERI-1 OTHER:
Chlorophyll a	☒		03-07136	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☒	Pebble Count ☒ % Fines ☐		
Transect	☐			
Photographs	☐			
Field Notes	☒			
Other				

Measurements:	Time: 9:15	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 13.51	A
pH:	8.37	
SC: (mS/cm)	401	
SC x 1000 =	0.457	µmho/cm
DO: (mg/L)	95.7% 8.95	
TUR: Clear ☐ Slight ☒ Turbid ☐ Opaque ☐		
Turbidity Comments:		

Macroinvertebrate Kick Duration: Kick Length (Ft.):

Site Visit Comments:

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 6/18/03 **Site Visit Code:** 03-0713

Waterbody: Flat Creek @ Mouth **Station ID:** M12FLATC04

Personnel: Ladlow / Bowman

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	(0) 16	0	0			
2	18	0.8	0.05			
3	20	1.3	0.12			
4	22	1.45	0.29			
5	24	1.5	0.49			
6	26	1.5	0.47			
7	28	1.5	0.54			
8	30	1.5	0.44			
9	32	1.5	0.54			
10	34	1.35	0.42			
11	36	1.35	0.53			
12	38	1.35	0.43			
13	40	1.05	0.28			
14	42	1.05	0.30			
15	44	1.2	0.39			
16	46	1.4	0.32			
17	48	1.35	0.35			
18	50	1.4	0.41			
19	52	1.5	0.29			
20	54	1.35	0.14			
21	56	1.3	0.13			
22	58	1.1	0.12			
23	60	1.05	0.05			
24	62	0.6	0.01			
25	64	0	0			
26						
27						
28						
29						
30						

Page 1 of 2 Data Mgmt. Approved

Revised 3/2003 DMA

SUBSTRATE DEQ/MDM

Date: 6-18-03 Site Visit Code: 03-0713

Waterbody: Flat Creek - At Mouth STORET Station ID: M12Flat004

Personnel: Laidhaw / Bowman

PEBBLE COUNT

Row ID	Particle Category		Size (mm)	Riffle Count	(Other) Count	Characteristic Group: PEBL-CNT		
						Sum	% of Total	Cum. Total
1	Silt / Clay		< 1	IIII		0		0.00%
2	Sand		1 - 2			0		0.00%
3	Very Fine	GRAVELS	2 - 4	IIII IIII I		0		0.00%
4	Fine		4 - 6	IIII IIII IIII		0		0.00%
5	Fine		6 - 8	I		0		0.00%
6	Medium		8 - 12	IIII II		0		0.00%
7	Medium		12 - 16	I		0		0.00%
8	Coarse		16 - 22	I		0		0.00%
9	Coarse		22 - 32	IIII		0		0.00%
10	Very Coarse		32 - 45	IIII II		0		0.00%
11	Very Coarse		45 - 64	IIII IIII I		0		0.00%
12	Small	COBBLES	64 - 90	IIII		0		0.00%
13	Small		90 - 128	III		0		0.00%
14	Large		128 - 180	IIII		0		0.00%
15	Large		180 - 256	IIII		0		0.00%
16	Small	BOULDERS	256 - 362	III		0		0.00%
17	Small		362 - 512			0		0.00%
18	Medium		512 - 1024	II		0		0.00%
19	Large		1024 - 2048	II		0		0.00%
20	Bedrock		> 2048	IIII IIII IIII IIII IIII IIII IIII IIII IIII IIII		0		0.00%
21	Total # Samples			0	0	0	0.00%	

- relatively turbid, some moss on rocks, minor algae on rocks,
- cobbles were observed

Pebble Count Data Entry Form

Revision 3/2003

Stream Reach Assessment Form

Station ID: M12Flat C04 Date: 6-18-03 Site Visit Code: 03-0713

Waterbody: Flat Creek At Mouth Reach Length: _____

Waterbody Seg ID: _____ Personnel: _____

Station ID's on reach: _____

Question 1, Stream Incisement:

8 = channel stable, no active downcutting occurring; old downcutting apparent but a new, stable riparian area has formed within the incised channel. There is perennial riparian vegetation will established in the riparian area. (Stage 1 and 5, Schumm's model)

6 = channel has evidence of old downcutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling bands, solid disturbance evident. (Stage 4).

4 = small headcut, in early stage, is present. Immediate action may prevent further degradation (early Stage 2).

2 = unstable, channel incised, actively widening, limited new riparian area/floodplain, floodplain not well vegetated. The vegetation that is present is mainly pioneer species. Bank failure is common. (Stage 3)

0 = channel deeply incised, resembling a gully, little or no riparian area, active downcutting is clearly occurring. Only occasional or rare flood events access the flood plain. Tributaries will also exhibit downcutting/headcuts. (Stage 2)

The presence of active headcuts should nearly always keep the stream reach from being rated sustainable.

Actual Score: 8 Potential Score: 8

Comments _____

Question 2, Percent of Streambanks with Active Lateral Cutting:

6 = the lateral bank erosion is in balance with the stream and its setting

4 = there is a minimal amount of active lateral bank erosion occurring

2 = there is a moderate amount of active lateral bank erosion occurring

0 = there is excessive lateral bank erosion occurring

Actual Score: 6 Potential Score: 6

Comments _____

Question 3, The Stream is in Balance with the Water and Sediment Being Supplied by the Watershed:

6 = the stream exhibits no excess sediment/bedload deposition, sediment occurs on point bars and other locations as would be expected in a stable, dynamic system

4 = sediment clogged gravel's are apparent in riffles or pools, or other evidence of excess sediment apparent

2 = mid-channel bars are common

0 = stream is braided (except naturally occurring braided systems), having at least 3 active channels

Actual Score: 4 Potential Score: 6

sediment apparent in bottom substrate

Comments _____

1 SRAF.xls

Question 4, Sufficient Soil Present to Hold Water and Act as a Rooting Medium:

3 = more than 85% of the riparian area with sufficient soil to hold water and act as a rooting medium

2 = 65% to 85% of the riparian area with sufficient soil to hold water and act as a rooting medium

1 = 35% to 65% of the riparian area with sufficient soil to hold water and act as a rooting medium

0 = 35% or less of the riparian area with sufficient soil to hold water and act as a rooting medium

Actual Score: 2 Potential Score: 2

Comments: [illegible]

Question 5, Percent of Streambank with Vegetation having a Deep, Binding Rootmass: (see Appendix I for stability ratings for most riparian, and other, species)

6 = more than 80% of the streambank comprised of plant species with deep, binding root masses

4 = 60% to 80% of the streambank comprised of plant species with deep, binding root masses

2 = 30% to 60% of the streambank comprised of plant species with deep binding root masses

0 = less than 30% of the streambank comprised of plant species with deep binding root masses

Actual Score: 6 Potential Score: 6

Comments:

Question 6, Weeds :

3 = No noxious weeds are present

2 = 0-1% of the riparian area has noxious weeds

1 = 1%-5% of the riparian area has noxious weeds

0 = over 5% of the riparian area has noxious weeds

Actual Score: 2 Potential Score: 3

Comments:

Question 7, Disturbance-Caused Undesirable Plants:

3 = 1% or less of the riparian area has undesirable plants

2 = 1%-5% of the riparian area has undesirable plants

1 = 5%-10% of the riparian area has undesirable plants

0 = over 10% of the riparian area has undesirable plants

Actual Score: 3 Potential Score: 3

Comments:

Question 8, Woody Species Establishment and Regeneration: (Note: Skip this question if the riparian area has no potential for woody species)

8 = all age classes of native woody riparian species present (see table, Fig 2)

6 = one age class of native woody riparian species clearly absent, all others well represented. For sites with potential for trees and shrubs, there may be one age class of each absent. Often, it will be the middle age group(s) that is (are) lacking. Having mature individuals and a young age class present indicate potential for recovery.

4 = two age classes of native riparian shrubs and/or two age classes of riparian trees clearly absent, other(s) well represented, or the stand is comprised of mainly mature, decadent or dead plants

2 = disturbance induced, (i.e., facultative, facultative upland species such as rose, or snowberry) or non-riparian species dominate. Re-evaluate Question 1, incisement, if this has happened.

0 = some woody species present (>10% cover), but herbaceous species dominate (at this point, the site potential should be re-evaluated to ensure that it has potential for woody vegetation). OR, the site has at least 5% cover of Russian olive and/or salt cedar

Actual Score: 6 Potential Score: 6

Comments

Question 9, Utilization of Trees and Shrubs: (Note: Skip this question if the riparian area has no potential for woody species)

4 = 0-5% of the available second year and older stems are browsed

3 = 5%-25% of the available second year and older stems are browsed

2 = 25%-50% of the available second year and older stems are browsed.

1 = more than 50% of the available second year and older stems are browsed. Many of the shrubs have either a "clubbed" growth form, or they are high-lined or umbrella shaped.

0 = there is noticeable use (10% or more) of unpalatable and normally unused woody species.

Actual Score: 4 Potential Score: 4

Comments

Question 10, Riparian/Wetland Vegetative Cover in the Riparian Area/Floodplain and Streambank:

8 = 85% or more of the riparian/wetland plant cover has a stability rating ≥ 6

6 = 75%-85% of the riparian/wetland plant cover has a stability rating ≥ 6

4 = 65%-75% of the riparian/wetland plant cover has a stability rating ≥ 6

2 = 55%-65% of the riparian/wetland plant cover has a stability rating ≥ 6

0 = less than 55% of the riparian/wetland plant cover has a stability rating ≥ 6

Actual Score: 8 Potential Score: 8

Comments

3 SRAF.xls

Question 11, Riparian Area/Floodplain Characteristics are Adequate to Dissipate Energy and Trap Sediment.

6 = active flood or overflow channels, large rock, or woody material present and adequate to dissipate energy and trap sediment. There is little surface erosion and no evidence of long, continuous erosional areas on floodplain/riparian area or streambank. There are no headcuts where either overland flow and/or flood channel flows return to the main channel.

4 = rock and/or woody material is present, but generally of insufficient size to dissipate energy. Some sediment trapping occurring. Occasional evidence of surface erosion. Generally not severe enough to have developed channels.

2 = inadequate rock and/or woody material available for dissipation of energy or sediment trapping. There is surface erosion (scouring) and occasional headcuts where overland flows or flood channel flows return to the main channel.

0 = riparian area/floodplain lacking any of these attributes: 1)adequate flood or overflow channels, 2) large rock, or 3) woody material suitable for energy dissipation and sediment trapping. Erosional areas are long and continuous. Lacking vegetation or substrate materials adequate to resist further erosion. Surface erosion is obvious on the floodplain/riparian area. Headcuts are present that have the potential to create meander cut-offs.

Actual Score: 6 Potential Score: 6

Comments

SUMMARY

		Actual Score	Possible Points	Potential Score
QUESTION 1:	Stream Incisement	0	0, 2, 4, 6, 8	0
QUESTION 2:	Lateral Cutting	0	0, 2, 4, 6	0
QUESTION 3:	Stream Balance	0	0, 2, 4, 6	0
QUESTION 4:	Sufficient Soil	0	N/A, 0, 1, 2, 3	0
QUESTION 5:	Rootmass	0	N/A, 0, 2, 4, 6	0
QUESTION 6:	Weeds	0	0, 1, 2, 3	0
QUESTION 7:	Undesirable Plants	0	0, 1, 2, 3	0
QUESTION 8:	Woody Species Establishment	0	N/A, 0, 2, 4, 6, 8	0
QUESTION 9:	Browse Utilization	0	N/A, 0, 1, 2, 3, 4	0
QUESTION 10:	Riparian/Wetland Vegetative Cover *	0	N/A, 0, 2, 4, 6, 8	0
QUESTION 11:	Riparian Area/Floodplain Characteristics *	0	N/A, 0, 2, 4, 6	0
	Total	0	61	0
Potential Score for most Bedrock or Boulder streams (questions 1, 2, 3, 6, 7, 11)		0	(32)	0
Potential Score for most low energy "E" streams (questions 1 – 7, 10, 11)		0	(49)	0

RATING: = $\frac{\text{Actual Score}}{\text{Potential Score}}$ X 100 = % rating #DIV/0!

80-100% = SUSTAINABLE
50-80% = AT RISK
LESS THAN 50% = NOT SUSTAINABLE

* Only in certain, specific situations can both of these receive an "N/A".

4 SRAF.xls

Montana Department of Environmental Quality Supplemental Questions

The score for these questions does not have an effect on the rating above.
Note: Answers to these questions must consider the potential of the stream.

Question 12. Fisheries Habitat / Stream Complexity Note: the answers to question 12 will be averaged

12a. Adult and Juvenile Holding/Escape Cover
8 = Abundant deep pools, woody debris, overhanging vegetation, boulders, root wads, undercut banks and/or aquatic

6 = Fish habitat is common (see above).

4 = Fish habitat is noticeably reduced. Most pools are shallow and/or woody debris, undercut banks, overhanging vegetation, boulders, root wads and/or aquatic vegetation are of limited supply.

2 = Pools and habitat features are sparse or non-existent or there are fish barriers.

0 = There is not enough water to support a fishery

N/A = Stream would not support fish under natural conditions

Actual Score: 6 Potential Score: 6

Comments

12b. Habitat Complexity
6 = A mixture of juvenile and adult cover types is present. High flow juvenile and adult refugia are present.

3 = Primarily adult or juvenile cover types are present. High flow refugia are reduced.

0 = High flow refugia are lacking.

N/A = Stream would not support fish under natural conditions

Actual Score: 6 Potential Score: 6

Comments

12c. Spawning Habitat (salmonid streams only)
8 = Areal extent of spawning substrate, morphology of spawning areas, and composition of spawning substrate are excellent.

4 = Areal extent of spawning substrate, morphology of spawning areas, and/or quality of spawning substrate reduced.

0 = Areal extent of spawning substrate, morphology of spawning areas, and/or quality of spawning substrate greatly reduced.

N/A = Stream would not support fish under natural conditions.

Actual Score: NA Potential Score:

Comments

5 SRAF.xls

12d. Fish Passsage

8 = No potential fish passage barriers apparent.

0 = Potential fish passage barriers present.

N/A = Stream would not support fish under natural conditions.

Actual Score: 8 Potential Score: 8

Comments

12e. Entrainment

8 = Entrainment of fish into water diversions not an issue.

4 = Entrainment of fish into water diversions may be a moderate issue.

0 = Entrainment of fish into water diversions may be a major issue.

Actual Score: 8 Potential Score: 8

Comments

12a-e Avg. Score Actual Score 0 Potential Score 0

Question 13. Solar Radiation

6 = More than 75% of the stream reach is adequately shaded by vegetation. – topography

4 = 50-75% of the stream reach does not have adequate shading or the water temperature is probably elevated by irrigation,

3 = Approximately 25-50% of the stream does not have adequate shade.

0 = More than 75% of the stream reach does not have adequate shade by vegetation or the water temperature is probably drastically altered by irrigation, etc.

Actual Score: 6 Potential Score: 6

Comments

Question 14. Algae growth / Nutrients

6 = Algae not apparent. Rocks are slippery.

4 = in small patches or along channel edge

2 = in large patches or discontinuous mats

0 = Mats cover bottom (hyper enriched conditions) or plants not apparent and rocks not slippery (toxic conditions)

N/A = No water

Actual Score: 4 Potential Score: 6

macrophytes present along shoreline

Comments

SRAF.xls

Question 15. Surface oils, turbidity, salinization, precipitants on stream bottom and/or water odor

6 = none

4 = Slight

2 = Moderate

0 = Extensive

N/A = No water

Actual Score: 6 Potential Score: 6

Comments

Question 16. Bacteria

4 = There are no known anthropogenic sources of bacteria

2 = Likely sources of bacteria are present. Wastewater or concentrated livestock operations are the most common sources.

0 = Feedlots are common or raw sewage is entering the stream

Actual Score: NA Potential Score:

Comments

Question 17. Macroinvertebrates

4 = The stream has a healthy and diverse community of macroinvertebrates. Stream riffles usually have an abundance of may flies, caddis flies and/or stone flies.

2 = The stream is dominated by pollution tolerant taxa such as fly and midge larva.

0 = Macroinvertebrates are rare or absent

N/A = Stream reach is ephemeral

Actual Score: 4 Potential Score: 4

Comments

7 SRAF.xls

Question 18. Irrigation impacts (Assess during critical low flow periods or you may need to inquire locally about this. Evaluate effects from de-watering or inter-basin transfer of water.)

8 = There are no noticeable impacts from irrigation

6 = Changes in flow resulting from irrigation practices are noticeable, however flows are adequate to support aquatic organisms.

4 = Flows support aquatic organisms, but habitat, especially riffles are drastically reduced or impacted.

2 = The flow is low enough to severely impair aquatic organisms

0 = All of the water has been diverted from the stream

N/A = Stream reach is ephemeral.

Actual Score: 6 Potential Score: 8

Comments: Possibly enhanced flow from irrigation return

Question 19. Landuse activities – Sources

8 = Landuse practices do not appear to significantly impact water quality or the riparian vegetation. Any impacts that occur appear to be natural.

6 = There are some signs of impact from landuse activities such as grazing, dryland agriculture, irrigation, feedlots, mining, timber harvesting, urban, roads, etc.

4 = Impacts from landuse activities are obvious and occur throughout most of the stream reach. For example, there are obvious signs of human induced erosion, saline seeps or overgrazing within the watershed.

2 = Landuse impacts are significant and widespread. Visual observation and photo documentation would provide overwhelming evidence that the stream is impaired.

0 = Land use impacts are so intrusive that the stream has lost most of its natural features. The stream does not appear to be capable to support most forms of aquatic life

Actual Score: _____ Potential Score: _____

Comments: _____

Total Actual 0 Total Potential 0

RATING $\frac{\text{Total}}{\text{Potential}} \times 100$ #DIV/0!

OVERALL RATING $\frac{\text{(Total NRCS Actual + Total MT Supplement Actual)}}{\text{(Total NRCS Potential + Total MT Supplement Potential)}} \times 100$ #DIV/0!

