REACH CHARACTERIZATION FIELD DATA SHEET

STREAM NAME Mill Creek	LOCATION Potts property below Emigrant confluence	
REACH ID # ML01	RIVER BASIN Scott	
UTM (us end) N 0503406 E 4602524	TOPOS	
UTM (ds end) N 0503405 E 4602522	STREAM ORDER 2 ELEVATION	
INVESTIGATORS SL, SR, JAI, JG		
FORM COMPLETED BY JAI, SL, SR, JG	DATE 6/18/03 TIME 12:15 PM	ASSOCIATED SITE ID #s ML01US, ML01DS, ML01XA, ML01XB

WEATHER CONDITIONS

Now		Past 24 hours
☐	storm (heavy rain)	☐
☐	rain (steady rain)	☐
☐	showers (intermittent)	☐
90 % ☑	% cloud cover	☐ ___%
☐	clear/sunny	☑

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air Temperature 19 °C

Other Thin clouds, Water temp: 15.9

STREAM MORPHOLOGY

Stream Subsystem: ☑ Perennial ☐ Intermittent ☐ Tidal

Stream Origin: ☐ Glacial ☐ Spring-fed ☐ Non-glacial montane ☑ Mixture of origins ☐ Swamp and bog ☐ Other_____

Reach Type: ☑ Riffle-Pool ☐ Cascade ☐ Plane-Bed ☐ Bedrock w/alluvial veneer ☐ Step-Pool ☐ Bedrock

Rosgen Type B3

WATERSHED FEATURES

Predominant Surrounding Landuse: ☐ Forest/Natural ☐ Residential ☐ Field/Pasture ☐ Commercial/Industrial ☐ Agricultural ☐ Other_____

Local Hydrologic Alterations: ☐ No Evidence ☐ Augmentation ☐ Dam/Retention ☐ Channelization ☐ Diversion ☐ Other_____

SEDIMENT SOURCES

MANAGEMENT ACTIVITIES (include short description)

Timber Harvesting: ☐ Yes ☑ No

Mining (Hardrock / Placer): ☐ Yes ☑ No

Grazing and/or Agriculture: ☑ Yes ☐ No outside of riparian (fenced off)

Evidence of Fire: ☐ Yes ☑ No

EROSIONAL FEATURES

Local Hillslopes: ☑ No Evidence ☐ Minor gullying/rilling ☐ Moderate gullying/rilling ☐ Major gullying/rilling ☐ Mass wasting (slides,debris) ☐ Other_____

Does sediment reach channel directly? ☐ Yes ☑ No

Roads and related features: ☐ No Evidence ☐ Unpaved ☐ Paved ☐ Culvert/Bridge ☑ Ditch/Roadcut ☐ Other_____

Does sediment reach channel directly? ☐ Yes ☑ No

Channel Stability: ☐ Stable ☑ Moderately stable ☐ Unstable ☐ Aggrading ☐ Downcutting ☐ Widening

Is the channel armored? ☐ Yes ☑ No

Evidence of bank undercutting? ☑ Yes ☐ No

Percent of streambank with deep binding root mass: ☐ >85% ☐ 85-65% ☑ 65-35% ☐ <35%

DEPOSITIONAL FEATURES

☐ Pool In-filling ☐ Lee (DS) deposits ☐ Channel bars ☐ Floodplain ☐ Terraces ☐ Other_____

Degree of instream sedimentation: ☐ None ☐ Low ☐ Medium ☐ High

CHANNEL FEATURES

Estimated Reach Length 210 m

Average Stream Width 5.5 m

Average Stream Depth 0.15 m

Sampling Reach Area 1155 m²

Estimated Manning's n _____

Canopy Cover: ☐ Open ☑ Partly shaded ☐ Shaded

Proportion of Reach Represented by Stream Morphology Types

Riffle 85 % Run 5 %

Pool 10 %

Form # D - ML01

REACH CHARACTERIZATION FIELD DATA SHEET

STREAM NAME Mill Creek	LOCATION Potts property below Emigrant confluence

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species present

☑ Trees ☐ Shrubs ☐ Grasses ☐ Herbaceous

dominant species present Alder

Extent of Riparian Buffer Zone	Width of Riparian Buffer Zone	Riparian Vegetation Age
☐ None	☐ < 1 Channel width	☐ Immature (< 5yrs)
☐ Fragmentary	☐ 1-5 Channel widths	☑ Established (5-30 yrs)
☑ Continuous	☑ > 5 Channel widths	☐ Mature/Old Growth (>30 yrs)

Extent of vegetation encroachment into stream channel

☐ None ☐ Minimal ☑ Moderate ☐ Heavy ☐ Extreme

LARGE WOODY DEBRIS

☐ Not Present ☐ Present in Cutbank ☑ Present in Channel

Density of LWD .02 m^2/km^2 (area of LWD/ reach area)

AQUATIC VEGETATION

Indicate the dominant type

☑ Rooted emergent ☑ Rooted submergent ☐ Rooted floating ☐ Free floating

☐ Floating Algae ☐ Attached Algae

Portion of the reach with aquatic vegetation 3 %

WATER QUALITY

Temperature 15 ^{0}C

Specific Conductance 70ms

Dissolved Oxygen N/A

pH 7.2

Turbidity N/A

Water Odors

☑ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other

Water Surface Oils

☐ Slick ☐ Sheen ☐ Globs ☐ Flecks ☑ None ☐ Other

Turbidity (visual)

☑ Clear ☐ Slightly turbid ☐ Turbid ☐ Opaque ☐ Stained ☐ Other

DISCHARGE

Velocity-Area Method

Distance from water's edge (m)	Depth (m)	Velocity (m/s)	Discharge (cms)	Notes
0.37	0.10	0.1	0.06185	
1.0	0.15	0.3	0.0225	
1.95	0.17	0.40	0.04692	
2.7	0.17	0.40	0.051	
3.45	0.19	0.40	0.057	
4.20	0.17	0.30	0.03825	
4.95	0.16	0.30	0.0360	
5.70	0.22	0.30	0.0495	

Total Discharge (cms) 0.30302

Float Method

	Width (m)	Avg Depth (m)	Float Distance (m)	Time (s)	Discharge (cms)
XS 1	7	0.17	15	19.6	0.91
XS 2	7	0.17	15	21.1	0.84

Estimated Discharge (cms) 0.875

Form # D2 - ML01

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS

STREAM NAME Mill Creek	LOCATION Potts property below confluence of emigrant creek	
STATION # _ REACH ID# ML01	STREAM CLASS 2	
UTM N_ UTM E_	RIVER BASIN Scott	
STORET #	AGENCY	
INVESTIGATORS JAI, JMG, SML, SR		
FORM COMPLETED BY JAI, JMG	DATE 6/23/03 TIME 2:45 PM	REASON FOR SURVEY

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 19	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE 15	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE 16	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 19	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE 19	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE 16	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE 11	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE 9 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE 7 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE 9 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE 9 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE 8 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE 10 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 167

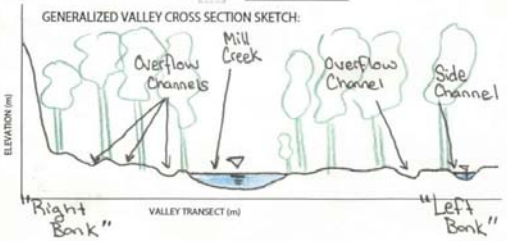
Stream Assessment Field Sketch Form

River/Stream: Mill Creek Reach ID: ML01

Date/Time: 6-18-2003, Afternoon Location: Pott's Property below confluence Map by: S.E.R.

Map Scale (if applicable): 1 ☐ = _____

GENERALIZED VALLEY CROSS SECTION SKETCH:



SYMBOL LEGEND:

- Geomorphic Unit Boundary
- Flow Direction
- UTM Coordinate Location: RS-1
- Fish Sampling Location & ID: F1
- Invertebrate Sampling Location & ID: I1
- Cross-section Location: x—x
- Undercut Bank
- Riparian Forest
- Large Woody Debris

HYDRAULIC UNIT KEY:

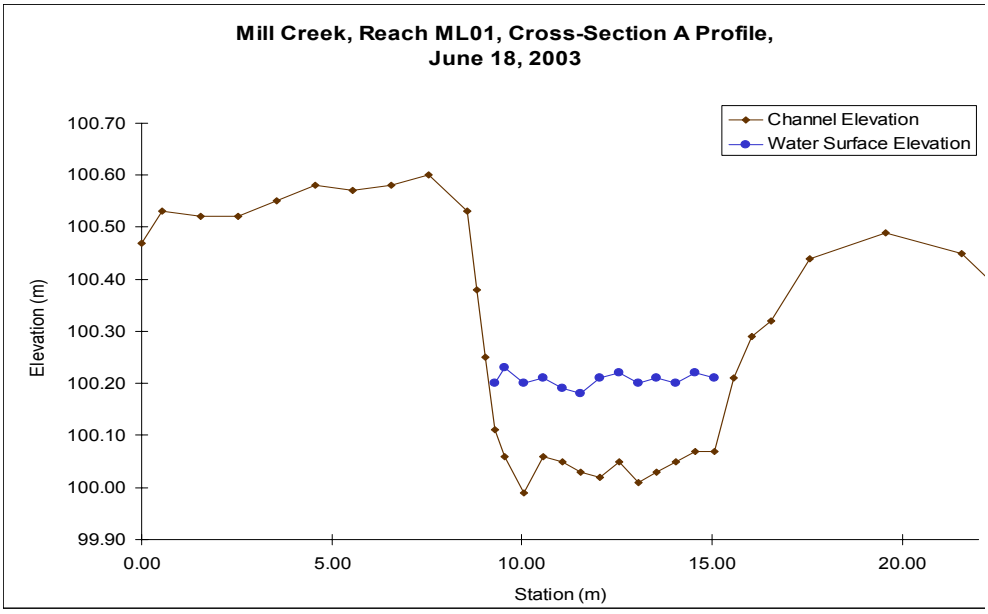
Flow Types:

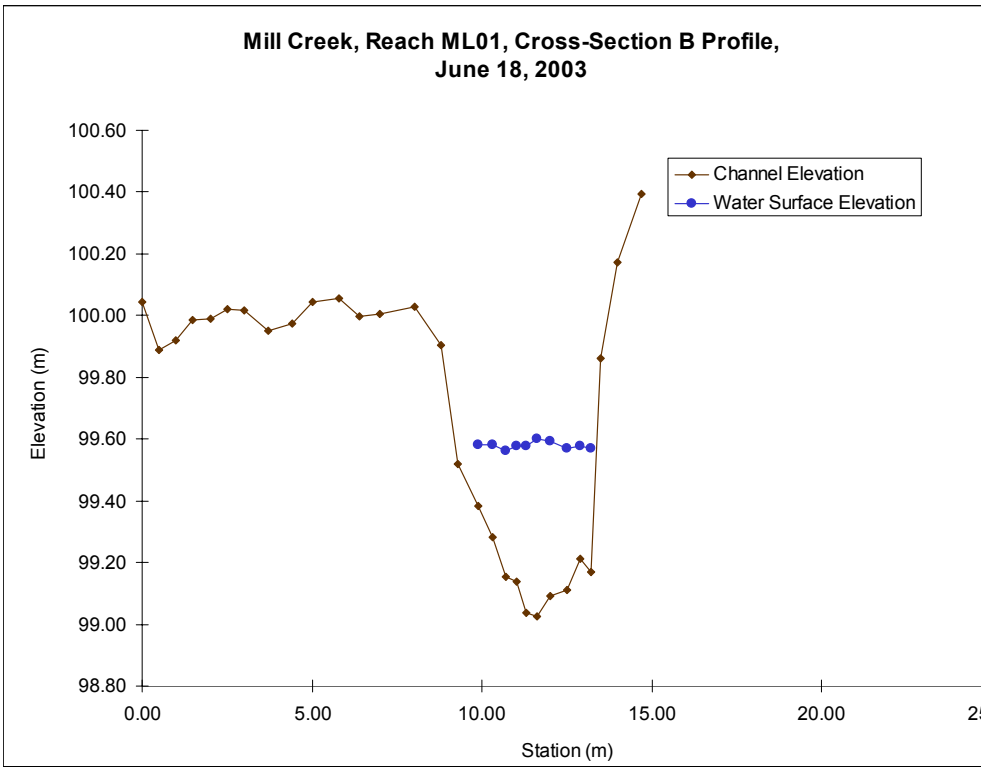
- ☐ H9 Free Fall
- ☐ H8 Chute
- ☐ H7 Broken standing waves
- ☐ H6 Unbroken standing waves
- ☐ H5 Rippled
- ☐ H4 Upwelling
- ☐ H3 Smooth surface flow
- ☐ H2 Scarcely perceptible flow
- ☐ H1 Standing water

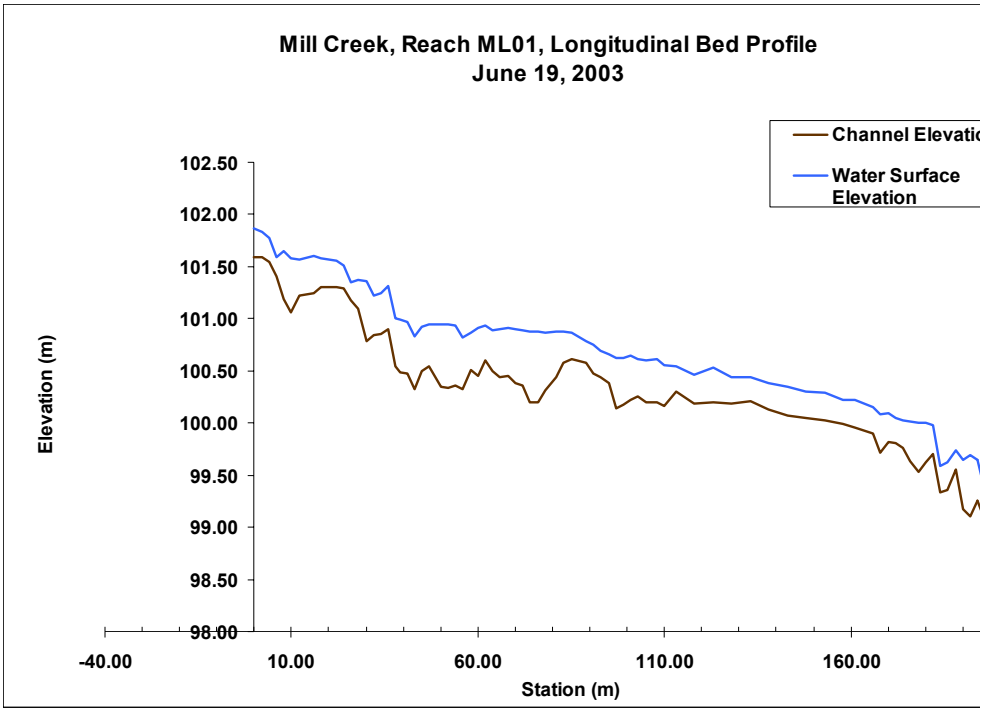
Substrate Categories:

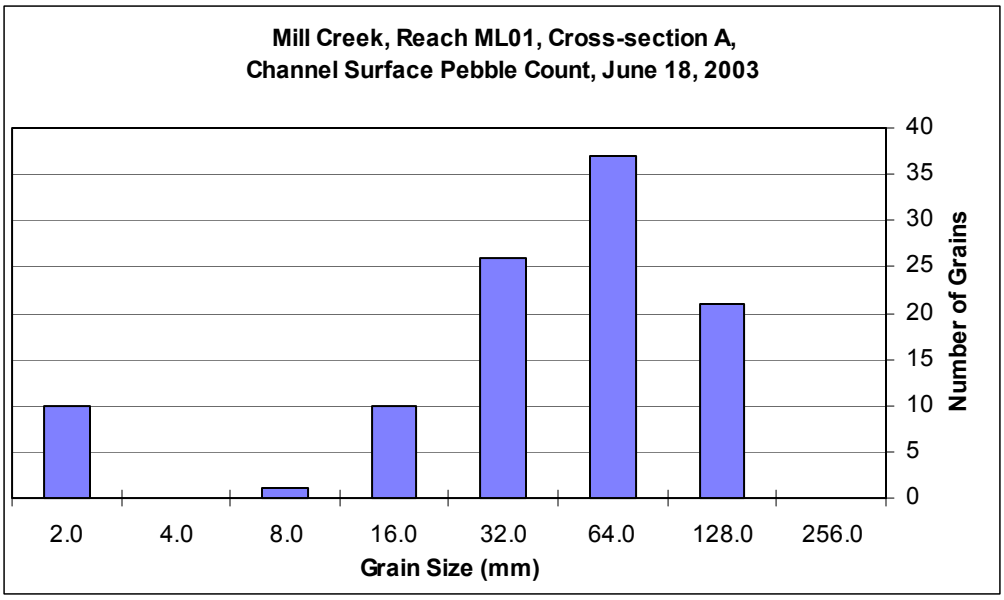
- ☐ S1 Silt
- ☐ S2 Sand
- ☒ S3 Gravel
- ☐ S4 Cobble Sm.
- ☐ S5 Cobble Lg.
- ☐ S6 Boulder Sm.
- ☐ S7 Boulder Lg.
- ☐ S8 Bimodal