75-100% = SUSTAINABLE
50-75% = AT RISK
LESS THAN 50% = NOT SUSTAINABLE

8 SRAF.xls

03 – 0715 – ___

Site Visit Form

(One Station per page)

STORET Project ID: TMDL - MT2
Trip ID: 2003 DRGEN Date: 6/19/03
Personnel: Gardland / Bowman

Waterbody Name Flat Creek County Lewis & Clark HUC 10030103
Station ID MT2 FlatCD5 Visit # ____ Location Downstream of Milford Colony
Lat 47°19'35.9" Long 112°11'48.8" Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84
Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☐	03-0715A	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☐	Macroinvertebrate Habitat Asmt. ☐		KICK HESS OTHER:
Algae/Macrophytes	☐	Aquatic Plant Form ☐		PERI-1 OTHER:
Chlorophyll a	☒		03-0715C (water + benthic)	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☒	Pebble Count ☒ % Fines ☐		
Transect	☐			
Photographs	☒			
Field Notes	☒			
Other				

Measurements:	Time: 17:00	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 21.96	A
pH:	8.65	
SC: (mS/cm)	.290	
SC x 1000 =		µmho/cm
DO: (mg/L)	9.06	103.6 %
TUR: Clear ☐ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments: Turbidity 10.8 NTU		

Macroinvertebrate Kick Duration: Kick Length (Ft.):

Site Visit Comments:

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 6/13/03 Site Visit Code: 03-6715

Waterbody: Flat Creek d/s Milford Company Station ID: M127a1C05

Personnel: L. Mew / Bowman

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	LEW 15.4 ft	1.28 ft	0.70			
2	16.5	1.22	1.91			
3	17.5	1.12	1.97			
4	18.5	1.00	2.11			
5	19.5	0.95	2.15			
6	20.5	0.95	2.06			
7	21.5	1.05	2.17			
8	22.5	1.09	2.01			
9	23.5	0.95	1.82			
10	24.5	0.90	2.16			
11	25.5	0.87	2.30			
12	26.6	0.85	2.10			
13	27.5	0.90	2.14			
14	28.5	0.78	2.06			
15	29.5	0.65	2.00			
16	30.5	0.63	2.04			
17	31.5	0.60	1.89			
18	32.5	0.62	0.36			
19	EOW 33.5	0.50	0.0			
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Page 1 of 2 Data Mgmt. Approved

Revised 3/2003 DMA

SUBSTRATE DEQ/MDM

Date: 6-18-03 Site Visit Code: 03-0715

Waterbody: Flat Creek d/s M. Hand Coly STORET Station ID: M12Flat C05

Personnel: Landlaw / Bowman

PEBBLE COUNT

Row ID	Particle Category		Size (mm)	Riffle Count	(Other) Count	Characteristic Group: PEBL-CNT		
						Sum	% of Total	Cum. Total
1	Silt / Clay		< 1	~~~~ ~~~~		0		0.00%
2	Sand		1 - 2			0		0.00%
3	Very Fine	GRAVELS	2 - 4	11		0		0.00%
4	Fine		4 - 6	11		0		0.00%
5	Fine		6 - 8			0		0.00%
6	Medium		8 - 12	~~~~ ~~~~ 11		0		0.00%
7	Medium		12 - 16			0		0.00%
8	Coarse		16 - 22	~~~~ ~~~~ ~~~~ ~~~~		0		0.00%
9	Coarse		22 - 32	~~~~ ~~~~ ~~~~ ~~~~ 11		0		0.00%
10	Very Coarse		32 - 45	~~~~ ~~~~ ~~~~ 111		0		0.00%
11	Very Coarse		45 - 64	~~~~ ~~~~		0		0.00%
12	Small	COBBLES	64 - 90	~~~~ 11		0		0.00%
13	Small		90 - 128	11		0		0.00%
14	Large		128 - 180	1		0		0.00%
15	Large		180 - 256			0		0.00%
16	Small	BOULDERS	256 - 362	1		0		0.00%
17	Small		362 - 512			0		0.00%
18	Medium		512 - 1024			0		0.00%
19	Large		1024 - 2048			0		0.00%
20	Bedrock		> 2048			0		0.00%
21	Total # Samples			0	0	0	0.00%	

Pebble Count Data Entry Form

Revision 3/2003

Stream Reach Assessment Form

Station ID: M12Flat C05 Date: 6/18/03 Site Visit Code: 03-0715

Waterbody: Flat Crk Reach Length: _____

Waterbody Seg ID: _____ Personnel: _____

Station ID's on reach: _____

Question 1, Stream Incisement:

8 = channel stable, no active downcutting occurring; old downcutting apparent but a new, stable riparian area has formed within the incised channel. There is perennial riparian vegetation will established in the riparian area. (Stage 1 and 5, Schumm's model)

6 = channel has evidence of old downcutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling bands, solid disturbance evident. (Stage 4).

4 = small headcut, in early stage, is present. Immediate action may prevent further degradation (early Stage 2).

2 = unstable, channel incised, actively widening, limited new riparian area/floodplain, floodplain not well vegetated. The vegetation that is present is mainly pioneer species. Bank failure is common. (Stage 3)

0 = channel deeply incised, resembling a gully, little or no riparian area, active downcutting is clearly occurring. Only occasional or rare flood events access the flood plain. Tributaries will also exhibit downcutting/headcuts. (Stage 2)

The presence of active headcuts should nearly always keep the stream reach from being rated sustainable.

Actual Score: 4 Potential Score: 8

Comments: bland erosion outside banks cutting

Question 2, Percent of Streambanks with Active Lateral Cutting:

6 = the lateral bank erosion is in balance with the stream and its setting

4 = there is a minimal amount of active lateral bank erosion occurring

2 = there is a moderate amount of active lateral bank erosion occurring

0 = there is excessive lateral bank erosion occurring

Actual Score: 3 Potential Score: 6

Comments: 50% cutting

Question 3, The Stream is in Balance with the Water and Sediment Being Supplied by the Watershed:

6 = the stream exhibits no excess sediment/bedload deposition, sediment occurs on point bars and other locations as would be expected in a stable, dynamic system

4 = sediment clogged gravel's are apparent in riffles or pools, or other evidence of excess sediment apparent

2 = mid-channel bars are common

0 = stream is braided (except naturally occurring braided systems), having at least 3 active channels

Actual Score: 3 Potential Score: 6

Comments: _____

1 SRAF.xls

Question 4, Sufficient Soil Present to Hold Water and Act as a Rooting Medium:

3 = more than 85% of the riparian area with sufficient soil to hold water and act as a rooting medium

2 = 65% to 85% of the riparian area with sufficient soil to hold water and act as a rooting medium

1 = 35% to 65% of the riparian area with sufficient soil to hold water and act as a rooting medium

0 = 35% or less of the riparian area with sufficient soil to hold water and act as a rooting medium

Actual Score: 3 Potential Score: 3

Comments

Question 5, Percent of Streambank with Vegetation having a Deep, Binding Rootmass: (see Appendix I for stability ratings for most riparian, and other, species)

6 = more than 80% of the streambank comprised of plant species with deep, binding root masses

4 = 60% to 80% of the streambank comprised of plant species with deep, binding root masses

2 = 30% to 60% of the streambank comprised of plant species with deep binding root masses

0 = less than 30% of the streambank comprised of plant species with deep binding root masses

Actual Score: 4 Potential Score: 6

Comments

Question 6, Weeds :

3 = No noxious weeds are present

2 = 0-1% of the riparian area has noxious weeds

1 = 1%-5% of the riparian area has noxious weeds

0 = over 5% of the riparian area has noxious weeds

Actual Score: 2 Potential Score: 3

Comments

Question 7, Disturbance-Caused Undesirable Plants:

3 = 1% or less of the riparian area has undesirable plants

2 = 1%-5% of the riparian area has undesirable plants

1 = 5%-10% of the riparian area has undesirable plants

0 = over 10% of the riparian area has undesirable plants

Actual Score: 2 Potential Score: 3

Comments

Question 8, Woody Species Establishment and Regeneration: (Note: Skip this question if the riparian area has no potential for woody species)

8 = all age classes of native woody riparian species present (see table, Fig 2)

6 = one age class of native woody riparian species clearly absent, all others well represented. For sites with potential for trees and shrubs, there may be one age class of each absent. Often, it will be the middle age group(s) that is (are) lacking. Having mature individuals and a young age class present indicate potential for recovery.

4 = two age classes of native riparian shrubs and/or two age classes of riparian trees clearly absent, other(s) well represented, or the stand is comprised of mainly mature, decadent or dead plants

2 = disturbance induced, (i.e., facultative, facultative upland species such as rose, or snowberry) or non-riparian species dominate. Re-evaluate Question 1, incisement, if this has happened.

0 = some woody species present (>10% cover), but herbaceous species dominate (at this point, the site potential should be re-evaluated to ensure that it has potential for woody vegetation). OR, the site has at least 5% cover of Russian olive and/or salt cedar

Actual Score: 2 Potential Score: 6

Comments: upstream riparian

Question 9, Utilization of Trees and Shrubs: (Note: Skip this question if the riparian area has no potential for woody species)

4 = 0-5% of the available second year and older stems are browsed

3 = 5%-25% of the available second year and older stems are browsed

2 = 25%-50% of the available second year and older stems are browsed.

1 = more than 50% of the available second year and older stems are browsed. Many of the shrubs have either a "clubbed" growth form, or they are high-lined or umbrella shaped.

0 = there is noticeable use (10% or more) of unpalatable and normally unused woody species.

Actual Score: 3 Potential Score: 4

Comments

Question 10, Riparian/Wetland Vegetative Cover in the Riparian Area/Floodplain and Streambank:

8 = 85% or more of the riparian/wetland plant cover has a stability rating ≥ 6

6 = 75%-85% of the riparian/wetland plant cover has a stability rating ≥ 6

4 = 65%-75% of the riparian/wetland plant cover has a stability rating ≥ 6

2 = 55%-65% of the riparian/wetland plant cover has a stability rating ≥ 6

0 = less than 55% of the riparian/wetland plant cover has a stability rating ≥ 6

Actual Score: 4 Potential Score: 6

Comments

3 SRAF.xls

Question 11, Riparian Area/Floodplain Characteristics are Adequate to Dissipate Energy and Trap Sediment.

6 = active flood or overflow channels, large rock, or woody material present and adequate to dissipate energy and trap sediment. There is little surface erosion and no evidence of long, continuous erosional areas on floodplain/riparian area or streambank. There are no headcuts where either overland flow and/or flood channel flows return to the main channel.

4 = rock and/or woody material is present, but generally of insufficient size to dissipate energy. Some sediment trapping occurring. Occasional evidence of surface erosion. Generally not severe enough to have developed channels.

2 = inadequate rock and/or woody material available for dissipation of energy or sediment trapping. There is surface erosion (scouring) and occasional headcuts where overland flows or flood channel flows return to the main channel.

0 = riparian area/floodplain lacking any of these attributes: 1)adequate flood or overflow channels, 2) large rock, or 3) woody material suitable for energy dissipation and sediment trapping. Erosional areas are long and continuous. Lacking vegetation or substrate materials adequate to resist further erosion. Surface erosion is obvious on the floodplain/riparian area. Headcuts are present that have the potential to create meander cut-offs.

Actual Score: 4 Potential Score: 6

Comments

SUMMARY

		Actual Score	Possible Points	Potential Score
QUESTION 1:	Stream Incisement	0	0, 2, 4, 6, 8	0
QUESTION 2:	Lateral Cutting	0	0, 2, 4, 6	0
QUESTION 3:	Stream Balance	0	0, 2, 4, 6	0
QUESTION 4:	Sufficient Soil	0	N/A, 0, 1, 2, 3	0
QUESTION 5:	Rootmass	0	N/A, 0, 2, 4, 6	0
QUESTION 6:	Weeds	0	0, 1, 2, 3	0
QUESTION 7:	Undesirable Plants	0	0, 1, 2, 3	0
QUESTION 8:	Woody Species Establishment	0	N/A, 0, 2, 4, 6, 8	0
QUESTION 9:	Browse Utilization	0	N/A, 0, 1, 2, 3, 4	0
QUESTION 10:	Riparian/Wetland Vegetative Cover *	0	N/A, 0, 2, 4, 6, 8	0
QUESTION 11:	Riparian Area/Floodplain Characteristics *	0	N/A, 0, 2, 4, 6	0
	Total	0	61	0
Potential Score for most Bedrock or Boulder streams (questions 1, 2, 3, 6, 7, 11)		0	(32)	0
Potential Score for most low energy "E" streams (questions 1 – 7, 10, 11)		0	(49)	0

RATING: = $\frac{\text{Actual Score}}{\text{Potential Score}}$ X 100 = % rating #DIV/0!

80-100% = SUSTAINABLE
50-80% = AT RISK
LESS THAN 50% = NOT SUSTAINABLE

* Only in certain, specific situations can both of these receive an "N/A".

Montana Department of Environmental Quality Supplemental Questions

The score for these questions does not have an effect on the rating above.
Note: Answers to these questions must consider the potential of the stream.

Question 12. Fisheries Habitat / Stream Complexity Note: the answers to question 12 will be averaged

12a. Adult and Juvenile Holding/Escape Cover
8 = Abundant deep pools, woody debris, overhanging vegetation, boulders, root wads, undercut banks and/or aquatic

6 = Fish habitat is common (see above).

4 = Fish habitat is noticeably reduced. Most pools are shallow and/or woody debris, undercut banks, overhanging vegetation, boulders, root wads and/or aquatic vegetation are of limited supply.

2 = Pools and habitat features are sparse or non-existent or there are fish barriers.

0 = There is not enough water to support a fishery

N/A = Stream would not support fish under natural conditions

Actual Score: 6 Potential Score: 8

Comments

12b. Habitat Complexity
6 = A mixture of juvenile and adult cover types is present. High flow juvenile and adult refugia are present.

3 = Primarily adult or juvenile cover types are present. High flow refugia are reduced.

0 = High flow refugia are lacking.

N/A = Stream would not support fish under natural conditions

Actual Score: 3 Potential Score: 4

Comments

12c. Spawning Habitat (salmonid streams only)
8 = Areal extent of spawning substrate, morphology of spawning areas, and composition of spawning substrate are excellent.

4 = Areal extent of spawning substrate, morphology of spawning areas, and/or quality of spawning substrate reduced.

0 = Areal extent of spawning substrate, morphology of spawning areas, and/or quality of spawning substrate greatly reduced.

N/A = Stream would not support fish under natural conditions.

Actual Score: 2 Potential Score: 4

Comments

5 SRAF.xls

12d. Fish Passsage

8 = No potential fish passage barriers apparent.

0 = Potential fish passage barriers present.

N/A = Stream would not support fish under natural conditions.

Actual Score: 8 Potential Score: 8

Comments

12e. Entrainment

8 = Entrainment of fish into water diversions not an issue.

4 = Entrainment of fish into water diversions may be a moderate issue.

0 = Entrainment of fish into water diversions may be a major issue.

Actual Score: 8 Potential Score: 8

Comments do not know

12a-e Avg. Score Actual Score 0 Potential Score 0

Question 13. Solar Radiation

6 = More than 75% of the stream reach is adequately shaded by vegetation.

4 = 50-75% of the stream reach does not have adequate shading or the water temperature is probably elevated by irrigation,

3 = Approximately 25-50% of the stream does not have adequate shade.

0 = More than 75% of the stream reach does not have adequate shade by vegetation or the water temperature is probably drastically altered by irrigation, etc.

Actual Score: 2 Potential Score: 4

Comments degrade no potential

Question 14. Algae growth / Nutrients

6 = Algae not apparent. Rocks are slippery.

4 = in small patches or along channel edge

2 = in large patches or discontinuous mats

0 = Mats cover bottom (hyper enriched conditions) or plants not apparent and rocks not slippery (toxic conditions)

N/A = No water

Actual Score: 3 Potential Score: 6

Comments

Question 15. Surface oils, turbidity, salinization, precipitants on stream bottom and/or water odor

6 = none

4 = Slight

2 = Moderate

0 = Extensive

N/A = No water

Actual Score: 6 Potential Score: 6

Comments

Question 16. Bacteria

4 = There are no known anthropogenic sources of bacteria

2 = Likely sources of bacteria are present. Wastewater or concentrated livestock operations are the most common sources.

0 = Feedlots are common or raw sewage is entering the stream

Actual Score: 2 Potential Score: 4

Comments Cows

Question 17. Macroinvertebrates

4 = The stream has a healthy and diverse community of macroinvertebrates. Stream riffles usually have an abundance of may flies, caddis flies and/or stone flies.

2 = The stream is dominated by pollution tolerant taxa such as fly and midge larva.

0 = Macroinvertebrates are rare or absent

N/A = Stream reach is ephemeral

Actual Score: 2-3 Potential Score: 4

Comments

7 SRAF.xls

Question 18. Irrigation impacts (Assess during critical low flow periods or you may need to inquire locally about this. Evaluate effects from de-watering or inter-basin transfer of water.)

8 = There are no noticeable impacts from irrigation

6 = Changes in flow resulting from irrigation practices are noticeable, however flows are adequate to support aquatic organisms.

4 = Flows support aquatic organisms, but habitat, especially riffles are drastically reduced or impacted.

2 = The flow is low enough to severely impair aquatic organisms

0 = All of the water has been diverted from the stream

N/A = Stream reach is ephemeral.

Actual Score: 4 Potential Score: 8

Comments upstream ditch comes in

Question 19. Landuse activities – Sources

8 = Landuse practices do not appear to significantly impact water quality or the riparian vegetation. Any impacts that occur appear to be natural.

6 = There are some signs of impact from landuse activities such as grazing, dryland agriculture, irrigation, feedlots, mining, timber harvesting, urban, roads, etc.

4 = Impacts from landuse activities are obvious and occur throughout most of the stream reach. For example, there are obvious signs of human induced erosion, saline seeps or overgrazing within the watershed.

2 = Landuse impacts are significant and widespread. Visual observation and photo documentation would provide overwhelming evidence that the stream is impaired.

0 = Land use impacts are so intrusive that the stream has lost most of its natural features. The stream does not appear to be capable to support most forms of aquatic life

Actual Score: 4 Potential Score: 8

Comments

Total Actual 0 Total Potential 0

RATING $\frac{\text{Total}}{\text{Potential}} \times 100$ #DIV/0!

OVERALL RATING $\frac{\text{(Total NRCS Actual + Total MT Supplement Actual)}}{\text{(Total NRCS Potential + Total MT Supplement Potential)}} \times 100$ #DIV/0!

75-100% = SUSTAINABLE
50-75% = AT RISK
LESS THAN 50% = NOT SUSTAINABLE

03 – 0716 – ___

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-MT-7
Trip ID: 2003 DRBEN Date: 6/19/03
Personnel: Laidlaw / Bowman

Waterbody Name Flat Crk County Lewis + Clark HUC 10030102
Station ID M12Flat006 Visit # ____ Location Diversion from Dearborn River
Lat 47°16'55.2" Long 112°28'54.3" Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84
Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☐ Metals ☐ Commons ☐	03-0716W	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☐	Macroinvertebrate Habitat Asmt. ☐		KICK HESS OTHER:
Algae/Macrophytes	☐	Aquatic Plant Form ☐		PERI-1 OTHER:
Chlorophyll a	☒		03-0716C	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☒			
Field Notes	☒			
Other				

Measurements:	Time: 1720	
Q / Flow (cfs)	Est. ☐	
Temp: (°C)	W 13.12	A
pH:	8.43	
SC: (mS/cm)	0.237	
SC x 1000 =	µmho/cm	
DO: (mg/L)	9.47 / 90%	
TUR: Clear ☒ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments:	.1 NTU	

Macroinvertebrate Kick Duration: Kick Length (Ft.):

Site Visit Comments:

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 6-18-03 **Site Visit Code:** 03-0716

Waterbody: Flat Crk Diversion **Station ID:** M17FlatC06

Personnel:

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	14	0	0	0		
2	15	.4	.13			
3	16	.85	.50			
4	17	1.28	1.50			
5	18	1.8	1.46			
6	19	2.1	1.50			
7	20	2.6	1.73			
8	21	3.0	1.97			
9	22	3.0	1.75			
10	23	3.0	2.07			
11	24	2.9	2.20			
12	25	2.8	1.97			
13	26	2.6	2.10			
14	27	2.55	2.06			
15	28	2.5	2.06			
16	29	2.5	1.73			
17	30	2.5	1.87			
18	31	2.49	1.54			
19	32	2.1	1.19			
20	33	1.8	1.25			
21	34	1.4	0.55			
22	35	0.75	0.09			
23	36	0	0			
24						
25						
26						
27						
28						
29						
30						

Page 1 of 2 Data Mgmt. Approved

03 – 0714 – __

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-M12
Trip ID: 2003 DRBEN Date: 6-18-03
Personnel: Landau / Bowman

Waterbody Name: Flat Creek County: Lewis & Clark HUC: 10030102
Station ID: M12FlatC08 Visit #: ____ Location: below Birdtail Rd
Lat: 47° 13' 44.0 N Long: 112° 03' 36.8 Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84
Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale?

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☐	03-0714W	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☐	Macroinvertebrate Habitat Asmt. ☐		KICK HESS OTHER:
Algae/Macrophytes	☐	Aquatic Plant Form ☐		PERI-1 OTHER:
Chlorophyll a	☒		03-0714C (water + sediment)	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☒	Pebble Count ☒ % Fines ☐		
Transect	☒			
Photographs	☒			
Field Notes	☒			
Other				

Measurements:	Time: 13:30	
Q / Flow (cfs)		Est. ☐
Temp: (°C) 21.51	W 21.51	A
pH: 8.44	8.44	
SC: (mS/cm) .477	.477	
SC x 1000 =		µmho/cm
DO: (mg/L) 11.3	266%	
TUR: Clear ☐ Slight ☒ Turbid ☐ Opaque ☐		
Turbidity Comments: 7.39 NTU		

Macroinvertebrate Kick Duration: Kick Length (Ft.):

Site Visit Comments:

BEHI measurements taken

Revised 3/2003 DMS

Stream Classification

Revised 3/2003

Date: 6-18-03 **Site Visit Code:** 03-0714

Waterbody: Flat Creek **Station ID:** M12Flat008

Personnel: Laidlaw Knutson, Steg, Bowman

Flat Creek D upstream end of canyon on Dearborn ranch

Bankfull Width (W_{bkf}) _____ Ft.

WIDTH of the stream channel, at bankfull stage elevation, in a riffle section

Mean DEPTH (d_{bkf}) _____ Ft.

Mean DEPTH of the stream channel cross-section, at bankfull stage elevation, in a riffle section.

Bnkfl. X-Section AREA (A_{bkf}) _____ Sq. Ft.

AREA of the stream channel cross-section, at bankfull stage elevation, in a riffle section.

Width/Depth RATIO (W_{bkf} / d_{bkf}) _____

Bankfull WIDTH divided by bankfull mean DEPTH, in a riffle section.

Maximum DEPTH (d_{mbkf}) _____ Ft.

Maximum depth of the bankfull channel cross-section, or distance between the bankfull stage and thalweg elevations, in a riffle section L = 10 R = 107

WIDTH of Flood-Prone Area (W_{fpa}) 97 Ft. 11.52

5.67

Twice maximum DEPTH, or (2 x d_{mbkf}) = the stage/elevation at which flood-prone area WIDTH is determined. (riffle section)

Entrenchment Ratio (ER) _____

The ratio of flood-prone area WIDTH divided by bankfull channel WIDTH. (W_{fpa} / W_{bkf}) (riffle section)

Channel Materials (Particle Size Index) D50 _____ mm.

The D50 particle size index represents the median diameter of channel materials, as sampled from the channel surface, between the bankfull stage and thalweg elevations.

Water Surface SLOPE (S) _____ Ft./Ft.

Channel slope = "rise" over "run" for a reach approximately 20-30 bankfull channel widths in length, with the "riffle to riffle" water surface slope representing the gradient at bankfull stage.

Channel SINUOSITY (K) _____

Sinuosity is an index of channel pattern, determined from a ratio of stream length divided by valley length (SL/VL); or estimated from a ratio of valley slope divided by channel slope (VS/S).

Stream Type _____

Comments:

Data Mgmt. Approved

Revised 4/2003

TOTAL DISCHARGE:

Date: 6-18. Site Visit Code: 23-0714

Waterbody: Flat CK. Station ID: M12FlatC08

Personnel: Total - 73 - 49.24

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	49	.9	0			
2	50	1.3	0			
3	51	1.5	0			
4	52	1.6	0			
5	53	1.2	0			
6	54	1.2	0			
7	55	1.15	.01			
8	56	1.5	~~.26~~ .14			
9	57	1.4	.25			
10	58	1.5	.21			
11	59	1.5	.58			
12	60	1.8	.75			
13	61	2.1	.96			
14	62	2.5	.92			
15	63	2.7	.79			
16	64	~~2.5~~ 2.5	.82			
17	65	2.3	.66			
18	66	2.4	.56			
19	67	2.3	.50			
20	68	2.1	.33			
21	69	2.0	.28			
22	70	1.85	.26			
23	71	1.3	0			
24	72	.9	0			
25	73	~~.15~~ .65	0			
26						
27						
28						
29						
30						

Page 1 of 2 Data Mgmt. Approved

Revised 3/2003 DMA 91

SUBSTRATE DEQ/MDM

Date: 6-19-03 Site Visit Code: 03-0714

Waterbody: Flat Creek Below Birdtail STORET Station ID: M12Flat C.08

Personnel: Honeywater plant in riffle

PEBBLE COUNT

Row ID	Particle Category		Size (mm)	Riffle Count	(Other) Count	Characteristic Group: PEBL-CNT Sum	% of Total	Cum. Total
1	Silt / Clay		< 1	𝍸 𝍸 𝍸 III		0		0.00%
2	Sand		1 - 2	IIII		0		0.00%
3	Very Fine	GRAVELS	2 - 4	𝍸 III		0		0.00%
4	Fine	GRAVELS	4 - 6	𝍸 𝍸 𝍸 𝍸 𝍸		0		0.00%
5	Fine	GRAVELS	6 - 8	𝍸 I		0		0.00%
6	Medium	GRAVELS	8 - 12	𝍸 𝍸 𝍸 𝍸 𝍸 III		0		0.00%
7	Medium	GRAVELS	12 - 16	𝍸 II		0		0.00%
8	Coarse	GRAVELS	16 - 22	𝍸 𝍸 III		0		0.00%
9	Coarse	GRAVELS	22 - 32	𝍸 𝍸 I		0		0.00%
10	Very Coarse	GRAVELS	32 - 45	𝍸 III		0		0.00%
11	Very Coarse	GRAVELS	45 - 64	III		0		0.00%
12	Small	COBBLES	64 - 90			0		0.00%
13	Small	COBBLES	90 - 128			0		0.00%
14	Large	COBBLES	128 - 180			0		0.00%
15	Large	COBBLES	180 - 256			0		0.00%
16	Small	BOULDERS	256 - 362			0		0.00%
17	Small	BOULDERS	362 - 512			0		0.00%
18	Medium	BOULDERS	512 - 1024			0		0.00%
19	Large	BOULDERS	1024 - 2048			0		0.00%
20	Bedrock	BOULDERS	> 2048			0		0.00%
21	Total # Samples			0	0	0	0.00%	

Pebble Count Data Entry Form

Site ID: M.2 Flat C08

Site Description: Flat Creek 20 upstream end of canyon on Dearborn Creek

CROSS-SECTIONAL PROFILE FIELD DATA SHEET

Page ____ of ____

Date: 6-18-03

Basin:

Downstream EOW HI = 14.25
upstream EOW HI = 12.03
Stream dist = 136 ft
Straight line = 57 ft

	REFERENCE		CHANNEL MEASUREMENTS								
			LONGITUDINAL OR X-SECTION		WATER LEVEL 6.0.W		BANKFULL		BANK HEIGHT		
STA	BS (+)	HI	FS (-)	ELEV	FS (-)	ELEV	FS (-)	ELEV	FS (-)	ELEV	NOTES
10	6.63	vertical face	height = 3.85'								
13.6	9.41										
29	10.43										
37	10.79										
44	10.74	~~Bank full~~									
47	11.43	Bank full	edge of water								
49	13.98	LEOW			0						
49.5	15.07				1.05						
54	15.7				1.65						
56.6	15.33				1.33						
60.5	16.06				2.03						
63.5	16.62	Thalweg			2.55						
69.3	15.68				1.65						
74.0	14.29	REOW			0.22	overhanging bank					
75.7	11.33										
80	11.23	Bank Full									
85	8.92										
100	8.94										
110	5.09										

STA = Station
HI = Height of Instrument (Elevation + BS)

BS = Backsight (Shot to a known elevation)
ELEV = If actual elevation (Datum) is unknown, use 100' to begin profile.

FS = Foresight (Shot to new point with unknown elevation)
RP = Reference Point

Revision 3/2003

Stream Reach Assessment Form

Station ID: M12FlatC08 Date: 6-18-03 Site Visit Code: M12FlatC08

Waterbody: Flat Creek Below Birdtail Rd Reach Length:

Waterbody Seg ID: Personnel: Laidlaw, Knutson, Bowman

Station ID's on reach:

Question 1, Stream Incisement:

8 = channel stable, no active downcutting occurring; old downcutting apparent but a new, stable riparian area has formed within the incised channel. There is perennial riparian vegetation will established in the riparian area. (Stage 1 and 5, Schumm's model)

6 = channel has evidence of old downcutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling bands, solid disturbance evident. (Stage 4).

4 = small headcut, in early stage, is present. Immediate action may prevent further degradation (early Stage 2).

2 = unstable, channel incised, actively widening, limited new riparian area/floodplain, floodplain not well vegetated. The vegetation that is present is mainly pioneer species. Bank failure is common. (Stage 3)

0 = channel deeply incised, resembling a gully, little or no riparian area, active downcutting is clearly occurring. Only occasional or rare flood events access the flood plain. Tributaries will also exhibit downcutting/headcuts. (Stage 2)

The presence of active headcuts should nearly always keep the stream reach from being rated sustainable.

Actual Score: 6 Potential Score: 8

Comments

Question 2, Percent of Streambanks with Active Lateral Cutting:

6 = the lateral bank erosion is in balance with the stream and its setting

4 = there is a minimal amount of active lateral bank erosion occurring

2 = there is a moderate amount of active lateral bank erosion occurring

0 = there is excessive lateral bank erosion occurring

Actual Score: 1 Potential Score: 6

Comments

Question 3, The Stream is in Balance with the Water and Sediment Being Supplied by the Watershed:

6 = the stream exhibits no excess sediment/bedload deposition, sediment occurs on point bars and other locations as would be expected in a stable, dynamic system

4 = sediment clogged gravel's are apparent in riffles or pools, or other evidence of excess sediment apparent

2 = mid-channel bars are common

0 = stream is braided (except naturally occurring braided systems), having at least 3 active channels

Actual Score: 3 Potential Score: 5

Comments

1 SRAF.xls

Question 4, Sufficient Soil Present to Hold Water and Act as a Rooting Medium:

3 = more than 85% of the riparian area with sufficient soil to hold water and act as a rooting medium

2 = 65% to 85% of the riparian area with sufficient soil to hold water and act as a rooting medium

1 = 35% to 65% of the riparian area with sufficient soil to hold water and act as a rooting medium

0 = 35% or less of the riparian area with sufficient soil to hold water and act as a rooting medium

Actual Score: 3 Potential Score: 3.

Comments

Question 5, Percent of Streambank with Vegetation having a Deep, Binding Rootmass: (see Appendix I for stability ratings for most riparian, and other, species)

6 = more than 80% of the streambank comprised of plant species with deep, binding root masses

4 = 60% to 80% of the streambank comprised of plant species with deep, binding root masses

2 = 30% to 60% of the streambank comprised of plant species with deep binding root masses

0 = less than 30% of the streambank comprised of plant species with deep binding root masses

Actual Score: Potential Score:

Comments Right Bank - Looking very. cover - steep - 40% cover
Left Bank - 95% cover

Question 6, Weeds :

3 = No noxious weeds are present

2 = 0-1% of the riparian area has noxious weeds

1 = 1%-5% of the riparian area has noxious weeds

0 = over 5% of the riparian area has noxious weeds

Actual Score: 1 Potential Score: 2.

Comments

Question 7, Disturbance-Caused Undesirable Plants:

3 = 1% or less of the riparian area has undesirable plants

2 = 1%-5% of the riparian area has undesirable plants

1 = 5%-10% of the riparian area has undesirable plants

0 = over 10% of the riparian area has undesirable plants

Actual Score: 2 Potential Score: 2.

Comments

Question 8, Woody Species Establishment and Regeneration: (Note: Skip this question if the riparian area has no potential for woody species)

8 = all age classes of native woody riparian species present (see table, Fig 2)

6 = one age class of native woody riparian species clearly absent, all others well represented. For sites with potential for trees and shrubs, there may be one age class of each absent. Often, it will be the middle age group(s) that is (are) lacking. Having mature individuals and a young age class present indicate potential for recovery.

4 = two age classes of native riparian shrubs and/or two age classes of riparian trees clearly absent, other(s) well represented, or the stand is comprised of mainly mature, decadent or dead plants

2 = disturbance induced, (i.e., facultative, facultative upland species such as rose, or snowberry) or non-riparian species dominate. Re-evaluate Question 1, incisement, if this has happened.

0 = some woody species present (>10% cover), but herbaceous species dominate (at this point, the site potential should be re-evaluated to ensure that it has potential for woody vegetation). OR, the site has at least 5% cover of Russian olive and/or salt cedar

Actual Score: 8 Potential Score: 8

Comments

Question 9, Utilization of Trees and Shrubs: (Note: Skip this question if the riparian area has no potential for woody species)

4 = 0-5% of the available second year and older stems are browsed

3 = 5%-25% of the available second year and older stems are browsed

2 = 25%-50% of the available second year and older stems are browsed.

1 = more than 50% of the available second year and older stems are browsed. Many of the shrubs have either a "clubbed" growth form, or they are high-lined or umbrella shaped.

0 = there is noticeable use (10% or more) of unpalatable and normally unused woody species.

Actual Score: 1 Potential Score: 4

Comments

Question 10, Riparian/Wetland Vegetative Cover in the Riparian Area/Floodplain and Streambank:

8 = 85% or more of the riparian/wetland plant cover has a stability rating ≥ 6

6 = 75%-85% of the riparian/wetland plant cover has a stability rating ≥ 6

4 = 65%-75% of the riparian/wetland plant cover has a stability rating ≥ 6

2 = 55%-65% of the riparian/wetland plant cover has a stability rating ≥ 6

0 = less than 55% of the riparian/wetland plant cover has a stability rating ≥ 6

Actual Score: Potential Score:

Comments

3 SRAF.xls

Question 11, Riparian Area/Floodplain Characteristics are Adequate to Dissipate Energy and Trap Sediment.

6 = active flood or overflow channels, large rock, or woody material present and adequate to dissipate energy and trap sediment. There is little surface erosion and no evidence of long, continuous erosional areas on floodplain/riparian area or streambank. There are no headcuts where either overland flow and/or flood channel flows return to the main channel.

4 = rock and/or woody material is present, but generally of insufficient size to dissipate energy. Some sediment trapping occurring. Occasional evidence of surface erosion. Generally not severe enough to have developed channels.

2 = inadequate rock and/or woody material available for dissipation of energy or sediment trapping. There is surface erosion (scouring) and occasional headcuts where overland flows or flood channel flows return to the main channel.

0 = riparian area/floodplain lacking any of these attributes: 1)adequate flood or overflow channels, 2) large rock, or 3) woody material suitable for energy dissipation and sediment trapping. Erosional areas are long and continuous. Lacking vegetation or substrate materials adequate to resist further erosion. Surface erosion is obvious on the floodplain/riparian area. Headcuts are present that have the potential to create meander cut-offs.

Actual Score: 6 Potential Score: 5

Comments

SUMMARY

		Actual Score	Possible Points	Potential Score
QUESTION 1:	Stream Incisement	0	0, 2, 4, 6, 8	0
QUESTION 2:	Lateral Cutting	0	0, 2, 4, 6	0
QUESTION 3:	Stream Balance	0	0, 2, 4, 6	0
QUESTION 4:	Sufficient Soil	0	N/A, 0, 1, 2, 3	0
QUESTION 5:	Rootmass	0	N/A, 0, 2, 4, 6	0
QUESTION 6:	Weeds	0	0, 1, 2, 3	0
QUESTION 7:	Undesirable Plants	0	0, 1, 2, 3	0
QUESTION 8:	Woody Species Establishment	0	N/A, 0, 2, 4, 6, 8	0
QUESTION 9:	Browse Utilization	0	N/A, 0, 1, 2, 3, 4	0
QUESTION 10:	Riparian/Wetland Vegetative Cover *	0	N/A, 0, 2, 4, 6, 8	0
QUESTION 11:	Riparian Area/Floodplain Characteristics *	0	N/A, 0, 2, 4, 6	0
	Total	0	61	0
Potential Score for most Bedrock or Boulder streams (questions 1, 2, 3, 6, 7, 11)		0	(32)	0
Potential Score for most low energy "E" streams (questions 1 – 7, 10, 11)		0	(49)	0

RATING: = $\frac{\text{Actual Score}}{\text{Potential Score}}$ X 100 = % rating #DIV/0!

80-100% = SUSTAINABLE
50-80% = AT RISK
LESS THAN 50% = NOT SUSTAINABLE

* Only in certain, specific situations can both of these receive an "N/A".

Montana Department of Environmental Quality Supplemental Questions

The score for these questions does not have an effect on the rating above.
Note: Answers to these questions must consider the potential of the stream.

Question 12. Fisheries Habitat / Stream Complexity Note: the answers to question 12 will be averaged

12a. Adult and Juvenile Holding/Escape Cover
8 = Abundant deep pools, woody debris, overhanging vegetation, boulders, root wads, undercut banks and/or aquatic

6 = Fish habitat is common (see above).