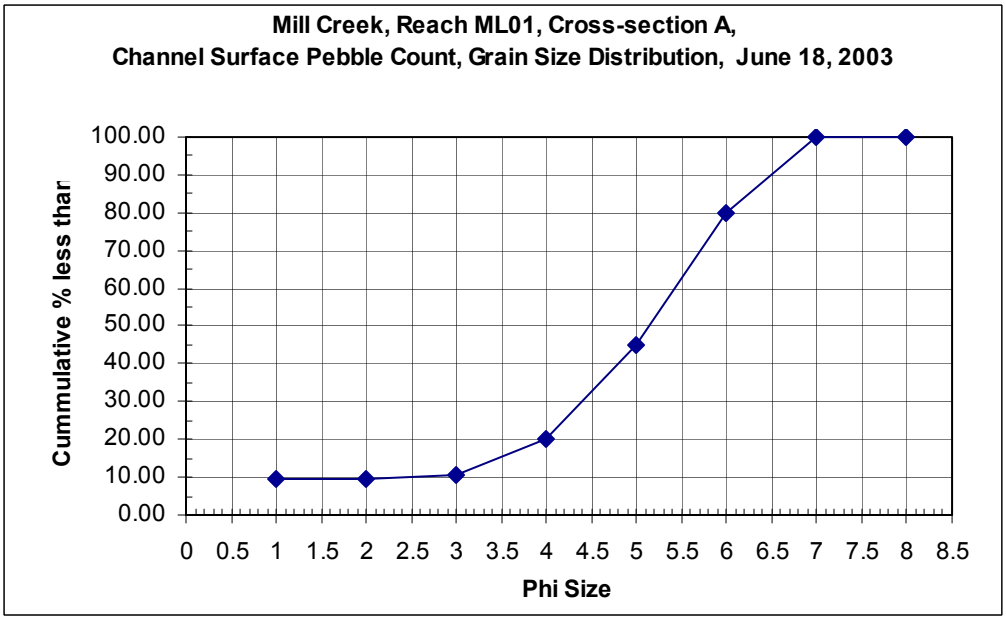
Form # C - ML01

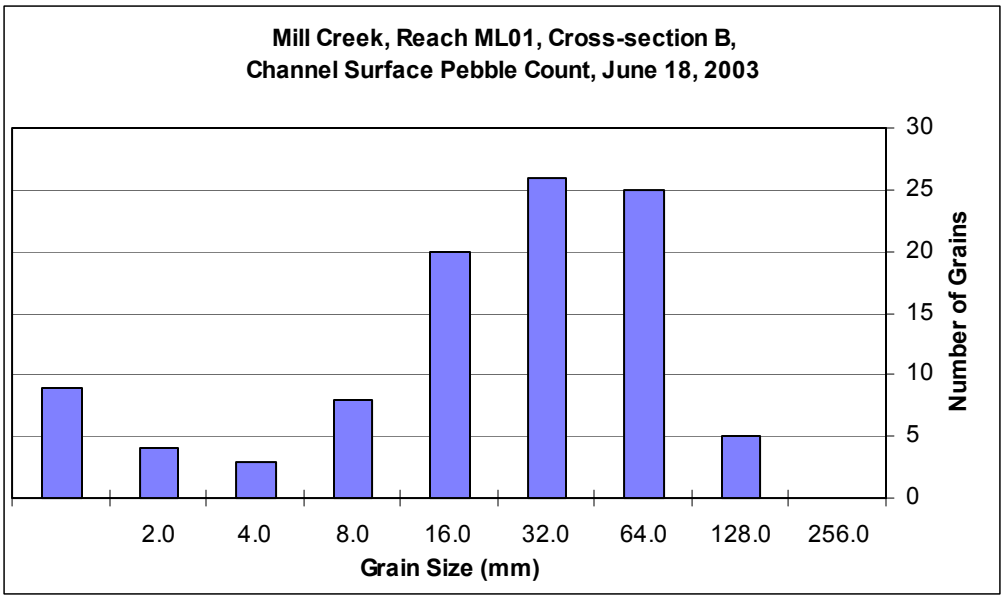

Mill Creek, Reach ML01, Cross-Section A Profile,
June 18, 2003
Channel Elevation
Water Surface Elevation
100.70
100.60
100.50
100.40
100.30
100.20
100.10
100.00
99.90
Elevation (m)
0.00
5.00
10.00
15.00
20.00
Station (m)

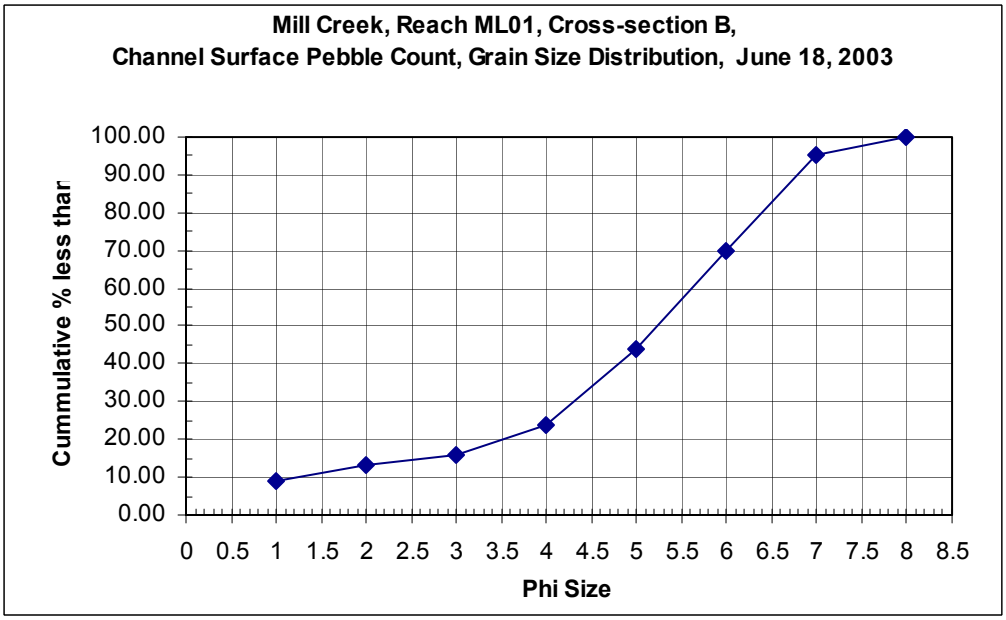

Mill Creek, Reach ML01, Cross-Section B Profile,
June 18, 2003
Channel Elevation
Water Surface Elevation
100.60
100.40
100.20
100.00
99.80
99.60
99.40
99.20
99.00
98.80
Elevation (m)
0.00
5.00
10.00
15.00
20.00
Station (m)


Mill Creek, Reach ML01, Longitudinal Bed Profile
June 19, 2003
Channel Elevatio
Water Surface Elevation
102.50
102.00
101.50
101.00
100.50
100.00
99.50
99.00
98.50
98.00
Elevation (m)
-40.00
10.00
60.00
110.00
160.00
Station (m)


Mill Creek, Reach ML01, Cross-section A,
Channel Surface Pebble Count, June 18, 2003
40
35
30
25
20
15
10
5
0
Number of Grains
2.0
4.0
8.0
16.0
32.0
64.0
128.0
256.0
Grain Size (mm)


Mill Creek, Reach ML01, Cross-section A,
Channel Surface Pebble Count, Grain Size Distribution, June 18, 2003
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Cummulative % less thar
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
Phi Size


Mill Creek, Reach ML01, Cross-section B,
Channel Surface Pebble Count, June 18, 2003
30
25
20
15
10
5
0
Number of Grains
2.0
4.0
8.0
16.0
32.0
64.0
128.0
256.0
Grain Size (mm)


Mill Creek, Reach ML01, Cross-section B,
Channel Surface Pebble Count, Grain Size Distribution, June 18, 2003
Cummulative % less thar
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5 8 8.5
Phi Size

REACH CHARACTERIZATION FIELD DATA SHEET

STREAM NAME Mill creek	LOCATION menke property riparian forest	
REACH ID # ML02	RIVER BASIN Scott	
UTM (us end) N 0503196 E 4602046	TOPOS	
UTM (ds end) N 0503237 E 4602265	STREAM ORDER 2 ELEVATION	
INVESTIGATORS SL, SR, JAI, JG		
FORM COMPLETED BY JAI, SL, SR, JG	DATE 6/23/03 TIME 9:20 AM	ASSOCIATED SITE ID #s ML02US,ML02DS, ML02XA, ML02XB

WEATHER CONDITIONS

Now		Past 24 hours
☐	storm (heavy rain)	☐
☐	rain (steady rain)	☐
☐	showers (intermittent)	☐
___% ☐	% cloud cover	☑ 15 %
☑	clear/sunny	☐

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air Temperature _____ ^{0}C

Other localized afternoon t-storm 1 week ago

STREAM MORPHOLOGY

Stream Subsystem
☑ Perennial ☐ Intermittent ☐ Tidal

Stream Origin
☐ Glacial ☐ Spring-fed
☐ Non-glacial montane ☑ Mixture of origins
☐ Swamp and bog ☐ Other_____

Reach Type
☐ Riffle-Pool ☐ Cascade
☐ Plane-Bed ☐ Bedrock w/alluvial veneer
☐ Step-Pool ☐ Bedrock

Rosgen Type Riffle-run

WATERSHED FEATURES

Predominant Surrounding Landuse
☐ Forest/Natural ☐ Residential
☑ Field/Pasture ☐ Commercial/Industrial
☐ Agricultural ☐ Other_____

Local Hydrologic Alterations
☐ No Evidence ☐ Augmentation
☐ Dam/Retention ☐ Channelization
☐ Diversion ☑ Other RB rip-rap levee

SEDIMENT SOURCES

MANAGEMENT ACTIVITIES (include short description)

Timber Harvesting
☐ Yes ☑ No _____

Mining (Hardrock / Placer)
☐ Yes ☑ No _____

Grazing and/or Agriculture
☑ Yes ☐ No exclusion fencing

Evidence of Fire
☐ Yes ☑ No _____

EROSIONAL FEATURES

Local Hillslopes
☑ No Evidence ☐ Major gullying/rilling
☐ Minor gullying/rilling ☐ Mass wasting (slides,debris)
☐ Moderate gullying/rilling ☐ Other_____

Does sediment reach channel directly?
☐ Yes ☑ No

Roads and related features
☑ No Evidence ☐ Culvert/Bridge
☐ Unpaved ☐ Ditch/Roadcut
☐ Paved ☐ Other_____

Does sediment reach channel directly?
☐ Yes ☑ No

Channel Stability
☐ Stable ☐ Aggrading
☑ Moderately stable ☐ Downcutting
☐ Unstable ☐ Widening

Is the channel armored? ☐ Yes ☑ No
Evidence of bank undercutting? ☑ Yes ☐ No

Percent of streambank with deep binding root mass
☐ >85% ☐ 85-65% ☑ 65-35% ☐ <35%

DEPOSITIONAL FEATURES
☐ Pool In-filling ☑ Floodplain
☐ Lee (DS) deposits ☐ Terraces
☐ Channel bars ☐ Other_____