4 = Fish habitat is noticeably reduced. Most pools are shallow and/or woody debris, undercut banks, overhanging vegetation, boulders, root wads and/or aquatic vegetation are of limited supply.

2 = Pools and habitat features are sparse or non-existent or there are fish barriers.

0 = There is not enough water to support a fishery

N/A = Stream would not support fish under natural conditions

Actual Score: 6 Potential Score: 8

Comments

12b. Habitat Complexity
6 = A mixture of juvenile and adult cover types is present. High flow juvenile and adult refugia are present.

3 = Primarily adult or juvenile cover types are present. High flow refugia are reduced.

0 = High flow refugia are lacking.

N/A = Stream would not support fish under natural conditions

Actual Score: 3 Potential Score: 4

Comments

12c. Spawning Habitat (salmonid streams only)
8 = Areal extent of spawning substrate, morphology of spawning areas, and composition of spawning substrate are excellent.

4 = Areal extent of spawning substrate, morphology of spawning areas, and/or quality of spawning substrate reduced.

0 = Areal extent of spawning substrate, morphology of spawning areas, and/or quality of spawning substrate greatly reduced.

N/A = Stream would not support fish under natural conditions.

Actual Score: 4 Potential Score: 5

Comments

5 SRAF.xls

12d. Fish Passsage

8 = No potential fish passage barriers apparent.

0 = Potential fish passage barriers present.

N/A = Stream would not support fish under natural conditions.

Actual Score: 8 Potential Score: 8

Comments

12e. Entrainment

8 = Entrainment of fish into water diversions not an issue.

4 = Entrainment of fish into water diversions may be a moderate issue.

0 = Entrainment of fish into water diversions may be a major issue.

Actual Score: 4 Potential Score: 5

Comments Headgates present upstream throughout drainage

12a-e Avg. Score Actual Score 0 Potential Score 0

Question 13. Solar Radiation

6 = More than 75% of the stream reach is adequately shaded by vegetation.

4 = 50-75% of the stream reach does not have adequate shading or the water temperature is probably elevated by irrigation,

3 = Approximately 25-50% of the stream does not have adequate shade.

0 = More than 75% of the stream reach does not have adequate shade by vegetation or the water temperature is probably drastically altered by irrigation, etc.

Actual Score: 0 Potential Score: 4

Comments

Question 14. Algae growth / Nutrients

6 = Algae not apparent. Rocks are slippery.

4 = in small patches or along channel edge

2 = in large patches or discontinuous mats

0 = Mats cover bottom (hyper enriched conditions) or plants not apparent and rocks not slippery (toxic conditions)

N/A = No water

Actual Score: 4 Potential Score: 6

Comments

Question 18. Irrigation impacts (Assess during critical low flow periods or you may need to inquire locally about this. Evaluate effects from de-watering or inter-basin transfer of water.)

8 = There are no noticeable impacts from irrigation

6 = Changes in flow resulting from irrigation practices are noticeable, however flows are adequate to support aquatic organisms.

4 = Flows support aquatic organisms, but habitat, especially riffles are drastically reduced or impacted.

2 = The flow is low enough to severely impair aquatic organisms

0 = All of the water has been diverted from the stream

N/A = Stream reach is ephemeral.

Actual Score: 6 Potential Score: 8

Comments: Upstream-there are diversion ditches

Question 19. Landuse activities – Sources

8 = Landuse practices do not appear to significantly impact water quality or the riparian vegetation. Any impacts that occur appear to be natural.

6 = There are some signs of impact from landuse activities such as grazing, dryland agriculture, irrigation, feedlots, mining, timber harvesting, urban, roads, etc.

4 = Impacts from landuse activities are obvious and occur throughout most of the stream reach. For example, there are obvious signs of human induced erosion, saline seeps or overgrazing within the watershed.

2 = Landuse impacts are significant and widespread. Visual observation and photo documentation would provide overwhelming evidence that the stream is impaired.

0 = Land use impacts are so intrusive that the stream has lost most of its natural features. The stream does not appear to be capable to support most forms of aquatic life

Actual Score: 4 Potential Score: 8

Comments: cattle grazing

Total Actual 0 Total Potential 0

RATING $\frac{\text{Total}}{\text{Potential}} \times 100$ #DIV/0!

OVERALL RATING $\frac{\text{(Total NRCS Actual + Total MT Supplement Actual)}}{\text{(Total NRCS Potential + Total MT Supplement Potential)}} \times 100$ #DIV/0!

75-100% = SUSTAINABLE
50-75% = AT RISK
LESS THAN 50% = NOT SUSTAINABLE

Question 15. Surface oils, turbidity, salinization, precipitants on stream bottom and/or water odor

6 = none

4 = Slight

2 = Moderate

0 = Extensive

N/A = No water

Actual Score: 6 Potential Score: 6

Comments

Question 16. Bacteria

4 = There are no known anthropogenic sources of bacteria

2 = Likely sources of bacteria are present. Wastewater or concentrated livestock operations are the most common sources.

0 = Feedlots are common or raw sewage is entering the stream

Actual Score: 2 Potential Score: 4

Comments Livestock

Question 17. Macroinvertebrates

4 = The stream has a healthy and diverse community of macroinvertebrates. Stream riffles usually have an abundance of may flies, caddis flies and/or stone flies.

2 = The stream is dominated by pollution tolerant taxa such as fly and midge larva.

0 = Macroinvertebrates are rare or absent

N/A = Stream reach is ephemeral

Actual Score: Potential Score:

Comments not sampled at this time

7 SRAF.xls

03 – 0722 –__

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-M12

Trip ID: 2003-DRBEN Date: 7/23/03

Personnel: (a.dbw) Bowman

Waterbody Name Flat Creek County Lewis + Clark HUC 10030102

Station ID M12FltC03 Visit # 2 Location Upstream of Hwy 200 (near DEQ F.S.)

Lat 47°18'19.2" Long 112°07'55.0 Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84

Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale?

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☒	03-0722W	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☒	Macroinvertebrate Habitat Asmt. ☒	03-0722M	KICK HESS OTHER:
Algae/Macrophytes	☒	Aquatic Plant Form ☒	03-0722A	PERI-1 OTHER:
Chlorophyll a	☒		03-0722C	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☒			
Field Notes	☒			
Other				

Measurements:	Time: 9:45	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 18.32	A
pH:	8.01	
SC: (mS/cm)	.313	
SC x 1000 =		µmho/cm
DO: (mg/L)	9.83	104.3%
TUR: Clear ☐ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments:	9.08	10.6

Macroinvertebrate Kick Duration: 1.58 minutes Kick Length (Ft.): 35

Site Visit Comments:

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 7-22 03 **Site Visit Code:** 03-0722

Waterbody: Flat Creek US Hwy 200 **Station ID:** M12FlaT003

Personnel: Ga. Mike Bowman

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	2'	0	0	0		
2	3	.2	.1	1		
3	4	.35	.25	1		
4	5	.5	.65	1		
5	6	.5	.68	1		
6	7	.6	.64	1		
7	8	.66	.66	1		
8	9	.7	.87	1		
9	10	.78	.91	1		
10	11	.80	.98			
11	12	.85	.97			
12	13	.85	.93			
13	14	.95	.85			
14	15	.95	.86			
15	16	1.0	.95			
16	17	.8	1.09			
17	18	.90	1.04			
18	19	.90	1.01			
19	20	.80	1.12			
20	21	.80	1.40			
21	22	.70	1.14			
22	23	.56	0			
23	23.5	0	0			
24						
25						
26						
27						
28						
29						
30						

Page 1 of 2

Data Mgmt. Approved

Stream Classification

Revised 3/2003

Date: **Site Visit Code:**

Waterbody: **Station ID:**

Personnel:

BE111 lat/long 47°18'36.1" / 112°07'56.6'

Bankfull Width (W_{bkf}) 27' Ft.

WIDTH of the stream channel, at bankfull stage elevation, in a riffle section

Mean DEPTH (d_{bkf}) _____ Ft.

Mean DEPTH of the stream channel cross-section, at bankfull stage elevation, in a riffle section.

Bnkfl. X-Section AREA (A_{bkf}) _____ Sq. Ft.

AREA of the stream channel cross-section, at bankfull stage elevation, in a riffle section.

Width/Depth RATIO (W_{bkf} / d_{bkf}) _____

Bankfull WIDTH divided by bankfull mean DEPTH, in a riffle section.

Maximum DEPTH (d_{mbkf}) _____ Ft.

Maximum depth of the bankfull channel cross-section, or distance between the bankfull stage and thalweg elevations, in a riffle section

WIDTH of Flood-Prone Area (W_{fpa}) _____ Ft.

Twice maximum DEPTH, or (2 x d_{mbkf}) = the stage/elevation at which flood-prone area WIDTH is determined. (riffle section)

Entrenchment Ratio (ER) _____

The ratio of flood-prone area WIDTH divided by bankfull channel WIDTH. (W_{fpa} / W_{bkf}) (riffle section)

Channel Materials (Particle Size Index) D50 _____ mm.

The D50 particle size index represents the median diameter of channel materials, as sampled from the channel surface, between the bankfull stage and thalweg elevations.

Water Surface SLOPE (S) _____ Ft./Ft.

Channel slope = "rise" over "run" for a reach approximately 20-30 bankfull channel widths in length, with the "riffle to riffle" water surface slope representing the gradient at bankfull stage.

Channel SINUOSITY (K) Height 13.06 G 0.025" / Upstream Height = 10.92

Sinuosity is an index of channel pattern, determined from a ratio of stream length divided by valley length (SL/VL); or estimated from a ratio of valley slope divided by channel slope (VS/S).

Distance = 242.5'

Straight line distance = 381'

Stream Type _____

Comments:

Data Mgmt. Approved

Revised 3/2003 DMA

SUBSTRATE DEQ/MDM

Date: 7-22-03 Site Visit Code: 03-0722

Waterbody: Flat Creek STORET Station ID: M12FLT03

Personnel: Landau/Brown

bankfull is all vegetated

PEBBLE COUNT

Row ID	Particle Category		Size (mm)	Riffle Count	(Other) Count	Bankfull (all vegetated) Characteristic Group: PEBL-CNT		
						Sum	% of Total	Cum. Total
1	Silt / Clay		< 1			0		0.00%
2	Sand		1 - 2			0		0.00%
3	Very Fine	GRAVELS	2 - 4			0		0.00%
4	Fine	GRAVELS	4 - 6			0		0.00%
5	Fine	GRAVELS	6 - 8			0		0.00%
6	Medium	GRAVELS	8 - 12			0		0.00%
7	Medium	GRAVELS	12 - 16			0		0.00%
8	Coarse	GRAVELS	16 - 22			0		0.00%
9	Coarse	GRAVELS	22 - 32			0		0.00%
10	Very Coarse	GRAVELS	32 - 45			0		0.00%
11	Very Coarse	GRAVELS	45 - 64			0		0.00%
12	Small	COBBLES	64 - 90			0		0.00%
13	Small	COBBLES	90 - 128			0		0.00%
14	Large	COBBLES	128 - 180			0		0.00%
15	Large	COBBLES	180 - 256			0		0.00%
16	Small	BOULDERS	256 - 362			0		0.00%
17	Small	BOULDERS	362 - 512			0		0.00%
18	Medium	BOULDERS	512 - 1024			0		0.00%
19	Large	BOULDERS	1024 - 2048			0		0.00%
20	Bedrock	BOULDERS	> 2048			0		0.00%
21	Total # Samples			0	0	0	0.00%	

Pebble Count Data Entry Form

Site ID: _____
Site Description: _____

CROSS-SECTIONAL PROFILE FIELD DATA SHEET

Page _____ of _____
Date: _____
Basin: _____

Elk Creek 03

7-22-03
*remember - measurements from right to left

	REFERENCE		CHANNEL MEASUREMENTS								
			LONGITUDINAL OR X-SECTION		WATER LEVEL		BANKFULL		BANK HEIGHT		
STA	BS (+)	HI	FS (-)	ELEV	FS (-)	ELEV	FS (-)	ELEV	FS (-)	ELEV	NOTES
2'	6.81										Right Edge
26'	7.65										
48'	6.96										
55'	7.44										
60'	8.87										
67'	8.99										Right Edge of flood (?)
78'	9.25										
83'	10.27										
85'	11.34										Right Bankfull (?)
85.4'	13.16	1.07 (Water)									Right Edge
89'	13.60	1.54									Right Edge of Water
96'	13.24	1.15									Thalweg
103.2'	12.84	.14									
104.0	10.78										Left Edge of Water
110.0	10.00										Left Bank
114.0	9.03										Left Bankfull
117.0	7.91										Left Flood (?)
123.0	5.63										Upper most site

STA = Station
HI = Height of Instrument (Elevation + BS)

BS = Backsight (Shot to a known elevation)
ELEV = If actual elevation (Datum) is unknown, use 100' to begin profile.

FS = Foresight (Shot to new point with unknown elevation)
RP = Reference Point

4/12

Date: _____

Stream Name: _____

Cross-section #: Bank: (right/left)

NOTES:

BANK ERODIBILITY HAZARD INDEX

PHOTO POINTS	Camera #	Photo #
1. Downstream to x-section		
2. Left pin to right pin		
3. Right pin to left pin		
4. Mid-channel to left bank		
5. Mid-channel to right bank		

BANK EROSION POTENTIAL

CRITERIA	VERY LOW		LOW		MODERATE		HIGH		VERY HIGH		EXTREME		BEHI DATA: BANKFULL		BEHI DATA: FLOODPRONE	
	VALUE	INDEX	VALUE	INDEX	VALUE	INDEX	VALUE	INDEX	VALUE	INDEX	VALUE	INDEX	VALUE	INDEX	VALUE	INDEX
Bank Ht/Bkf Ht	1.0-1.1	1.0-1.9	1.1-1.19	2.0-3.9	1.2-1.5	4.0-5.9	1.6-2.0	6.0-7.9	2.1-2.8	8.0-9.0	>2.8	10				
Root Depth/Bank Ht	1.0-0.9	1.0-1.9	0.89-0.50	2.0-3.9	0.49-0.30	4.0-5.9	29-0.15	6.0-7.9	0.14-0.05	8.0-9.0	<0.05	10				
Root density (%)	100-80	1.0-1.9	79-55	2.0-3.9	54-30	4.0-5.9	29-15	6.0-7.9	14-5	8.0-9.0	<5.0	10				
Bank Angle (degrees)	0-20	1.0-1.9	21-60	2.0-3.9	61-80	4.0-5.9	81-90	6.0-7.9	91-119	8.0-9.0	>119	10				
(slope)	0-0.36		0.37-1.73		1.74-5.67		5.68-0.0		1.01-(-1.81)		<(-1.81)					
Surface Prot. (%)	100-80	1.0-1.9	79-55	2.0-3.9	54-30	4.0-5.9	29-15	6.0-7.9	15-10	8.0-9.0	<10	10				
TOTALS												Total				
		5-9.5		10-19.5		20-29.5		30-39.5		40-45		45-50				
Adjustments											Adjust					
Numerical											Numerical					

Conclusions for Bankfull BEHI

Bank Erosion Potential: _____

Near Bank Stress: _____

Estimated Bank Loss/yr: _____

Conclusions for Floodprone BEHI

Bank Erosion Potential: _____

Near Bank Stress: _____

Estimated Bank Loss/yr: _____

BANK MATERIALS: CIRCLE ONE

- BEDROCK: Bank erosion potential always very low
- BOULDERS: Bank erosion potential low
- COBBLE: Decrease by one category unless mixture of Gravel/Sand is over 50%, then no adjustment
- GRAVEL: Adjust values up by 5-10 points depending on composition of Sand
- SAND: Adjust values up by 10 points
- SILT/CLAY: No adjustment unless a part of unconsolidated bank, then adjust up to 10 points
- STRATIFICATION: 5-10 points (upward) depending on position of unstable layers in relation to bankfull stage

Some gravel layers stratifications

NEAR BANK STRESS RATING	Ambi/A**	Value
Low	0.32 or Less	
Moderate	0.33-0.41	
High	0.042-0.45	
Very High	0.046-0.50	
Extreme	0.51 or more	

Bank Profile Data (Rise and Run from Toe Pin)

RISE	RUN	NOTES

Bank Ht = 4'
BF Ht =
Root Depth = .5
Root Density = 20%
Bank ∠° = 40°
Surface Protection = 80%

Bank Profile Sketch

03-0821-__

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-M12

Trip ID: 2003-DRTPA Date: 7/24/03

Personnel: La, Haw, Bowman

Waterbody Name Flat Creek County Lewis + Clark HUC 10030102

Station ID M12 Flat C04 Visit # 2 Location Flat Creek At Mouth

Lat — Long — Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84

Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☐ Metals ☐ Commons ☒	03-0821 W	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☒	Macroinvertebrate Habitat Asmt. ☐	03-0821M	KICK HESS OTHER:
Algae/Macrophytes	☒	Aquatic Plant Form ☐	03-0821A	PERI-1 OTHER:
Chlorophyll a	☒		03-0821C	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☐			
Field Notes	☐			
Other				

Measurements:	Time: 1000	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 17.42	A
pH:	8.40	
SC: (mS/cm)	.366	
SC x 1000 =		µmho/cm
DO: (mg/L)	10.14	111.4%
TUR: Clear ☐ Slight ☒ Turbid ☐ Opaque ☐		
Turbidity Comments:	3.54 NTU	
	3.01 NTU	

Macroinvertebrate Kick Duration: 2 min 30 sec Kick Length (Ft.): 30'

Site Visit Comments:

lots of bedrock bottom reach

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 7-24-03. Site Visit Code: 03-0821

Waterbody: Flat Creek @ Mouth Station ID: M12FlatC02

Personnel:

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	2'	0	0			
2	4	.7	0			
3	6	.95	.03			
4	8	1.05	.11			
5	10	1.05	.19			
6	12	.95	.16			
7	14	1.0	.15			
8	16	1.0	.22			
9	18	.9	.15			
10	20	.75	.20			
11	22	.85	.22			
12	24	.62	.18			
13	26	.45	.17			
14	28	.65	.20			
15	30	.82	.13			
16	32	.8	.17			
17	34	.9	.08			
18	36	1.1	.05			
19	38	.75	.0			
20	40	.08	.0			
21	42	.38	.04			
22	44	.49	.0			
23	46	.1	.0			
24	46.6					
25						
26						
27						
28						
29						
30						

Page 1 of 2

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21.1.1.12

MACROINVERTEBRATE HABITAT ASSESSMENT FIELD FORM RIFFLE/RUN PREVALENCE

Date: 7-24-03 Site Visit Code: 03-0821

Waterbody: Flat Creek at Marlin Site: MT2FLAT004

Personnel: Linda Bowman

HABITAT PARAMETER	OPTIMAL	SUB-OPTIMAL	MARGINAL	POOR
1A. Riffle Development	Well-developed riffle; riffle as wide as stream & extends two times width of stream.	Riffle as wide as stream but length less than two times width.	Reduced riffle area that is not as wide as stream & its length less than two times width.	Riffles virtually non-existent
1A. score: 8.5	9-10	6-8	3-5	0-2
Comments:				
1B. Benthic Substrate	Diverse substrate dominated by cobble.	Substrate diverse with abundant cobble, but bedrock, boulders, fine gravel, or sand prevalent.	Substrate dominated by bedrock, boulders, sand, or silt; cobble present.	Monotonous fine gravel, sand, silt, or bedrock substrate.
1B. score: 5	9-10	6-8	3-5	0-2
Comments:	mostly bedrock >60%			
2. Embeddedness	Gravel, cobble, or boulder particles are between 0-25% surrounded by fine sediment (particles less than 6.35 mm [.25"]).	Gravel, cobble, or boulder particles are between 25-50 % surrounded by fine sediment.	Gravel, cobble, or boulder particles are between 50-75% surrounded by fine sediment.	Gravel, cobble, or boulder particles are over 75% surrounded by fine sediment.
2. score: 16	16-20	11-15	6-10	0-5
Comments:				
3. Channel Alteration (channelization, straightening, dredging, other alterations)	Channel alterations absent or minimal; stream pattern apparently in natural state.	Some channelization present, usually in areas of crossings, etc. Evidence of past alterations (before past 20 years) may be resent, but more recent channel alteration is not present.	New embankments present on both banks; 40-80% of the stream reach channelized & disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized & disrupted.
3. score: 20	16-20	11-15	6-10	0-5
Comments:				
4. Sediment Deposition	Little or no enlargement of bars & less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from coarse gravel; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, coarse sand on old & new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, & bends; moderate deposition in pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
4. score: 15	16-20	11-15	6-10	0-5
Comments:				

5. Channel Flow Status	Water fills baseflow channel; minimal amount of channel substrate exposed.	Water fills > 75% of the baseflow channel; < 25% channel substrate exposed.	Water fills 25-75% of the baseflow channel; riffle substrates mostly exposed.	Very little water in channel, & mostly present as standing pools.
5. score: 15	16-20	11-15	6-10	0-5
Comments:				
6. Bank Stability (score each bank) NOTE: Determine left or right side while facing downstream.	Banks stable; no evidence of erosion or bank failure; little apparent potential for future problems.	Moderately stable; infrequent, small areas of erosion mostly healed over.	Moderately unstable; moderate frequency & size of erosional areas; up to 60% of banks in reach have erosion; high erosion potential during high flow.	Unstable; many eroded areas; "raw" areas frequent along straight sections & bends; obvious bank sloughing; 60-100% of banks have erosion scars on sideslopes.
6. score: 10	9-10	6-8	3-5	0-2
	Left Side 10	Average:		
	Right Side 10	Comments:		
7. Bank Vegetation Protection (score each bank) NOTE: reduce scores for annual crops & weeds which do not hold soil well (e.g. knapweed).	Over 90% of the streambank surfaces covered by stabilizing vegetation; vegetative disruption minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by vegetation; disruption evident, but not affecting full plant growth potential to any great extent; more than one-half of potential plant height evident.	50-70% of the streambank surfaces covered in vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of potential plant height remaining.	Less than 50% of the streambank surfaces covered by vegetation; extensive disruption of vegetation; vegetation removed to 2 inches or less.
7. score: 10	9-10	6-8	3-5	0-2
	Left Side 10	Average:		
	Right Side 10	Comments:		
8. Vegetated Zone Width (score each side)	Width of vegetated zone > 100 feet.	Width of vegetated zone 30-100 feet.	Width of vegetated zone 10-30 feet.	Width of vegetated zone < 10 feet.
8. score: 10	9-10	6-8	3-5	0-2
	Left Side 10	Average:		
	Right Side 10	Comments:		

TOTAL SCORE: Score compared to maximum possible:

03 – 0823 – __

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-MI2

Trip ID: 2003-DRBKN Date: 7/24/03

Personnel: [illegible]

Waterbody Name Flat Creek County Lewis + Clark HUC 10030102

Station ID MI2FLC05 Visit # 2 Location Downstream of Milford Colony

Lat — Long — Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84

Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☒	03-0823W	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☒	Macroinvertebrate Habitat Asmt. ☐	03-0823M	KICK HESS OTHER:
Algae/Macrophytes	☒	Aquatic Plant Form ☐	03-0823A	PERI-1 OTHER:
Chlorophyll a	☒		03-0823C	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☐			
Field Notes	☐			
Other				

Measurements:	Time: 13:30	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 17.68	A
pH:	8.32	
SC: (mS/cm)	.273	
SC x 1000 =		µmho/cm
DO: (mg/L)	9.14	96%
TUR: Clear ☒ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments:	10.4 & 10.5	

Macroinvertebrate Kick Duration: 3 min Kick Length (Ft.): 35'

Site Visit Comments:

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 7/24/03 **Site Visit Code:** 03-0823

Waterbody: Flat Creek B/w Midland Colony **Station ID:** MIDFlatCO5

Personnel: Tim/Shad

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	Ø 3.0 LEW	Ø	Ø			
2	4.0	0.30	0.43			
3	5.0	0.39	0.94			
4	6.0	0.32	1.25			
5	7.0	0.48	1.44			
6	8.0	0.50	1.73			
7	9.0	0.61	2.18			
8	10.0	0.63	2.56			
9	11.0	0.68	1.75			
10	12.0	0.80	1.54			
11	13.0	0.78	1.82			
12	14.0	1.00	1.85			
13	15.0	1.12	1.73			
14	16.0	1.25	0.40			
15	16.5 REW	Ø.20	Ø			
16						
17						
18						
19						
20						
21						
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23						
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25						
26						
27						
28						
29						
30						

Page 1 of 2 Data Mgmt. Approved

21.1.1.12

MACROINVERTEBRATE HABITAT ASSESSMENT FIELD FORM RIFFLE/RUN PREVALENCE

Date: 7/24/03 Site Visit Code: 03-DS23

Waterbody: Flat Creek nw Milled Site: M12S1a1CD5

Personnel: Shad / Tim

HABITAT PARAMETER	OPTIMAL	SUB-OPTIMAL	MARGINAL	POOR
1A. Riffle Development	Well-developed riffle; riffle as wide as stream & extends two times width of stream.	Riffle as wide as stream but length less than two times width.	Reduced riffle area that is not as wide as stream & its length less than two times width.	Riffles virtually non-existent
1A. score:	9-10	6-8 8.5	3-5	0-2
Comments:				
1B. Benthic Substrate	Diverse substrate dominated by cobble.	Substrate diverse with abundant cobble, but bedrock, boulders, fine gravel, or sand prevalent.	Substrate dominated by bedrock, boulders, sand, or silt; cobble present.	Monotonous fine gravel, sand, silt, or bedrock substrate.
1B. score:	9-10	6-8 7	3-5	0-2
Comments:				
2. Embeddedness	Gravel, cobble, or boulder particles are between 0-25% surrounded by fine sediment (particles less than 6.35 mm [.25"]).	Gravel, cobble, or boulder particles are between 25-50 % surrounded by fine sediment.	Gravel, cobble, or boulder particles are between 50-75% surrounded by fine sediment.	Gravel, cobble, or boulder particles are over 75% surrounded by fine sediment.
2. score:	16-20 16	11-15	6-10	0-5
Comments:				
3. Channel Alteration (channelization, straightening, dredging, other alterations)	Channel alterations absent or minimal; stream pattern apparently in natural state.	Some channelization present, usually in areas of crossings, etc. Evidence of past alterations (before past 20 years) may be resent, but more recent channel alteration is not present.	New embankments present on both banks; 40-80% of the stream reach channelized & disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized & disrupted.
3. score:	16-20 18	11-15	6-10	0-5
Comments:				
4. Sediment Deposition	Little or no enlargement of bars & less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from coarse gravel; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, coarse sand on old & new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, & bends; moderate deposition in pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
4. score:	16-20	11-15 12	6-10	0-5
Comments:				

5. Channel Flow Status	Water fills baseflow channel; minimal amount of channel substrate exposed.	Water fills > 75% of the baseflow channel; < 25% channel substrate exposed.	Water fills 25-75% of the baseflow channel; riffle substrates mostly exposed.	Very little water in channel, & mostly present as standing pools.
5. score:	16-20 18	11-15	6-10	0-5
Comments:				
6. Bank Stability (score each bank) NOTE: Determine left or right side while facing downstream.	Banks stable; no evidence of erosion or bank failure; little apparent potential for future problems.	Moderately stable; infrequent, small areas of erosion mostly healed over.	Moderately unstable; moderate frequency & size of erosional areas; up to 60% of banks in reach have erosion; high erosion potential during high flow.	Unstable; many eroded areas; "raw" areas frequent along straight sections & bends; obvious bank sloughing; 60-100% of banks have erosion scars on sideslopes.
6. score:	9-10	6-8	3-5	0-2
	Left Side 7	Average: 7		
	Right Side 7	Comments:		
7. Bank Vegetation Protection (score each bank) NOTE: reduce scores for annual crops & weeds which do not hold soil well (e.g. knapweed).	Over 90% of the streambank surfaces covered by stabilizing vegetation; vegetative disruption minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by vegetation; disruption evident, but not affecting full plant growth potential to any great extent; more than one-half of potential plant height evident.	50-70% of the streambank surfaces covered in vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of potential plant height remaining.	Less than 50% of the streambank surfaces covered by vegetation; extensive disruption of vegetation; vegetation removed to 2 inches or less.
7. score:	9-10	6-8	3-5	0-2
	Left Side 9	Average: 8.5		
	Right Side 8	Comments:		
8. Vegetated Zone Width (score each side)	Width of vegetated zone > 100 feet.	Width of vegetated zone 30-100 feet.	Width of vegetated zone 10-30 feet.	Width of vegetated zone < 10 feet.
8. score:	9-10	6-8	3-5	0-2
	Left Side 9	Average: 9		
	Right Side 9	Comments:		

TOTAL SCORE: Score compared to maximum possible:

Place Site Visit
03 – 0825 – __

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-MIZ
Trip ID: 2003-DRBEN Date: 7-2 03
Personnel: Laidlaw / Bowman

Waterbody Name: Flat Creek County: Lewis & Clark HUC: 10030102
Station ID: MIZFlatC06 Visit #: 2 Location: Diversion from Dearborn
Lat: — Long: — Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84
Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale?

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☒	03-0825W	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☐	Macroinvertebrate Habitat Asmt. ☐		KICK HESS OTHER:
Algae/Macrophytes	☐	Aquatic Plant Form ☐		PERI-1 OTHER:
Chlorophyll a	☑		03-0825C	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☐			
Field Notes	☐			
Other				

Measurements:	Time: 1645	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 14.70	A
pH:	8.46	
SC: (mS/cm)	.263	
SC x 1000 =		µmho/cm
DO: (mg/L)	9.67	95.4
TUR: Clear ☒ Slight ☐ Turbid ☐ Opaque ☐		
Turbidity Comments:	.43 NTU	
	.58 NTU	

Macroinvertebrate Kick Duration: N/A Kick Length (Ft.): N/A

Site Visit Comments:

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 7-24-03 **Site Visit Code:** 03-0825

Waterbody: Flat Creek - Diversion **Station ID:** M12FlatC06

Personnel: Landau / Bowman

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	1	.20	0	1		
2	2	.32	.60	1		
3	3	.80	1.65	1		
4	4	1.15	1.60	1		
5	5	1.50	1.85	1		
6	6	1.50	1.98	1		
7	7	1.45	2.50	1		
8	8	1.50	3.05	1		
9	9	1.40	3.01	1		
10	10	1.40	3.12	1		
11	11	1.40	2.68	1		
12	12	1.35	3.18	1		
13	13	1.4	2.38	1		
14	14	1.4	2.81	1		
15	15	1.4	2.60	1		
16	16	1.35	2.74	1		
17	17	1.3	2.44	1		
18	18	1.3	2.21	1		
19	19	1.3	1.32	1		
20	20	0.9	1.12	1		
21	21.0	0.6	.60	1		
22						
23						
24						
25						
26						
27						
28						
29						
30						

Page 1 of 2 Data Mgmt. Approved

21.1.1.12

MACROINVERTEBRATE HABITAT ASSESSMENT FIELD FORM RIFFLE/RUN PREVALENCE

Date: 7-24-03 Site Visit Code: 03-0805

Waterbody: Dearborn River above FC diversion Site: M12S1atC06

Personnel: Sid/Tina

HABITAT PARAMETER	OPTIMAL	SUB-OPTIMAL	MARGINAL	POOR
1A. Riffle Development	Well-developed riffle; riffle as wide as stream & extends two times width of stream.	Riffle as wide as stream but length less than two times width.	Reduced riffle area that is not as wide as stream & its length less than two times width.	Riffles virtually non-existent
1A. score:	9-10 10	6-8	3-5	0-2
Comments:				
1B. Benthic Substrate	Diverse substrate dominated by cobble.	Substrate diverse with abundant cobble, but bedrock, boulders, fine gravel, or sand prevalent.	Substrate dominated by bedrock, boulders, sand, or silt; cobble present.	Monotonous fine gravel, sand, silt, or bedrock substrate.
1B. score:	9-10 10	6-8	3-5	0-2
Comments:				
2. Embeddedness	Gravel, cobble, or boulder particles are between 0-25% surrounded by fine sediment (particles less than 6.35 mm [.25"]).	Gravel, cobble, or boulder particles are between 25-50 % surrounded by fine sediment.	Gravel, cobble, or boulder particles are between 50-75% surrounded by fine sediment.	Gravel, cobble, or boulder particles are over 75% surrounded by fine sediment.
2. score:	16-20 20	11-15	6-10	0-5
Comments:				
3. Channel Alteration (channelization, straightening, dredging, other alterations)	Channel alterations absent or minimal; stream pattern apparently in natural state.	Some channelization present, usually in areas of crossings, etc. Evidence of past alterations (before past 20 years) may be resent, but more recent channel alteration is not present.	New embankments present on both banks; 40-80% of the stream reach channelized & disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized & disrupted.
3. score:	16-20 19	11-15	6-10	0-5
Comments:				
4. Sediment Deposition	Little or no enlargement of bars & less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from coarse gravel; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, coarse sand on old & new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, & bends; moderate deposition in pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
4. score:	16-20 19	11-15	6-10	0-5
Comments:				

5. Channel Flow Status	Water fills baseflow channel; minimal amount of channel substrate exposed.	Water fills > 75% of the baseflow channel; < 25% channel substrate exposed.	Water fills 25-75% of the baseflow channel; riffle substrates mostly exposed.	Very little water in channel, & mostly present as standing pools.
5. score:	16-20 18	11-15	6-10	0-5
Comments:	Low flows; Much cobble exposed on edges - Not Bad			
6. Bank Stability (score each bank) NOTE: Determine left or right side while facing downstream.	Banks stable; no evidence of erosion or bank failure; little apparent potential for future problems.	Moderately stable; infrequent, small areas of erosion mostly healed over.	Moderately unstable; moderate frequency & size of erosional areas; up to 60% of banks in reach have erosion; high erosion potential during high flow.	Unstable; many eroded areas; "raw" areas frequent along straight sections & bends; obvious bank sloughing; 60-100% of banks have erosion scars on sideslopes.
6. score:	9-10	6-8	3-5	0-2
	Left Side 9	Average: 9		
	Right Side 9	Comments:		
7. Bank Vegetation Protection (score each bank) NOTE: reduce scores for annual crops & weeds which do not hold soil well (e.g. knapweed).	Over 90% of the streambank surfaces covered by stabilizing vegetation; vegetative disruption minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by vegetation; disruption evident, but not affecting full plant growth potential to any great extent; more than one-half of potential plant height evident.	50-70% of the streambank surfaces covered in vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of potential plant height remaining.	Less than 50% of the streambank surfaces covered by vegetation; extensive disruption of vegetation; vegetation removed to 2 inches or less.
7. score:	9-10	6-8	3-5	0-2
	Left Side 9	Average: 9		
	Right Side 9	Comments:		
8. Vegetated Zone Width (score each side)	Width of vegetated zone > 100 feet.	Width of vegetated zone 30-100 feet.	Width of vegetated zone 10-30 feet.	Width of vegetated zone < 10 feet.
8. score:	9-10	6-8	3-5	0-2
	Left Side 9	Average: 9		
	Right Side 9	Comments:		

TOTAL SCORE: Score compared to maximum possible:

03 – 0826 – __

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-M12
Trip ID: 2003-DRBRA Date: 7-24-03
Personnel: Laidlaw / Bowman

Waterbody Name Flat Creek County Lewis & Clark HUC 10030102
Station ID M12 Flat C07 Visit # 2 Location Flat Creek Road
Lat — Long — Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84
Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale?