Degree of instream sedimentation
☐ None ☑ Low ☐ Medium ☐ High

CHANNEL FEATURES

Estimated Reach Length 130 m
Average Stream Width 4 m
Average Stream Depth 0.09 m
Sampling Reach Area 520 m^2
Estimated Manning's n _____

Canopy Cover
☐ Open ☑ Partly shaded ☐ Shaded

Proportion of Reach Represented by Stream Morphology Types
Riffle 60 % Run 30 %
Pool 10 %

Form # D - ML02

REACH CHARACTERIZATION FIELD DATA SHEET

STREAM NAME Mill creek	LOCATION menke property riparian forest

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species present

☐ Trees ☑ Shrubs ☐ Grasses ☐ Herbaceous

dominant species present willows and alder

Extent of Riparian Buffer Zone	Width of Riparian Buffer Zone	Riparian Vegetation Age
☐ None	☐ < 1 Channel width	☐ Immature (< 5yrs)
☑ Fragmentary	☐ 1-5 Channel widths	☐ Established (5-30 yrs)
☐ Continuous	☑ > 5 Channel widths	☑ Mature/Old Growth (>30 yrs)

Extent of vegetation encroachment into stream channel

☐ None ☑ Minimal ☐ Moderate ☐ Heavy ☐ Extreme

LARGE WOODY DEBRIS

☑ Not Present ☐ Present in Cutbank ☐ Present in Channel

Density of LWD _____ m^2/km^2 (area of LWD/ reach area)

AQUATIC VEGETATION

Indicate the dominant type

☑ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free floating

☐ Floating Algae ☐ Attached Algae

Portion of the reach with aquatic vegetation 2 %

WATER QUALITY

Temperature 13.4 °C

Specific Conductance 67ms

Dissolved Oxygen N/A

pH 6.8

Turbidity N/A

Water Odors

☑ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other_____

Water Surface Oils

☐ Slick ☐ Sheen ☐ Globs ☐ Flecks ☑ None ☐ Other_____

Turbidity (visual)

☑ Clear ☐ Slightly turbid ☐ Turbid ☐ Opaque ☐ Stained ☐ Other_____

DISCHARGE

Velocity-Area Method

Distance from water's edge (m)	Depth (m)	Velocity (m/s)	Discharge (cms)	Notes
0.25	0.115	<0.1	0.00575	assumd .01
0.75	0.20	0.1	0.01	
1.25	0.15	0.2	0.015	
1.75	0.175	0.3	0.0265	
2.25	0.24	0.3	0.036	
2.75	0.18	0.1	0.09	
3.25	0.06	<0.1	0.003	
1.75-2.0	0.01	0.0		assumd .01

Total Discharge (cms) 0.105

Float Method

	Width (m)	Avg Depth (m)	Float Distance (m)	Time (s)	Discharge (cms)
XS 1	2.4	0.74	5.0	14.77	0.61
XS 2	2.4	0.74	5.0	11.07, 7.8	0.8, 1.14

Estimated Discharge (cms) 0.85

Form # D2 - ML02

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS

STREAM NAME Mill Creek	LOCATION Menke property, riparian forest	
STATION # _ REACH ID# ML02	STREAM CLASS 2	
UTM N_ UTM E_	RIVER BASIN Scott	
STORET #	AGENCY	
INVESTIGATORS JAI, JMG, SML, SR		
FORM COMPLETED BY JAI, JMG, SML, SR	DATE 6/23/03 TIME 1:00 PM	REASON FOR SURVEY

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 19	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE 16	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE 7	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 20	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE 15	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS

Parameters to be evaluated broader than sampling reach

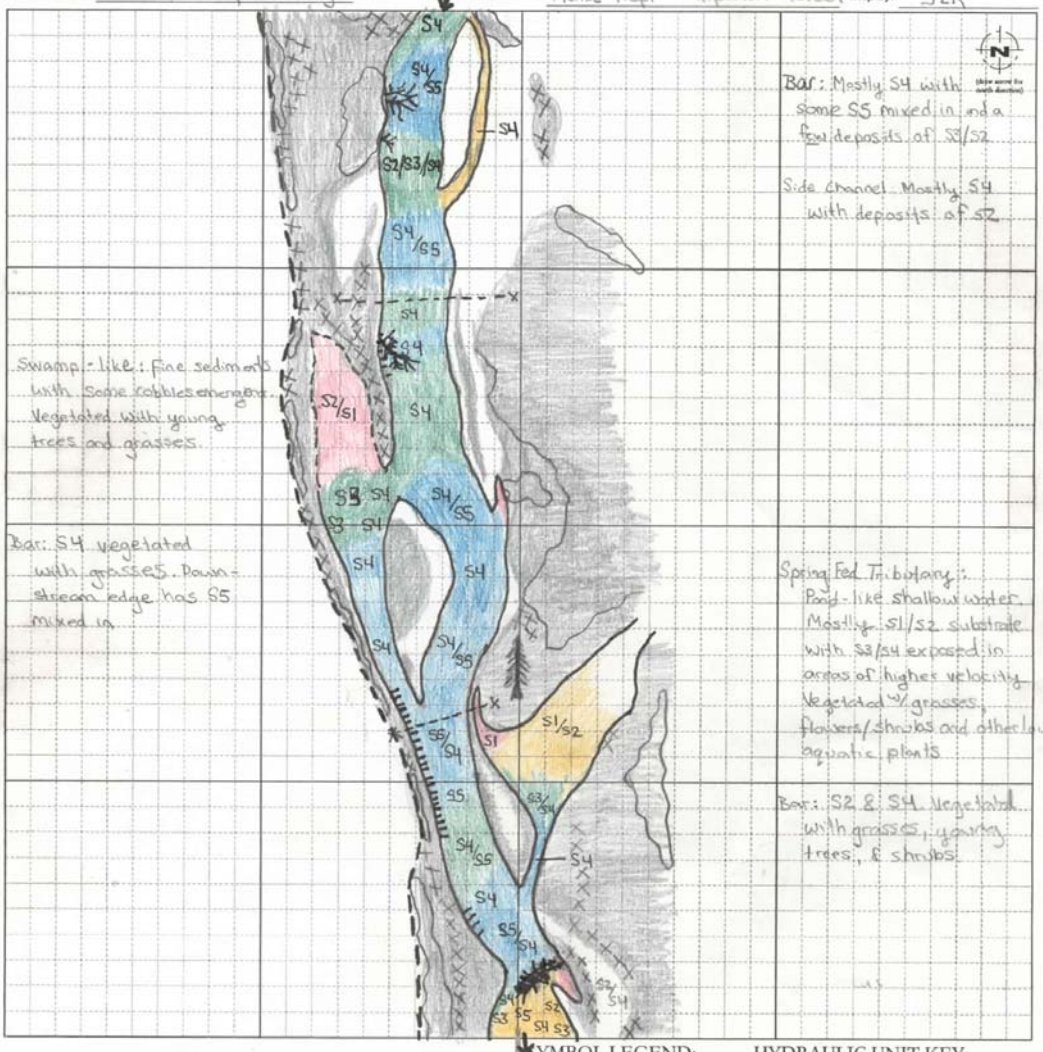
Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE 8	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE 7	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE 8 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE 7 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE 7 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE 7 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE 10 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE 4 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 135

Stream Assessment Field Sketch Form

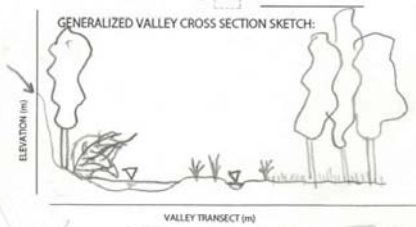
River/Stream: Mill Creek Reach ID: ML02

Date/Time: 6-24-2003, Morning Location: Menke Prop. - Riparian Forest Map by: SER



Map Scale (if applicable): 1 [ ] = _____

GENERALIZED VALLEY CROSS SECTION SKETCH:



SYMBOL LEGEND:

- Geomorphic Unit Boundary
- Flow Direction
- UTM Coordinate Location: RS-1
- Fish Sampling Location & ID: F1
- Invertebrate Sampling Location & ID: I1
- Cross-section Location: x---x
- Roots or Low Branches in Water
- Undercut Bank

HYDRAULIC UNIT KEY:

Flow Types:

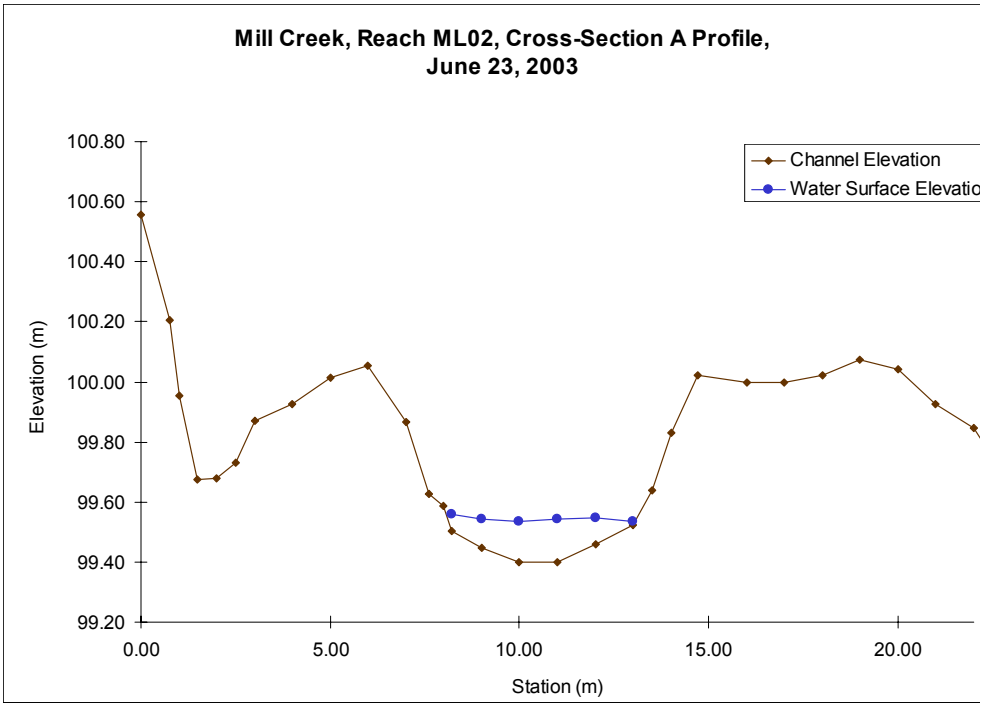
- [ ] H9 Free Fall
- [ ] H8 Chute
- [ ] H7 Broken standing waves
- [ ] H6 Unbroken standing waves
- [ ] H5 Rippled
- [ ] H4 Upwelling
- [ ] H3 Smooth surface flow
- [ ] H2 Scarcely perceptible flow
- [ ] H1 Standing water

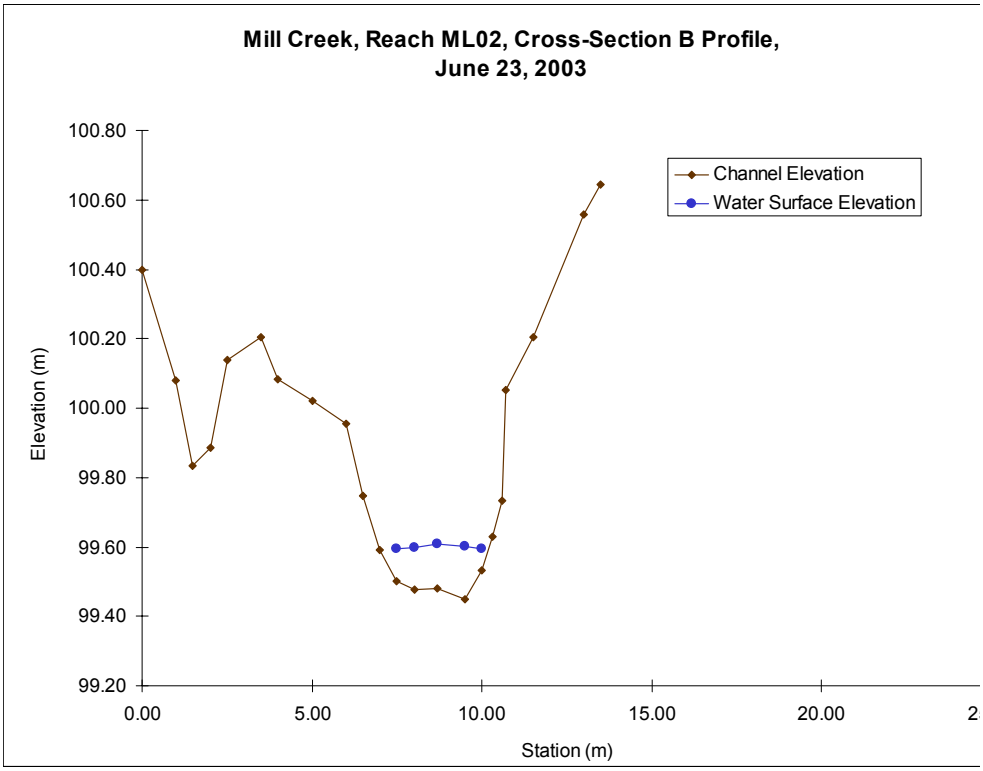
Substrate Categories:

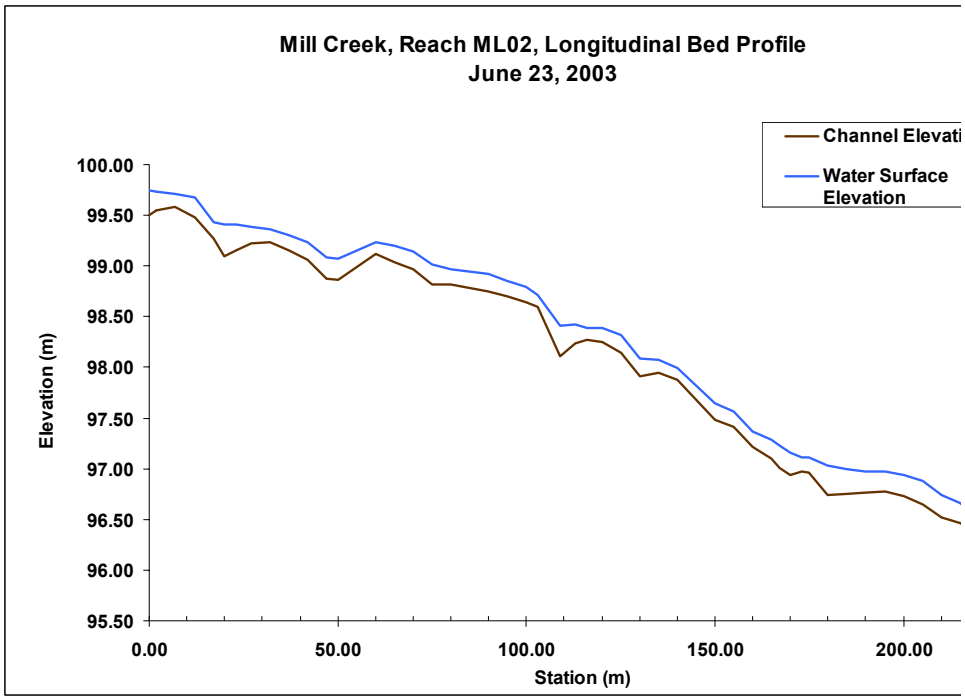
- [ ] S1 Silt
- [ ] S2 Sand
- [ ] S3 Gravel
- [ ] S4 Cobble Sm.
- [ ] S5 Cobble Lg.
- [ ] S6 Boulder Sm.
- [ ] S7 Boulder Lg.
- [ ] S8 Bimodal

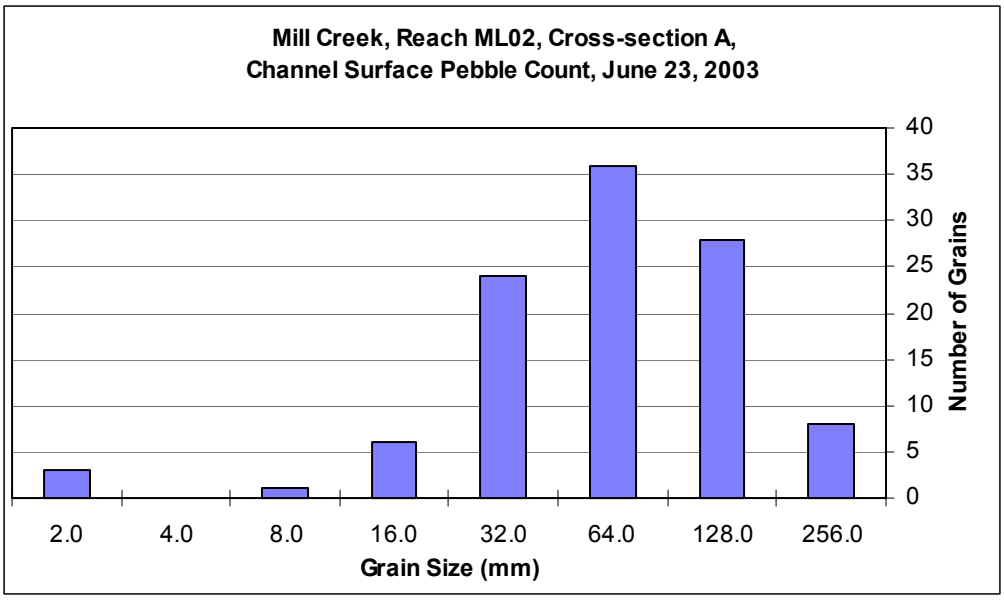
Bank Vegetation Older/Taller Riparian Trees