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☒	Nutrients ☒ Metals ☐ Commons ☒	03-0826W	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☐	Macroinvertebrate Habitat Asmt. ☐		KICK HESS OTHER:
Algae/Macrophytes	☐	Aquatic Plant Form ☐		PERI-1 OTHER:
Chlorophyll a	☒		03-0826C	CHLPHL-2 OTHER: Bottle
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☐			
Field Notes	☐			
Other				

Measurements:	Time: 13:00
Q / Flow (cfs)	Est. ☐
Temp: (°C)	W 13.11°C A
pH:	8.50
SC: (mS/cm)	.259
SC x 1000 =	µmho/cm
DO: (mg/L)	9.51 mg/L / 94.6%
TUR: Clear ☒ Slight ☐ Turbid ☐ Opaque ☐	
Turbidity Comments:	3.65
	3.44 NTU

Macroinvertebrate Kick Duration: N/A Kick Length (Ft.):

Site Visit Comments:

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 7-24-03 **Site Visit Code:** 03-0826

Waterbody: Flat Creek **Station ID:** M12FlatC07

Personnel: Laidlaw Bowman

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	1	1.0	.09			
2	2	1.2	.67			
3	3	1.2	1.84			
4	4	1.3	2.10			
5	5	1.3	2.03			
6	6	1.0	2.30			
7	7	0.9	2.45			
8	8	1.0	2.95			
9	9	0.9	2.27			
10	10	1.2	2.70			
11	11	1.20	3.15			
12	12	1.2	3.17			
13	13	1.2	2.48			
14	14	0.9	0.61			
15	15	0.6	0.05			
16	16	0.65	.35			
17	17	0.62	1.37			
18	18	0.65	1.67			
19	19	0.45	0			
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Page 1 of 2 Data Mgmt. Approved

03-0820-__

Site Visit Form

(One Station per page)

STORET Project ID: TMDL-M12

Trip ID: 2003-D2BRN Date: ____

Personnel: Laidlaw / Bowman

Waterbody Name: Flat Creek County: Lewis + Clark HUC: 10030102

Station ID: M12FlatC08 Visit #: 2 Location: 1 miles below Bedford

Lat: – Long: – Verified? ☐ By ____ GPS Datum (Circle One): NAD 27 NAD 83 WGS84

Lat/Long obtained by method other than GPS? Y ☐ N ☐ If Y what method used? If by map what is the map scale? ____

Samples Taken:			Sample ID/File Location:	Sample Collection Procedure
Water	☑	Nutrients ☒ Metals ☐ Commons ☒	03-0820W	GRAB
Sediment	☐			SED-1
Macroinvertebrate	☒	Macroinvertebrate Habitat Asmt. ☒	03-0820M	KICK HESS OTHER:
Algae/Macrophytes	☒	Aquatic Plant Form ☐	03-0820A	PERI-1 OTHER:
Chlorophyll a	☒		03-0820C	CHLPHL-2 OTHER:
Habitat Assessment	☐	Stream Reach Asmt. ☐ Other ☐		Purpose: TMDL
Substrate	☐	Pebble Count ☐ % Fines ☐		
Transect	☐			
Photographs	☐			
Field Notes	☐			
Other				

Measurements:	Time: 16:00	
Q / Flow (cfs)		Est. ☐
Temp: (°C)	W 21.98	A
pH:	8.40	
SC: (mS/cm)	.438	
SC x 1000 =		µmho/cm
DO: (mg/L)	11.26 mg/L / 129%	
TUR: Clear ☐ Slight ☑ Turbid ☐ Opaque ☐		
Turbidity Comments:	4.98 NTU	
	0.46	

Macroinvertebrate Kick Duration: 2 minutes Kick Length (Ft.):

Site Visit Comments:

Revised 3/2003 DMA

Revised 4/2003

TOTAL DISCHARGE:

Date: 7-23-02 **Site Visit Code:** 03-0820

Waterbody: Flat Creek Below Bridge **Station ID:** M12FlatC08

Personnel: Laidlaw / Bowman

	**Distance from initial point	**Depth	**Velocity (at point)	**Width	**Area	**Discharge
1	2	.40	.03	0		
2	3.5	.65	.16	1.5		
3	5.0	1.0	.21	1.5		
4	6.5	1.15	.26	1.5		
5	8.0	1.0	.26	1.5		
6	9.5	1.05	.35	1.5		
7	11.0	1.22	.5	1.5		
8	12.5	1.32	.34	1.5		
9	14.0	1.25	.29	1.5		
10	15.5	1.40	.17	1.5		
11	17.0	1.45	.19	1.5		
12	18.5	1.45	.23	1.5		
13	20.0	1.57	.02	1.5		
14	21.5	1.5	.03	1.5		
15	23.0	1.32	0	1.5		
16	24.5	.98	0	1.5		
17	26.0	.48	0	1.5		
18	27.3	0	0			
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Page 1 of 2 Data Mgmt. Approved

M12FLATC06	Date-	6/18/2003	17:20
Flat Creek, Diversion from the Dearborn River			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope		
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50		mm
Percentage of Fines (<2mm)		*%*
Stream Type		
Discharge	*76.22*	*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)		%
Stream Reach Assessment Score (MT adjusted)		%
Macroinvertabrate Habitat Assessment Score		%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)		
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*76.22*	*cfs*
Temperature, water	13.12	degree C
pH	8.43	
Specific Conductance	0.227	mS/cm
Dissolved Oxygen	9.47	mg/L
Dissolved Oxygen, % Saturation	90	%
Turbidity	1	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	2.1	mg/m^3	0.1
Benthic Chlorophyll a	30.7	mg/m^3	0.1
Total Phosphorus, TP	0.009	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

M12FLATC02	Date-	6/18/2003	20:30
Flat Creek on Flat Creek Rd, just above Culvert			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope		
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50		mm
Percentage of Fines (<2mm)		*%*
Stream Type		
Discharge		*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)		%
Stream Reach Assessment Score (MT adjusted)		%
Macroinvertabrate Habitat Assessment Score		%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)		
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow		*cfs*
Temperature, water		degree C
pH		
Specific Conductance		mS/cm
Dissolved Oxygen		mg/L
Dissolved Oxygen, % Saturation		%
Turbidity	7.29	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	ND	mg/m^3	0.1
Benthic Chlorophyll a	8.3	mg/m^3	0.1
Total Phosphorus, TP	ND	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

M12FLATC05	Date-	6/18/2003	17:00
Flat Creek DS of Milford Colony			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope		
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	27	mm
Percentage of Fines (<2mm)	*13.16*	*%*
Stream Type		
Discharge	*30.84*	*cfs*

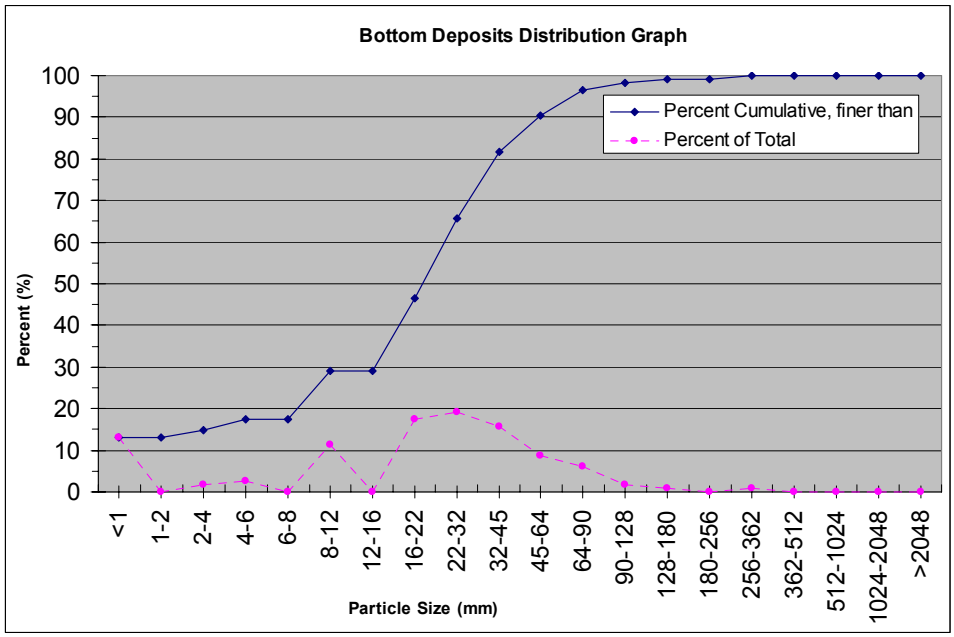
Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)		%
Stream Reach Assessment Score (MT adjusted)		%
Macroinvertabrate Habitat Assessment Score		%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)		
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*30.84*	*cfs*
Temperature, water	21.96	degree C
pH	8.69	
Specific Conductance	0.29	mS/cm
Dissolved Oxygen	9.06	mg/L
Dissolved Oxygen, % Saturation	103.6	%
Turbidity	10.8	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	ND	mg/m^3	0.1
Benthic Chlorophyll a	31	mg/m^3	0.1
Total Phosphorus, TP	0.012	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

Macroinvertabrate Data Results		
parameter	*value*	*units*
TOTAL SCORE (max =18)	8	score
PERCENT OF MAX SCORE	44	%
IMPAIRMENT CLASSIFICATION	MODERATE IMPAIRMENT	
USE SUPPORT	PARTIAL SUPPORT	

		Pebble Count Data			
	Mean size	Particle Size (mm)	Sum	% Total	Cum. Total
S/C	0.5	<1	15	13.16	13.16
S	1.5	1-2		0.00	13.16
FG	3	2-4	2	1.75	14.91
FG	5	4-6	3	2.63	17.54
FG	7	6-8		0.00	17.54
MG	10	8-12	13	11.40	28.95
MG	14	12-16		0.00	28.95
CG	18	16-22	20	17.54	46.49
CG	27	22-32	22	19.30	65.79
CG	38.5	32-45	18	15.79	81.58
CG	54.5	45-64	10	8.77	90.35
SC	77	64-90	7	6.14	96.49
SC	109	90-128	2	1.75	98.25
MC	154	128-180	1	0.88	99.12
LC	218	180-256		0.00	99.12
LC	309	256-362	1	0.88	100.00
SB	437	362-512		0.00	100.00
MB	768	512-1024		0.00	100.00
LB	1536	1024-2048		0.00	100.00
BR		>2048		0.00	100.00
		TOTALS	114	100.00	100.00
		D50 particle size (mm)	22-32		
		% Fines (<2mm)	13.16		
M12FLATC05	Date-	6/18/2003	17:00		
Flat Creek DS of Milford Colony					



M12FLATC08	Date-	6/18/2003	13:30
Flat Creek below Birdtail Rd on Dearborn Ranch			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width	*33.00*	*Ft*
Mean Depth	*3.67*	*Ft*
Bnkfull X-sect area	*120.96*	*Sq Ft*
Width/Depth	*9.00*	
Max Depth	*5.49*	*Ft*
Flood prone width	*100.00*	*Ft*
Entrenchement Ratio	*3.03*	
Water slope	*0.0017*	
Channel Sinuosity	*2.59*	
BEHI Index Score (adjusted)	29.00	
BEHI Rating	*Moderate*	
Channel D50	10	mm
Percentage of Fines (<2mm)	*15.79*	*%*
Stream Type		
Discharge	*17.35*	*cfs*

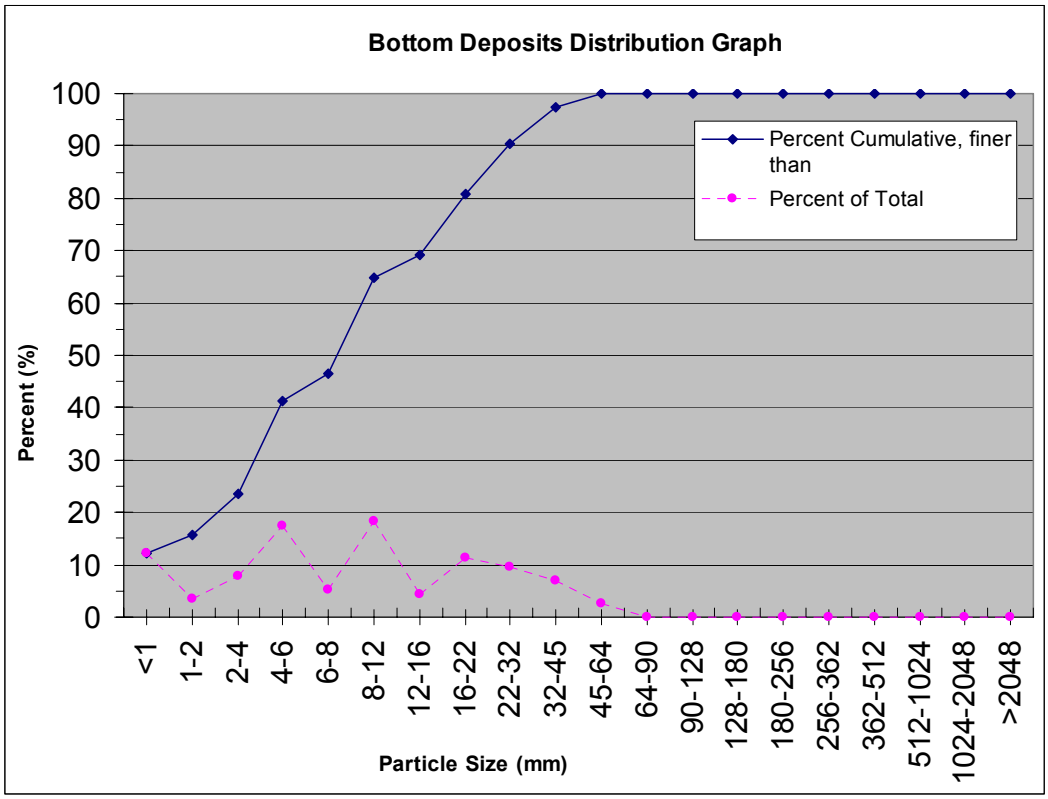
Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)	**94.8**	%
Stream Reach Assessment Score (MT adjusted)	**94.1**	%
Macroinvertabrate Habitat Assessment Score		%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)	**Non Impaired, Fully Supporting**	
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

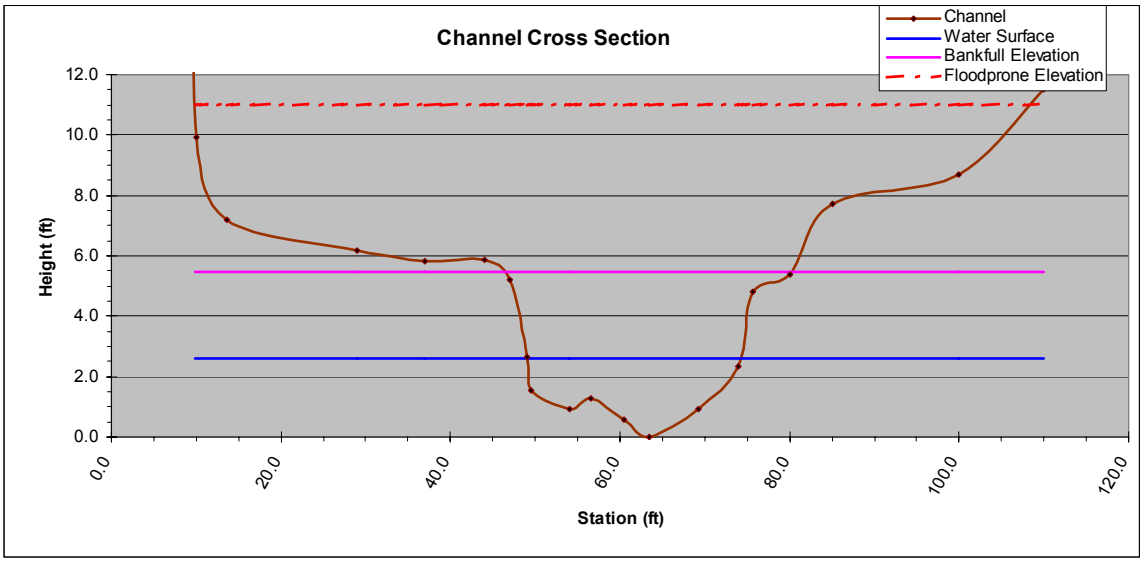
Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*17.35*	*cfs*
Temperature, water	21.51	degree C
pH	8.44	
Specific Conductance	0.477	mS/cm
Dissolved Oxygen	11.3	mg/L
Dissolved Oxygen, % Saturation	126.6	%
Turbidity	7.39	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	0.9	mg/m^3	0.1
Benthic Chlorophyll a	12.9	mg/m^3	0.1
Total Phosphorus, TP	0.061	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

Macroinvertabrate Data Results		
parameter	*value*	*units*
TOTAL SCORE (max =18)	6	score
PERCENT OF MAX SCORE	33	%
IMPAIRMENT CLASSIFICATION	MODERATE IMPAIRMENT	
USE SUPPORT	PARTIAL SUPPORT	

		Pebble Count Data			
	Mean size	*Particle Size (mm)*	*Sum*	*% Total*	*Cum. Total*
S/C	0.5	<1	14	*12.28*	*12.28*
S	1.5	1-2	4	*3.51*	*15.79*
FG	3	2-4	9	*7.89*	*23.68*
FG	5	4-6	20	*17.54*	*41.23*
FG	7	6-8	6	*5.26*	*46.49*
MG	10	8-12	21	*18.42*	*64.91*
MG	14	12-16	5	*4.39*	*69.30*
CG	18	16-22	13	*11.40*	*80.70*
CG	27	22-32	11	*9.65*	*90.35*
CG	38.5	32-45	8	*7.02*	*97.37*
CG	54.5	45-64	3	*2.63*	*100.00*
SC	77	64-90		*0.00*	*100.00*
SC	109	90-128		*0.00*	*100.00*
MC	154	128-180		*0.00*	*100.00*
LC	218	180-256		*0.00*	*100.00*
LC	309	256-362		*0.00*	*100.00*
SB	437	362-512		*0.00*	*100.00*
MB	768	512-1024		*0.00*	*100.00*
LB	1536	1024-2048		*0.00*	*100.00*
BR		>2048		*0.00*	*100.00*
		TOTALS	114	*100.00*	*100.00*
		D50 particle size (mm)	8-12		
		% Fines (<2mm)	**15.79**		
M12FLATC08	**Date-**	**6/18/2003**	**13:30**		
Flat Creek below Birdtail Rd on Dearborn Ranch					





	BEHI Field Measures			BEHI Calculated Values		
	Parameter	***Value***	***Units***	***Parameter***	***Value***	***Units***
Longitudinal Information	Rod reading @ Upstream Edge of Water	12.03	feet	*Slope*	*0.0017*	
				Sinuousity	*2.59*	
	Rod reading @ Downstream Edge of Water	14.25	feet	*Max Depth*	*5.49*	feet
				Floodprone Height	*10.97*	feet
	Stream Distance	1340.00	feet	*Mean Depth*	*3.67*	feet
	Straightline Distance	517.00	feet	*Bankfull Width*	*33.00*	feet
Cross-Sectional Information	Left Edge of Bankfull	47.00	feet	*Floodplrone Width*	*100.00*	feet
	Right Edge of Bankfull	80.00	feet	*Bankfull Area*	*120.96*	ft^2
	Rod reading @ Thalweg	*16.62*	feet	*FloodproneArea*		ft^2
	Rod reading @ Bankfull Depth	*11.13*	feet	*W/D Ratio*	*9.00*	
	Rod reading @ Floodplain Depth	*5.65*	feet	*Cross Sectional Area*	*120.96*	ft^2
	Left Edge of Floodprone depth	10.00	feet	*Entrenchment Ratio*	*3.03*	
	Right Edge of Floodprone depth	110.00	feet			
BEHI Information	Bank Height	11.00	feet			
	Bankfull Height	5.88	feet	*Bank Ht/Bankfull Ht*	*1.87*	
	Root Depth	1.00	feet	*Root Depth/Bank Ht*	*0.09*	
	Root Density	25.00	%	*Root Density*	*25*	*%*
	Bank Angle	70.00	Degrees	*Bank Angle*	*70*	*degrees*
	Surface Protection	50.00	%	*Surface Protection*	*50*	*%*
Near Bank Stress Information	Velocity at thalweg	0.79	ft/sec	*Velocity Gradient*	*0.06*	*ft/sec/ft*
	Tape reading at thalweg	63.00	feet	*Near Bank stress / Mean Shear stress*		
	velocity at left bank	0.00	ft/sec			
	tape reading at left bank	49.00	feet	*A nb / A*		
	Near bank stress					
	Mean shear stress					
	Near bank x-sectional area		ft^2			