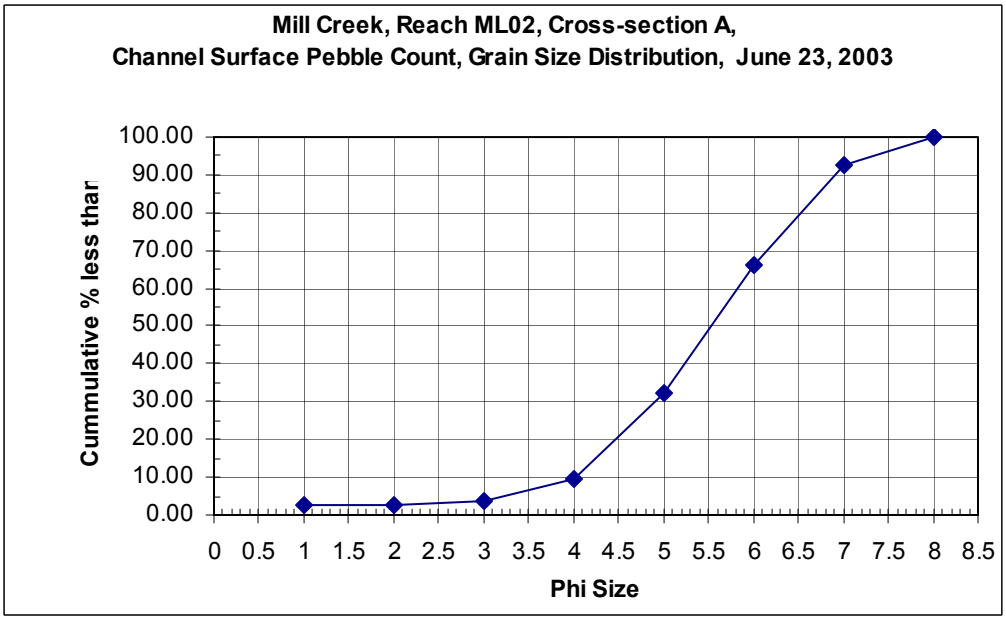
Form # C - ML02

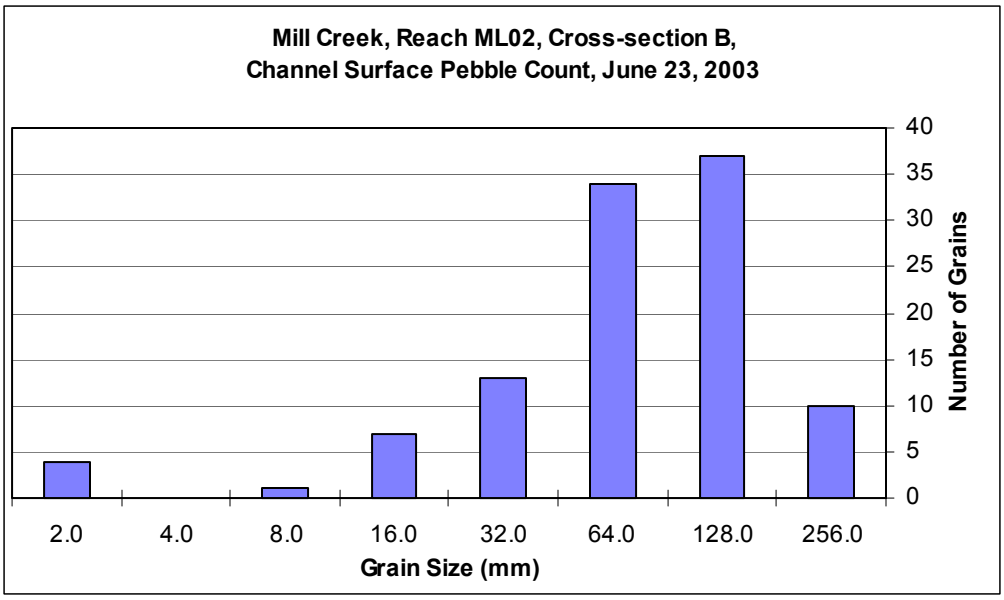

Mill Creek, Reach ML02, Cross-Section A Profile,
June 23, 2003
Channel Elevation
Water Surface Elevatio
Elevation (m)
100.80
100.60
100.40
100.20
100.00
99.80
99.60
99.40
99.20
0.00
5.00
10.00
15.00
20.00
Station (m)

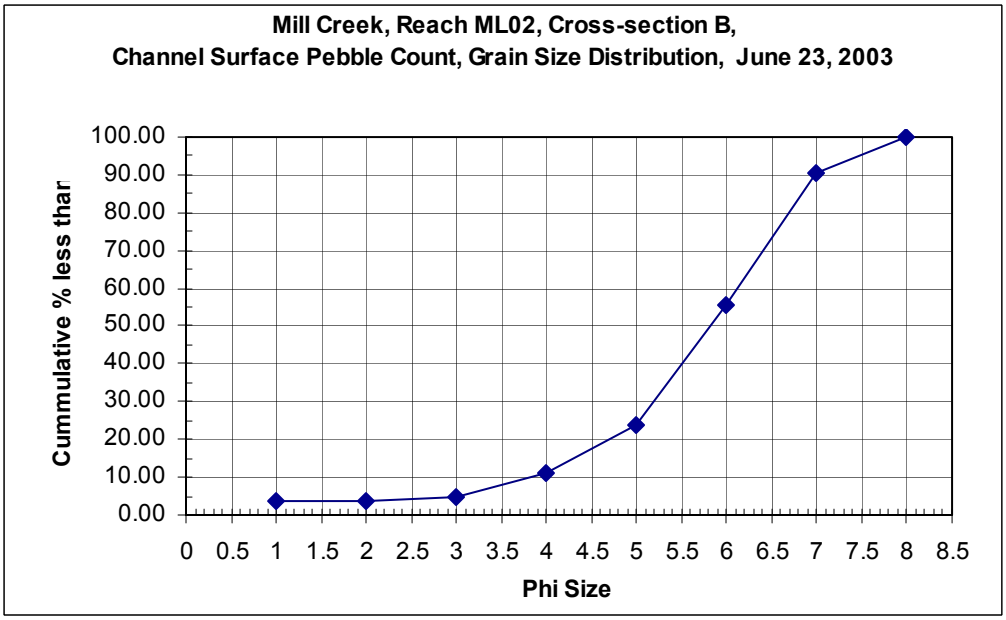

Mill Creek, Reach ML02, Cross-Section B Profile,
June 23, 2003
Channel Elevation
Water Surface Elevation
Elevation (m)
100.80
100.60
100.40
100.20
100.00
99.80
99.60
99.40
99.20
0.00
5.00
10.00
15.00
20.00
Station (m)


Mill Creek, Reach ML02, Longitudinal Bed Profile
June 23, 2003
Channel Elevati
Water Surface Elevation
100.00
99.50
99.00
98.50
98.00
97.50
97.00
96.50
96.00
95.50
Elevation (m)
0.00
50.00
100.00
150.00
200.00
Station (m)


Mill Creek, Reach ML02, Cross-section A,
Channel Surface Pebble Count, June 23, 2003
40
35
30
25
20
15
10
5
0
Number of Grains
2.0
4.0
8.0
16.0
32.0
64.0
128.0
256.0
Grain Size (mm)


Mill Creek, Reach ML02, Cross-section A,
Channel Surface Pebble Count, Grain Size Distribution, June 23, 2003
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Cummulative % less thar
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5 8 8.5
Phi Size


Mill Creek, Reach ML02, Cross-section B,
Channel Surface Pebble Count, June 23, 2003
40
35
30
25
20
15
10
5
0
Number of Grains
2.0
4.0
8.0
16.0
32.0
64.0
128.0
256.0
Grain Size (mm)


Mill Creek, Reach ML02, Cross-section B,
Channel Surface Pebble Count, Grain Size Distribution, June 23, 2003
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Cummulative % less thar
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
Phi Size

REACH CHARACTERIZATION FIELD DATA SHEET

STREAM NAME Mill creek	LOCATION menke property above emigrant confluence	
REACH ID # ML03	RIVER BASIN Scott	
UTM (us end) N 0502825 E 4601568	TOPOS	
UTM (ds end) N 0503025 E 4601758	STREAM ORDER 2 ELEVATION	
INVESTIGATORS SL, SR, JAI, JG		
FORM COMPLETED BY JAI, SL, SR, JG	DATE 6/22/03 TIME 11:00 AM	ASSOCIATED SITE ID #s ML03US,ML03DS, ML03XA, ML03XB

WEATHER CONDITIONS

Now		Past 24 hours
☐	storm (heavy rain)	☐
☐	rain (steady rain)	☐
☐	showers (intermittent)	☐
25 % ☑	% cloud cover	☑ 25 %
☐	clear/sunny	☐

Has there been a heavy rain in the last 7 days? ☐ Yes ☑ No

Air Temperature 18 °C

Other _____

STREAM MORPHOLOGY

Stream Subsystem: ☑ Perennial ☐ Intermittent ☐ Tidal

Stream Origin: ☐ Glacial ☐ Spring-fed ☑ Non-glacial montane ☐ Mixture of origins ☐ Swamp and bog ☐ Other _____

Reach Type: ☐ Riffle-Pool ☐ Cascade ☐ Plane-Bed ☐ Bedrock w/alluvial veneer ☐ Step-Pool ☐ Bedrock

Rosgen Type D3 Riffle-run

WATERSHED FEATURES

Predominant Surrounding Landuse: ☐ Forest/Natural ☐ Residential ☑ Field/Pasture ☐ Commercial/Industrial ☐ Agricultural ☐ Other _____

Local Hydrologic Alterations: ☑ No Evidence ☐ Augmentation ☐ Dam/Retention ☐ Channelization ☐ Diversion ☐ Other _____

SEDIMENT SOURCES

MANAGEMENT ACTIVITIES (include short description)

Timber Harvesting: ☐ Yes ☑ No _____

Mining (Hardrock / Placer): ☐ Yes ☑ No _____

Grazing and/or Agriculture: ☑ Yes ☐ No no evident cattle crossing, but expect occasional grazing

Evidence of Fire: ☐ Yes ☑ No _____

EROSIONAL FEATURES

Local Hillslopes: ☑ No Evidence ☐ Minor gullying/rilling ☐ Moderate gullying/rilling ☐ Major gullying/rilling ☐ Mass wasting (slides,debris) ☐ Other _____

Does sediment reach channel directly? ☐ Yes ☑ No

Roads and related features: ☑ No Evidence ☐ Unpaved ☐ Paved ☐ Culvert/Bridge ☐ Ditch/Roadcut ☐ Other _____