BEHI Associated Index Value (from form)		*Possible Adjustment Factors*
Bank Ht/Bankfull Ht	6.00	Bank Materials
Root Depth/Bank Ht	8.00	*Bedrock is always Very Low*
Root Density	6.00	*Boulders are always Low*
Bank Angle	5.00	*Cobble decrease the category by one unless the mixture of Sand/Gravel is over 50%*
Surface Protection	4.00	
Total Index Value	***29.0***	*Gravel- adjust the values up 5-10 pts depending on sand composition*
Numeric Adjustments:		
Bank Materials Index adjustment:		*Sand- adjust the values up 10 pts*
		silt/clay- no adjustment
Bank Stratification Index adjustment:		Stratification
Total adjusted Index Value:	***29.0***	*5-10 pts upward depending on position of unstable layers relative to bankfull stage*
Bank Erosion Potential Rating:		**Moderate**

M12FLATC04	Date-	6/18/2003	9:15
Flat Creek at confluence with Dearborn River on Dearborn Ranch			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope		
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	154	mm
Percentage of Fines (<2mm)	*2.80*	*%*
Stream Type		
Discharge	*19.51*	*cfs*

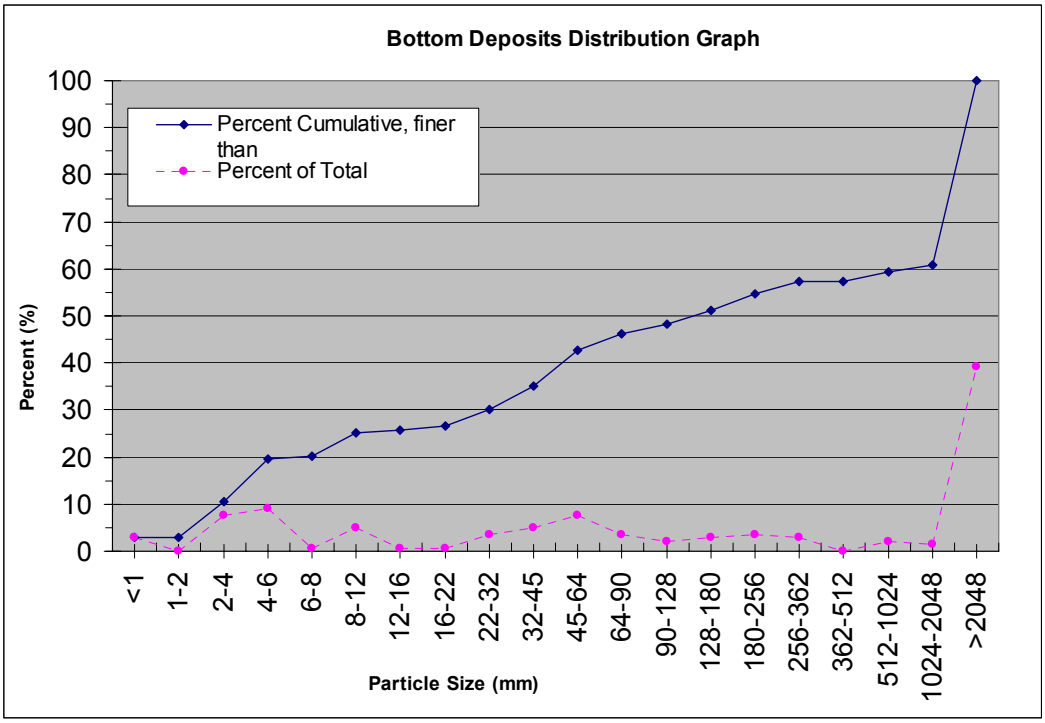
Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)		%
Stream Reach Assessment Score (MT adjusted)		%
Macroinvertabrate Habitat Assessment Score		%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)		
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*19.51*	*cfs*
Temperature, water	18.51	degree C
pH	8.37	
Specific Conductance	0.401	mS/cm
Dissolved Oxygen	8.95	mg/L
Dissolved Oxygen, % Saturation	95.7	%
Turbidity		NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	ND	mg/m^3	0.1
Benthic Chlorophyll a	16.6	mg/m^3	0.1
Total Phosphorus, TP	0.034	mg/L	0.004
Total Kiejdahl Notrogen, TKN	0.8	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

Macroinvertabrate Data Results		
parameter	*value*	*units*
TOTAL SCORE (max =18)	5	score
PERCENT OF MAX SCORE	28	%
IMPAIRMENT CLASSIFICATION	MODERATE IMPAIRMENT	
USE SUPPORT	PARTIAL SUPPORT	

		Pebble Count Data			
	Mean size	*Particle Size (mm)*	*Sum*	*% Total*	*Cum. Total*
S/C	0.5	<1	4	*2.80*	*2.80*
S	1.5	1-2		*0.00*	*2.80*
FG	3	2-4	11	*7.69*	*10.49*
FG	5	4-6	13	*9.09*	*19.58*
FG	7	6-8	1	*0.70*	*20.28*
MG	10	8-12	7	*4.90*	*25.17*
MG	14	12-16	1	*0.70*	*25.87*
CG	18	16-22	1	*0.70*	*26.57*
CG	27	22-32	5	*3.50*	*30.07*
CG	38.5	32-45	7	*4.90*	*34.97*
CG	54.5	45-64	11	*7.69*	*42.66*
SC	77	64-90	5	*3.50*	*46.15*
SC	109	90-128	3	*2.10*	*48.25*
MC	154	128-180	4	*2.80*	*51.05*
LC	218	180-256	5	*3.50*	*54.55*
LC	309	256-362	4	*2.80*	*57.34*
SB	437	362-512		*0.00*	*57.34*
MB	768	512-1024	3	*2.10*	*59.44*
LB	1536	1024-2048	2	*1.40*	*60.84*
BR		>2048	56	*39.16*	*100.00*
		TOTALS	143	*100.00*	*100.00*
		D50 particle size (mm)	128-180		
		% Fines (<2mm)	**2.80**		
M12FLATC04	**Date-**	**6/18/2003**	**9:15**		
Flat Creek at confluence with Dearborn River on Dearborn Ranch					



M12FLATC06	Date-	7/24/2003	16:45
Flat Creek, Diversion from the Dearborn River			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope		
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50		mm
Percentage of Fines (<2mm)		*%*
Stream Type		
Discharge	*57.91*	*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)		%
Stream Reach Assessment Score (MT adjusted)		%
Macroinvertabrate Habitat Assessment Score		%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)		
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*57.91*	*cfs*
Temperature, water	14.7	degree C
pH	8.46	
Specific Conductance	0.263	mS/cm
Dissolved Oxygen	9.67	mg/L
Dissolved Oxygen, % Saturation	95.4	%
Turbidity	0.46	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	1.8	mg/m^3	0.1
Benthic Chlorophyll a	5.7	mg/m^3	0.1
Total Phosphorus, TP	ND	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	0.056	mg/L	0.01
Total Nitrogen, TN		mg/L	

M12FLATC02	Date-	7/24/2003	18:00
Flat Creek on Flat Creek Rd, just above Culvert			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope		
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50		mm
Percentage of Fines (<2mm)		*%*
Stream Type		
Discharge	*34.47*	*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)		%
Stream Reach Assessment Score (MT adjusted)		%
Macroinvertabrate Habitat Assessment Score		%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)		
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*34.47*	*cfs*
Temperature, water	15.11	degree C
pH	8.5	
Specific Conductance	0.259	mS/cm
Dissolved Oxygen	9.51	mg/L
Dissolved Oxygen, % Saturation	94.6	%
Turbidity	3.55	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	3.6	mg/m^3	0.1
Benthic Chlorophyll a	19.2	mg/m^3	0.1
Total Phosphorus, TP	0.069	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

M12FLATC05	Date-	7/24/2003	13:30
Flat Creek DS of Milford Colony			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope		
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	27	mm
Percentage of Fines (<2mm)	*13.16*	*%*
Stream Type		
Discharge	*13.44*	*cfs*

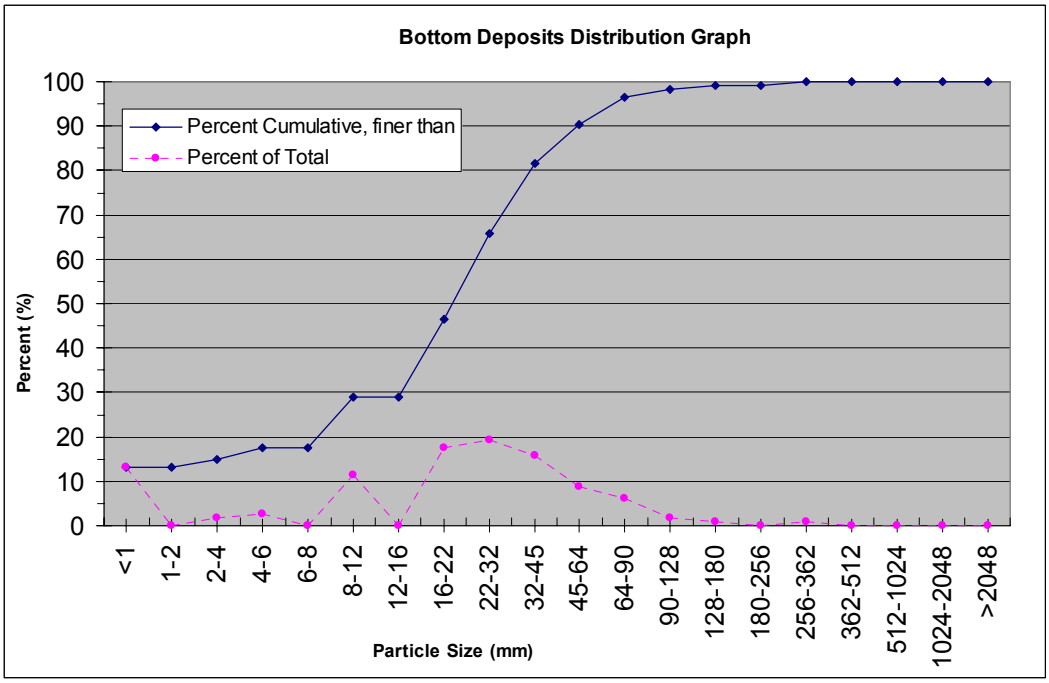
Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)		%
Stream Reach Assessment Score (MT adjusted)		%
Macroinvertabrate Habitat Assessment Score	**80**	%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)		
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		3 min 35'

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*13.44*	*cfs*
Temperature, water	17.68	degree C
pH	8.32	
Specific Conductance	0.273	mS/cm
Dissolved Oxygen	9.14	mg/L
Dissolved Oxygen, % Saturation	96	%
Turbidity	10.45	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	14	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	14	mg/L	10
Water Column Chlorophyll a	2.1	mg/m^3	0.1
Benthic Chlorophyll a	22.2	mg/m^3	0.1
Total Phosphorus, TP	0.069	mg/L	0.004
Total Kiejdahl Notrogen, TKN	0.6	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

Macroinvertabrate Data Results		
parameter	*value*	*units*
TOTAL SCORE (max =18)	8	score
PERCENT OF MAX SCORE	44	%
IMPAIRMENT CLASSIFICATION	MODERATE IMPAIRMENT	
USE SUPPORT	PARTIAL SUPPORT	

		Pebble Count Data			
	Mean size	*Particle Size (mm)*	*Sum*	*% Total*	*Cum. Total*
S/C	0.5	<1	15	*13.16*	*13.16*
S	1.5	1-2		*0.00*	*13.16*
FG	3	2-4	2	*1.75*	*14.91*
FG	5	4-6	3	*2.63*	*17.54*
FG	7	6-8		*0.00*	*17.54*
MG	10	8-12	13	*11.40*	*28.95*
MG	14	12-16		*0.00*	*28.95*
CG	18	16-22	20	*17.54*	*46.49*
CG	27	22-32	22	*19.30*	*65.79*
CG	38.5	32-45	18	*15.79*	*81.58*
CG	54.5	45-64	10	*8.77*	*90.35*
SC	77	64-90	7	*6.14*	*96.49*
SC	109	90-128	2	*1.75*	*98.25*
MC	154	128-180	1	*0.88*	*99.12*
LC	218	180-256		*0.00*	*99.12*
LC	309	256-362	1	*0.88*	*100.00*
SB	437	362-512		*0.00*	*100.00*
MB	768	512-1024		*0.00*	*100.00*
LB	1536	1024-2048		*0.00*	*100.00*
BR		>2048		*0.00*	*100.00*
		TOTALS	114	*100.00*	*100.00*
		D50 particle size (mm)	22-32		
		% Fines (<2mm)	**13.16**		
	M12FLATC05	**Date-**	**7/24/2003**	**13:30**	
	Flat Creek DS of Milford Colony				



M12FLATC03	Date-	7/22/2003	9:45
Flat Creek Upstream of Hwy 200, on Dearborn Ranch property			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width	*23.00*	*Ft*
Mean Depth	*2.15*	*Ft*
Bnkfull X-sect area	*49.39*	*Sq Ft*
Width/Depth	*10.71*	
Max Depth	*3.15*	*Ft*
Flood prone width	*63.00*	*Ft*
Entrenchement Ratio	*2.74*	
Water slope	*0.0046*	
Channel Sinuosity	*1.23*	
BEHI Index Score (adjusted)	30.10	
BEHI Rating	*MDDERATE-HIGH*	
Channel D50	27	mm
Percentage of Fines (<2mm)	*31.97*	*%*
Stream Type	C4	*borderline E4, just needs more sinuo*
Discharge	*13.42*	*cfs*

Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)		%
Stream Reach Assessment Score (MT adjusted)		%
Macroinvertabrate Habitat Assessment Score		%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)		
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		

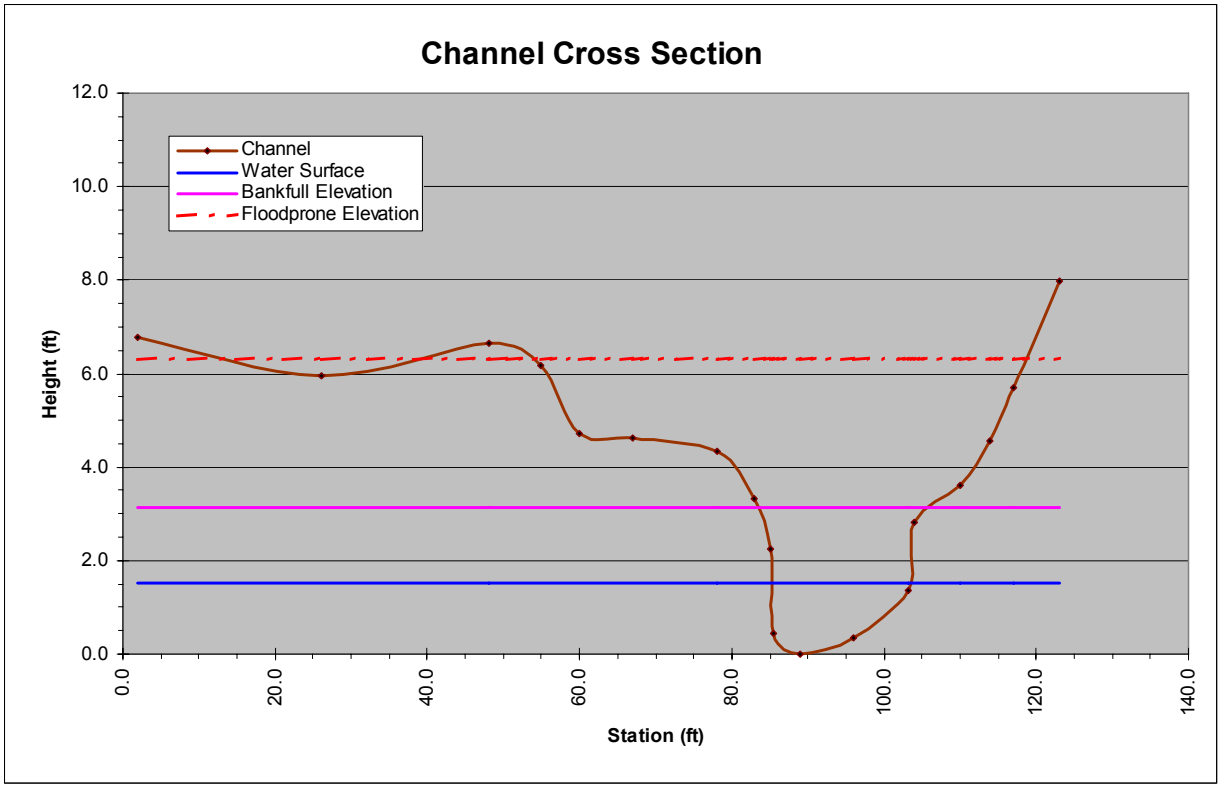
1.58 min
30'

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*13.42*	*cfs*
Temperature, water	18.32	degree C
pH	8.01	
Specific Conductance	0.313	mS/cm
Dissolved Oxygen	9.83	mg/L
Dissolved Oxygen, % Saturation	104.3	%
Turbidity	10.14	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	2.4		0.1
Benthic Chlorophyll a	31.6		0.1
Total Phosphorus, TP	0.025		0.004
Total Kiejdahl Notrogen, TKN	ND		0.5
Nitrate + Nitrite	ND		0.01
Total Nitrogen, TN			

Macroinvertabrate Data Results		
parameter	*value*	*units*
TOTAL SCORE (max =18)	5	score
PERCENT OF MAX SCORE	28	%
IMPAIRMENT CLASSIFICATION	MODERATE IMPAIRMENT	
USE SUPPORT	PARTIAL SUPPORT	

		Pebble Count Data			
	Mean size	*Particle Size (mm)*	*Sum*	*% Total*	*Cum. Total*
S/C	0.5	<1	27	*22.13*	*22.13*
S	1.5	1-2	12	*9.84*	*31.97*
FG	3	2-4		*0.00*	*31.97*
FG	5	4-6	3	*2.46*	*34.43*
FG	7	6-8		*0.00*	*34.43*
MG	10	8-12	3	*2.46*	*36.89*
MG	14	12-16	4	*3.28*	*40.16*
CG	18	16-22	4	*3.28*	*43.44*
CG	27	22-32	9	*7.38*	*50.82*
CG	38.5	32-45	16	*13.11*	*63.93*
CG	54.5	45-64	16	*13.11*	*77.05*
SC	77	64-90	10	*8.20*	*85.25*
SC	109	90-128	11	*9.02*	*94.26*
MC	154	128-180	4	*3.28*	*97.54*
LC	218	180-256	1	*0.82*	*98.36*
LC	309	256-362	2	*1.64*	*100.00*
SB	437	362-512		*0.00*	*100.00*
MB	768	512-1024		*0.00*	*100.00*
LB	1536	1024-2048		*0.00*	*100.00*
BR		>2048		*0.00*	*100.00*
		TOTALS	122	*100.00*	*100.00*
		D50 particle size (mm)	27		
		% Fines (<2mm)	**31.97**		
	M12FLATC03	**Date-**	**7/22/2003**	**9:45**	
	Flat Creek Upstream of Hwy 200, on Dearborn Ranch property				



	BEHI Field Measures			BEHI Calculated Values		
	Parameter	Value	Units	Parameter	Value	Units
Longitudinal Information	Rod reading @ Upstream Edge of Water	10.92	feet	Slope	0.0046	
				Sinuousity	1.23	
	Rod reading @ Downstream Edge of Water	13.05	feet	Max Depth	3.15	feet
				Floodprone Height	6.30	feet
	Stream Distance	467.50	feet	Mean Depth	2.15	feet
	Straightline Distance	381.00	feet	Bankfull Width	23.00	feet
Cross-Sectional Information	Left Edge of Bankfull	83.00	feet	Floodplrone Width	63.00	feet
	Right Edge of Bankfull	106.00	feet	Bankfull Area	49.39	ft^2
	Rod reading @ Thalweg	13.60	feet	FloodproneArea		ft^2
	Rod reading @ Bankfull Depth	10.45	feet	W/D Ratio	10.71	
	Rod reading @ Floodplain Depth	7.30	feet	Cross Sectional Area	49.39	ft^2
	Left Edge of Floodprone depth	55.00	feet	Entrenchment Ratio	2.74	
	Right Edge of Floodprone depth	118.00	feet			
BEHI Information	Bank Height	4.00	feet			
	Bankfull Height	2.82	feet	Bank Ht/Bankfull Ht	1.42	
	Root Depth	0.50	feet	Root Depth/Bank Ht	0.13	
	Root Density	20.00	%	Root Density	20	%
	Bank Angle	40.00	Degrees	Bank Angle	40	degrees
	Surface Protection	80.00	%	Surface Protection	80	%
Near Bank Stress Information	Velocity at thalweg		ft/sec	Velocity Gradient		ft/sec/ft
	Tape reading at thalweg		feet	Near Bank stress / Mean Shear stress		
	velocity at left bank		ft/sec			
	tape reading at left bank		feet	A nb / A		
	Near bank stress					
	Mean shear stress					
	Near bank x-sectional area		ft^2			

M12FLATC03	Date- 7/22/2003	9:45
Flat Creek Upstream of Hwy 200, on Dearborn Ranch property		

BEHI Associated Index Value (from form)		Possible Adjustment Factors
Bank Ht/Bankfull Ht	5.20	Bank Materials
Root Depth/Bank Ht	8.00	Bedrock is always Very Low
Root Density	6.40	Boulders are always Low
Bank Angle	3.00	Cobble decrease the category by one unless the mixture of Sand/Gravel is over 50%
Surface Protection	1.50	
Total Index Value	**24.1**	Gravel- adjust the values up 5-10 pts depending on sand composition
Numeric Adjustments:		
Bank Materials Index adjustment:	0	Sand- adjust the values up 10 pts
		silt/clay- no adjustment
Bank Stratification Index adjustment:	6	Stratification
		5-10 pts upward depending on position of unstable layers relative to bankfull stage
Total adjusted Index Value:	**30.1**	
Bank Erosion Potential Rating:		**MDDERATE-HIGH**

M12FLATC08	Date-	7/23/2003	16:00
Flat Creek below Birdtail Rd on Dearborn Ranch			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width	*33.00*	*Ft*
Mean Depth	*3.67*	*Ft*
Bnkfull X-sect area	*120.96*	*Sq Ft*
Width/Depth	*9.00*	
Max Depth	*5.49*	*Ft*
Flood prone width	*100.00*	*Ft*
Entrenchement Ratio	*3.03*	
Water slope	*0.0017*	
Channel Sinuosity	*2.59*	
BEHI Index Score (adjusted)	29.00	
BEHI Rating	*Moderate*	
Channel D50	10	mm
Percentage of Fines (<2mm)	*15.79*	*%*
Stream Type	E4	*Sinuousity and W/D made it E over C*
Discharge	*5.39*	*cfs*

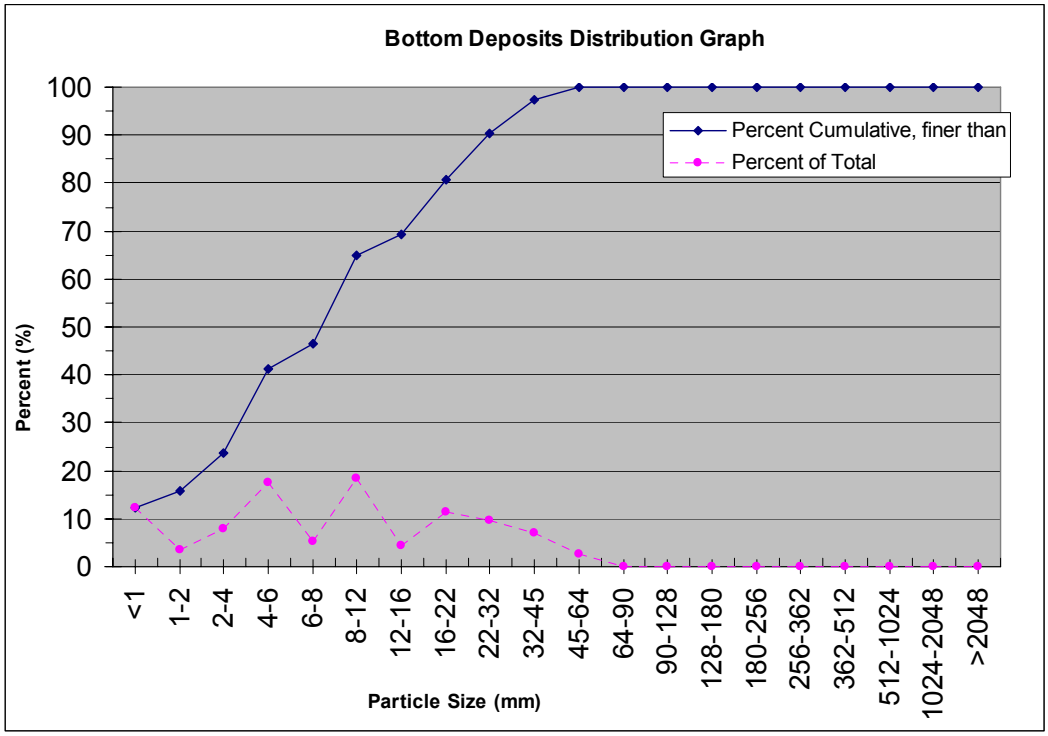
Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)	**94.8**	%
Stream Reach Assessment Score (MT adjusted)	**94.1**	%
Macroinvertabrate Habitat Assessment Score	**66.2**	%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)	**Non Impaired, Fully Supporting**	
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		3 min 40'

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*5.39*	*cfs*
Temperature, water	21.98	degree C
pH	8.4	
Specific Conductance	0.438	mS/cm
Dissolved Oxygen	11.26	mg/L
Dissolved Oxygen, % Saturation	129	%
Turbidity	5.72	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	0.9	mg/m^3	0.1
Benthic Chlorophyll a	32.8	mg/m^3	0.1
Total Phosphorus, TP	0.057	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

Macroinvertabrate Data Results		
parameter	*value*	*units*
TOTAL SCORE (max =18)	6	score
PERCENT OF MAX SCORE	33	%
IMPAIRMENT CLASSIFICATION	MODERATE IMPAIRMENT	
USE SUPPORT	PARTIAL SUPPORT	

		Pebble Count Data			
	Mean size	Particle Size (mm)	Sum	% Total	Cum. Total
S/C	0.5	<1	14	12.28	12.28
S	1.5	1-2	4	3.51	15.79
FG	3	2-4	9	7.89	23.68
FG	5	4-6	20	17.54	41.23
FG	7	6-8	6	5.26	46.49
MG	10	8-12	21	18.42	64.91
MG	14	12-16	5	4.39	69.30
CG	18	16-22	13	11.40	80.70
CG	27	22-32	11	9.65	90.35
CG	38.5	32-45	8	7.02	97.37
CG	54.5	45-64	3	2.63	100.00
SC	77	64-90		0.00	100.00
SC	109	90-128		0.00	100.00
MC	154	128-180		0.00	100.00
LC	218	180-256		0.00	100.00
LC	309	256-362		0.00	100.00
SB	437	362-512		0.00	100.00
MB	768	512-1024		0.00	100.00
LB	1536	1024-2048		0.00	100.00
BR		>2048		0.00	100.00
		TOTALS	114	100.00	100.00
		D50 particle size (mm)	8-12		
		% Fines (<2mm)	15.79		
	M12FLATC08	Date-	7/23/2003	16:00	
	Flat Creek below Birdtail Rd on Dearborn Ranch				



	BEHI Field Measures			BEHI Calculated Values		
	Parameter	Value	Units	Parameter	Value	Units
Longitudinal Information	Rod reading @ Upstream Edge of Water	12.03	feet	Slope	0.0017	
				Sinuousity	2.59	
	Rod reading @ Downstream Edge of Water	14.25	feet	Max Depth	5.49	feet
				Floodprone Height	10.97	feet
	Stream Distance	1340.00	feet	Mean Depth	3.67	feet
	Straightline Distance	517.00	feet	Bankfull Width	33.00	feet
Cross-Sectional Information	Left Edge of Bankfull	47.00	feet	Floodplrone Width	100.00	feet
	Right Edge of Bankfull	80.00	feet	Bankfull Area	120.96	ft^2
	Rod reading @ Thalweg	16.62	feet	FloodproneArea		ft^2
	Rod reading @ Bankfull Depth	11.13	feet	W/D Ratio	9.00	
	Rod reading @ Floodplain Depth	5.65	feet	Cross Sectional Area	120.96	ft^2
	Left Edge of Floodprone depth	10.00	feet	Entrenchment Ratio	3.03	
	Right Edge of Floodprone depth	110.00	feet			
BEHI Information	Bank Height	11.00	feet			
	Bankfull Height	5.88	feet	Bank Ht/Bankfull Ht	1.87	
	Root Depth	1.00	feet	Root Depth/Bank Ht	0.09	
	Root Density	25.00	%	Root Density	25	%
	Bank Angle	70.00	Degrees	Bank Angle	70	degrees
	Surface Protection	50.00	%	Surface Protection	50	%
Near Bank Stress Information	Velocity at thalweg	0.79	ft/sec	Velocity Gradient	0.06	ft/sec/ft
	Tape reading at thalweg	63.00	feet	Near Bank stress / Mean Shear stress		
	velocity at left bank	0.00	ft/sec			
	tape reading at left bank	49.00	feet	A nb / A		
	Near bank stress					
	Mean shear stress					
	Near bank x-sectional area		ft^2			

M12FLATC08	Date- 7/23/2003	16:00
Flat Creek below Birdtail Rd on Dearborn Ranch		

BEHI Associated Index Value (from form)		Possible Adjustment Factors
Bank Ht/Bankfull Ht	6.00	Bank Materials
Root Depth/Bank Ht	8.00	Bedrock is always Very Low
Root Density	6.00	Boulders are always Low
Bank Angle	5.00	Cobble decrease the category by one unless the mixture of Sand/Gravel is over 50%
Surface Protection	4.00	
Total Index Value	***29.0***	Gravel- adjust the values up 5-10 pts depending on sand composition
Numeric Adjustments:		
Bank Materials Index adjustment:		Sand- adjust the values up 10 pts
		silt/clay- no adjustment
Bank Stratification Index adjustment:		Stratification
Total adjusted Index Value:	***29.0***	5-10 pts upward depending on position of unstable layers relative to bankfull stage
Bank Erosion Potential Rating:		**Moderate**

M12FLATC04	Date-	7/24/2003	10:00
Flat Creek at confluence with Dearborn River on Dearborn Ranch			

Geomorphology Data		
parameter	*value*	*units*
Bankfull Width		*Ft*
Mean Depth		*Ft*
Bnkfull X-sect area		*Sq Ft*
Width/Depth		
Max Depth		*Ft*
Flood prone width		*Ft*
Entrenchement Ratio		
Water slope		
Channel Sinuosity		
BEHI Index Score (adjusted)		
BEHI Rating		
Channel D50	154	mm
Percentage of Fines (<2mm)	*2.80*	*%*
Stream Type		
Discharge	*4.08*	*cfs*

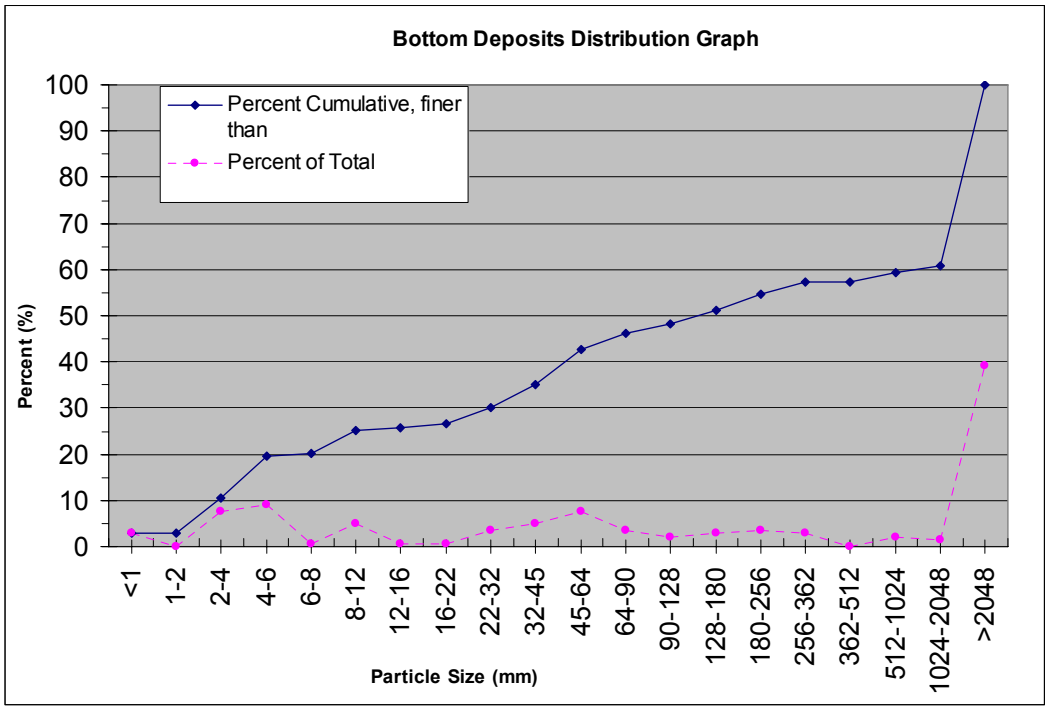
Stream Reach Habitat Assessments		
Parameter	*Value*	*Units*
Stream Reach Assessment Score (NRCS)		%
Stream Reach Assessment Score (MT adjusted)		%
Macroinvertabrate Habitat Assessment Score	**86.5**	%
OVERALL SITE RATINGS		
Stream Reach Assessment Score (NRCS)		
Stream Reach Assessment Score (MT adjusted)		
Macroinvertabrate Habitat Assessment Score		2.5 min 30"

Field Measurements of water chemistry		
parameter	*value*	*units*
Flow	*4.08*	*cfs*
Temperature, water	19.92	degree C
pH	8.4	
Specific Conductance	0.366	mS/cm
Dissolved Oxygen	10.14	mg/L
Dissolved Oxygen, % Saturation	111.4	%
Turbidity	3.28	NTU

Lab Results from Field Samples			
parameter	*value*	*units*	*RL*
Total Suspended Solids, TSS	ND	mg/L	10
Volatile Suspended Solids, VSS	ND	mg/L	10
TSS-VSS	ND	mg/L	10
Water Column Chlorophyll a	ND	mg/m^3	0.1
Benthic Chlorophyll a	14.3	mg/m^3	0.1
Total Phosphorus, TP	0.019	mg/L	0.004
Total Kiejdahl Notrogen, TKN	ND	mg/L	0.5
Nitrate + Nitrite	ND	mg/L	0.01
Total Nitrogen, TN		mg/L	

Macroinvertabrate Data Results		
parameter	*value*	*units*
TOTAL SCORE (max =18)	5	score
PERCENT OF MAX SCORE	28	%
IMPAIRMENT CLASSIFICATION	MODERATE IMPAIRMENT	
USE SUPPORT	PARTIAL SUPPORT	

		Pebble Count Data			
	Mean size	*Particle Size (mm)*	*Sum*	*% Total*	*Cum. Total*
S/C	0.5	<1	4	*2.80*	*2.80*
S	1.5	1-2		*0.00*	*2.80*
FG	3	2-4	11	*7.69*	*10.49*
FG	5	4-6	13	*9.09*	*19.58*
FG	7	6-8	1	*0.70*	*20.28*
MG	10	8-12	7	*4.90*	*25.17*
MG	14	12-16	1	*0.70*	*25.87*
CG	18	16-22	1	*0.70*	*26.57*
CG	27	22-32	5	*3.50*	*30.07*
CG	38.5	32-45	7	*4.90*	*34.97*
CG	54.5	45-64	11	*7.69*	*42.66*
SC	77	64-90	5	*3.50*	*46.15*
SC	109	90-128	3	*2.10*	*48.25*
MC	154	128-180	4	*2.80*	*51.05*
LC	218	180-256	5	*3.50*	*54.55*
LC	309	256-362	4	*2.80*	*57.34*
SB	437	362-512		*0.00*	*57.34*
MB	768	512-1024	3	*2.10*	*59.44*
LB	1536	1024-2048	2	*1.40*	*60.84*
BR		>2048	56	*39.16*	*100.00*
		TOTALS	143	*100.00*	*100.00*
		D50 particle size (mm)	128-180		
		% Fines (<2mm)	***2.80***		
	M12FLATC04	**Date-**	**7/24/2003**	**10:00**	
	Flat Creek at confluence with Dearborn River on Dearborn Ranch				



WATER QUALITY DATA

BIOLOGICAL DATA AND REPORTS