Does sediment reach channel directly? ☐ Yes ☑ No

Channel Stability: ☐ Stable ☐ Moderately stable ☑ Unstable ☐ Aggrading ☐ Downcutting ☐ Widening

Is the channel armored? ☐ Yes ☑ No

Evidence of bank undercutting? ☑ Yes ☐ No

Percent of streambank with deep binding root mass: ☐ >85% ☐ 85-65% ☐ 65-35% ☑ <35%

DEPOSITIONAL FEATURES

☐ Pool In-filling ☐ Lee (DS) deposits ☑ Channel bars ☑ Floodplain ☐ Terraces ☐ Other _____

Degree of instream sedimentation: ☐ None ☑ Low ☐ Medium ☐ High

CHANNEL FEATURES

Estimated Reach Length 345 m

Average Stream Width 2.5 m

Average Stream Depth 0.046 m

Sampling Reach Area 862.5 m²

Estimated Manning's n _____

Canopy Cover: ☑ Open ☐ Partly shaded ☐ Shaded

Proportion of Reach Represented by Stream Morphology Types

Riffle 60 % Run 40 %

Pool 3 %

Form # D - ML03

REACH CHARACTERIZATION FIELD DATA SHEET

STREAM NAME Mill creek	LOCATION menke property above emigrant confluence

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species present

☐ Trees ☐ Shrubs ☑ Grasses ☐ Herbaceous

dominant species present_____

Extent of Riparian Buffer Zone	Width of Riparian Buffer Zone	Riparian Vegetation Age
☑ None	☑ < 1 Channel width	☐ Immature (< 5yrs)
☐ Fragmentary	☐ 1-5 Channel widths	☐ Established (5-30 yrs)
☐ Continuous	☐ > 5 Channel widths	☐ Mature/Old Growth (>30 yrs)

Extent of vegetation encroachment into stream channel

☑ None ☐ Minimal ☐ Moderate ☐ Heavy ☐ Extreme

LARGE WOODY DEBRIS

☐ Not Present ☑ Present in Cutbank ☐ Present in Channel

Density of LWD _2_____m^2/km^2 (area of LWD/ reach area)

AQUATIC VEGETATION

Indicate the dominant type

☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free floating

☐ Floating Algae ☐ Attached Algae

Portion of the reach with aquatic vegetation _____%

WATER QUALITY

Temperature__12.5___^{0}C

Specific Conductance 57_____

Dissolved Oxygen___N/A___

pH __7.4____

Turbidity __N/A___

Water Odors

☑ Normal/None ☐ Sewage

☐ Petroleum ☐ Chemical

☐ Fishy ☐ Other_____

Water Surface Oils

☐ Slick ☐ Sheen ☐ Globs ☐ Flecks

☑ None ☐ Other_____

Turbidity (visual)

☑ Clear ☐ Slightly turbid ☐ Turbid

☐ Opaque ☐ Stained ☐ Other_____

DISCHARGE

Velocity-Area Method

Distance from water's edge (m)	Depth (m)	Velocity (m/s)	Discharge (cms)	Notes
0-0.25	0.01	0.0	0	
0.25-0.50	0.08	0.0	0	
0.50-0.75	0.18	0.1	0.0045	
0.75-1.0	0.24	0.1	0.006	
1.0-1.25	0.22	0.1	0.0055	
1.25-1.50	0.21	0.1	0.00525	
1.50-1.75	0.13	0.0		
1.75-2.0	0.01	0.0		

Total Discharge (cms) 0.02125

Float Method

	Width (m)	Avg Depth (m)	Float Distance (m)	Time (s)	Discharge (cms)
XS 1	4.0	0.05	9.0	20, 30	.09, .06
XS 2	4.0	0.05	9.0	32	0.06

Estimated Discharge (cms) 0.07

Form # D2 - ML03

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS

STREAM NAME Mill Creek	LOCATION Potts property below confluence of emigrant creek	
STATION # _ REACH ID# ML03	STREAM CLASS 2	
UTM N_ UTM E_	RIVER BASIN Scott	
STORET #	AGENCY	
INVESTIGATORS JAI, JMG, SML, SR		
FORM COMPLETED BY SR, JG	DATE 6/22/03 TIME 11:00 AM	REASON FOR SURVEY

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 16	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE 16	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE 7	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 18	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE 10	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS

Parameters to be evaluated broader than sampling reach

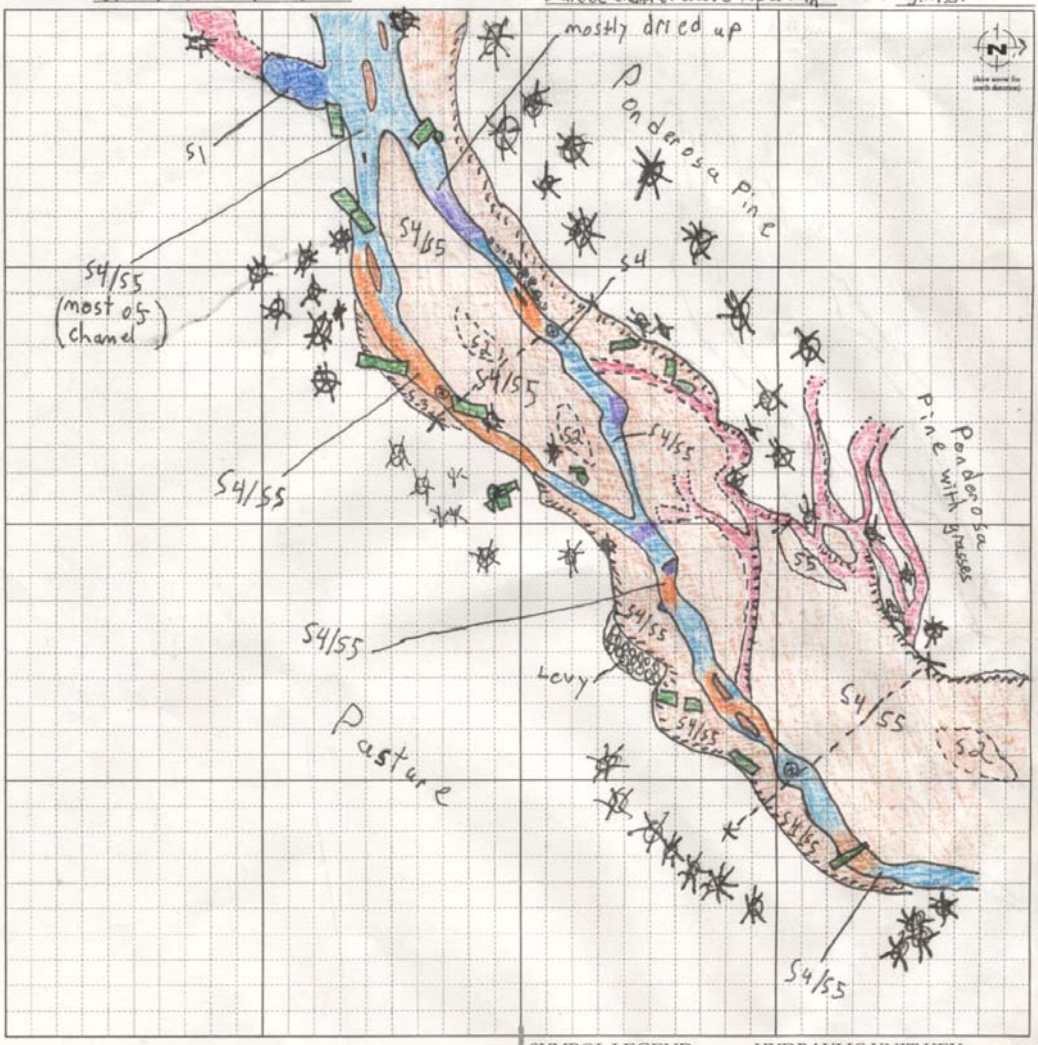
Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE 20	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE 8	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE 9 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE 9 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE 1 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE 1 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE 10 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE 10 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 135

Stream Assessment Field Sketch Form

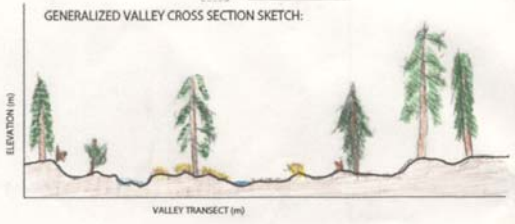
River/Stream: Mill Reach ID: ML03

Date/Time: 6/22/03 9:35am Location: Braided channel above Sparman Map by: J.M.G.



Map Scale (if applicable): 1 [ ] = _____

GENERALIZED VALLEY CROSS SECTION SKETCH:



SYMBOL LEGEND:

- Geomorphic Unit Boundary
- Flow Direction
- UTM Coordinate Location: RS-1
- Fish Sampling Location & ID: F1
- Invertebrate Sampling Location & ID: I1
- Cross-section Location: x---x
- Ponderosa Pine LWD

HYDRAULIC UNIT KEY:

Flow Types:

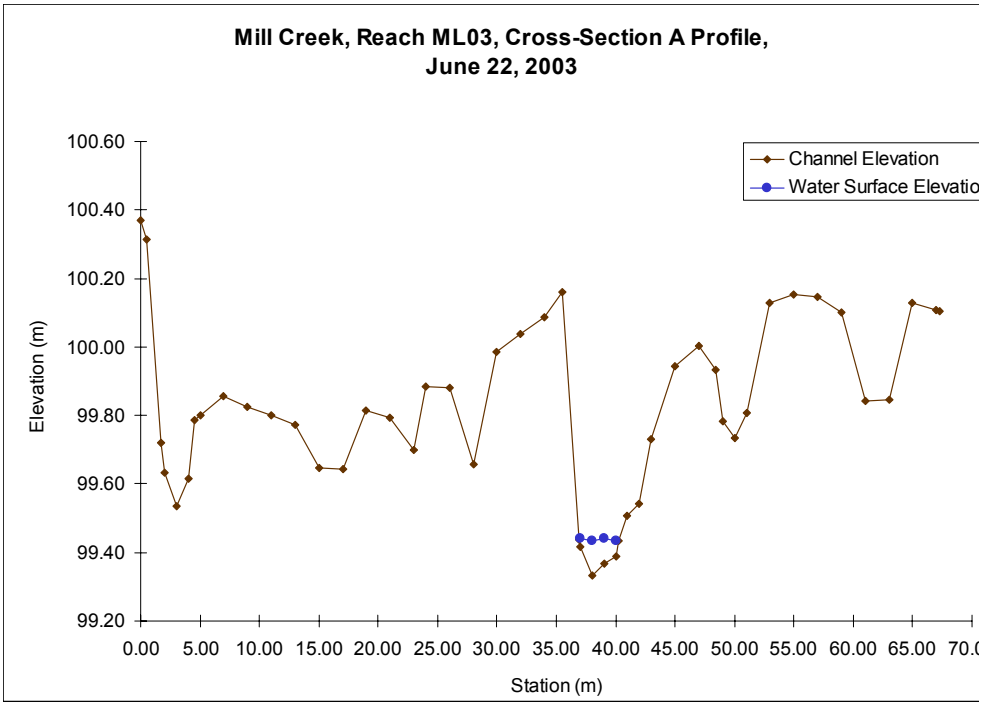
- [ ] H9 Free Fall
- [ ] H8 Chute
- [ ] H7 Broken standing waves
- [ ] H6 Unbroken standing waves
- [ ] H5 Rippled
- [ ] H4 Upwelling
- [ ] H3 Smooth surface flow
- [ ] H2 Scarcely perceptible flow
- [ ] H1 Standing water

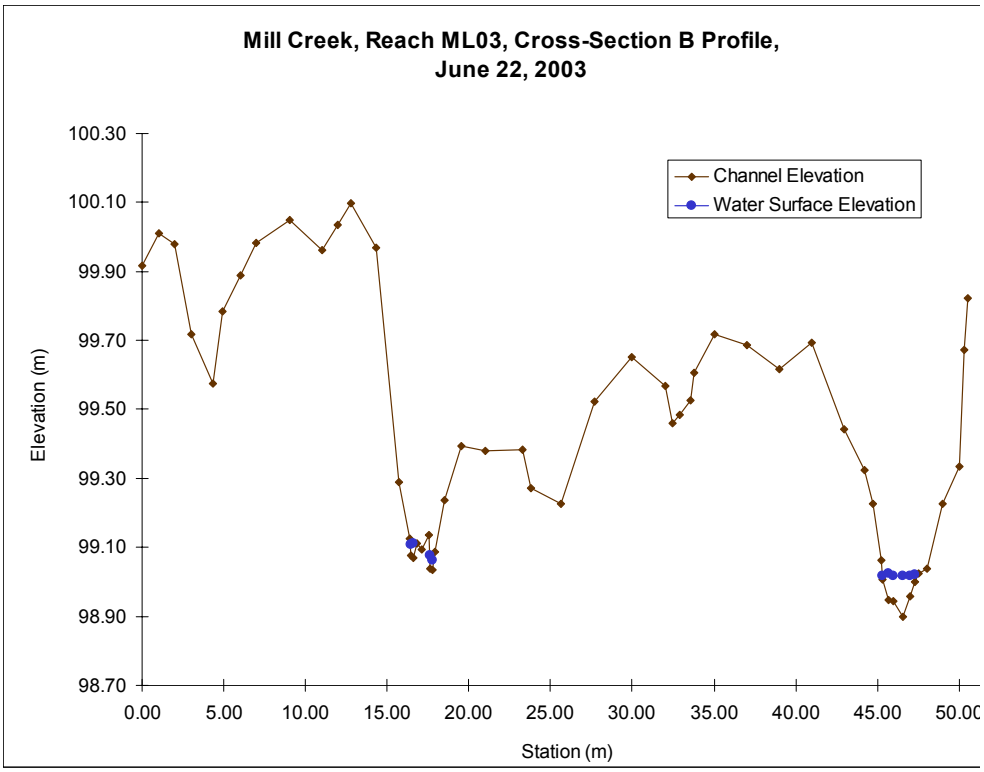
Substrate Categories:

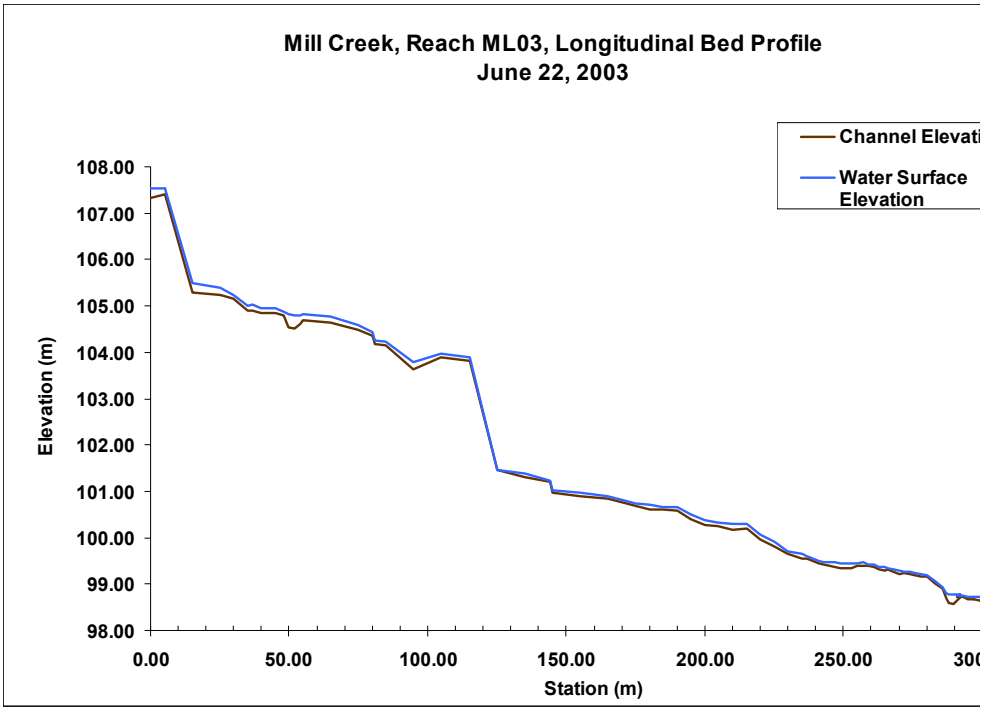
- [ ] S1 Silt
- [ ] S2 Sand
- [ ] S3 Gravel
- [ ] S4 Cobble Sm.
- [ ] S5 Cobble Lg.
- [ ] S6 Boulder Sm.
- [ ] S7 Boulder Lg.
- [ ] S8 Bimodal

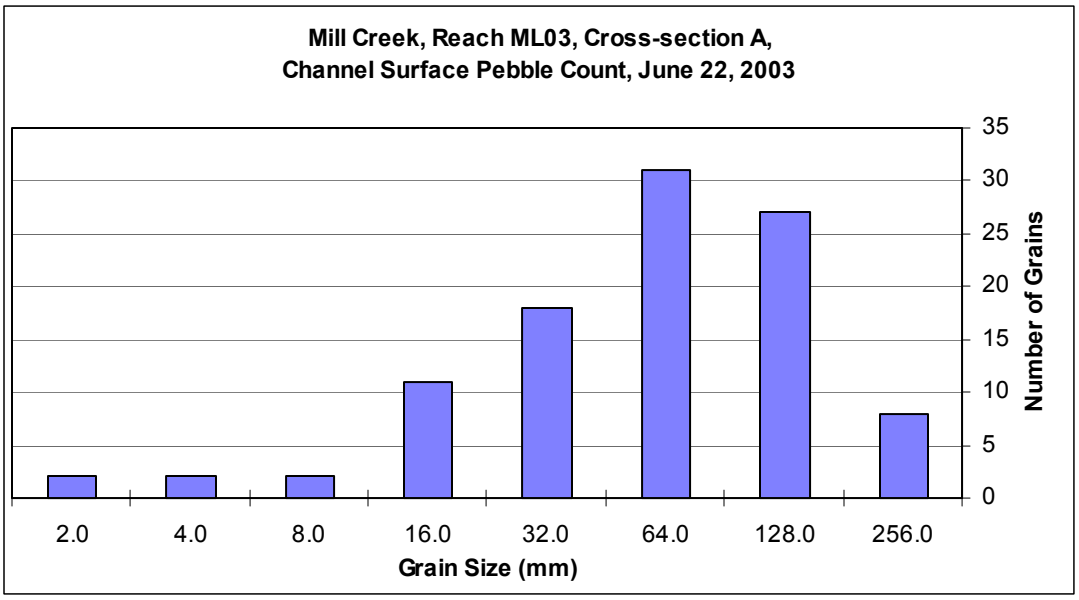
Cobble bar
Former/overflow cha

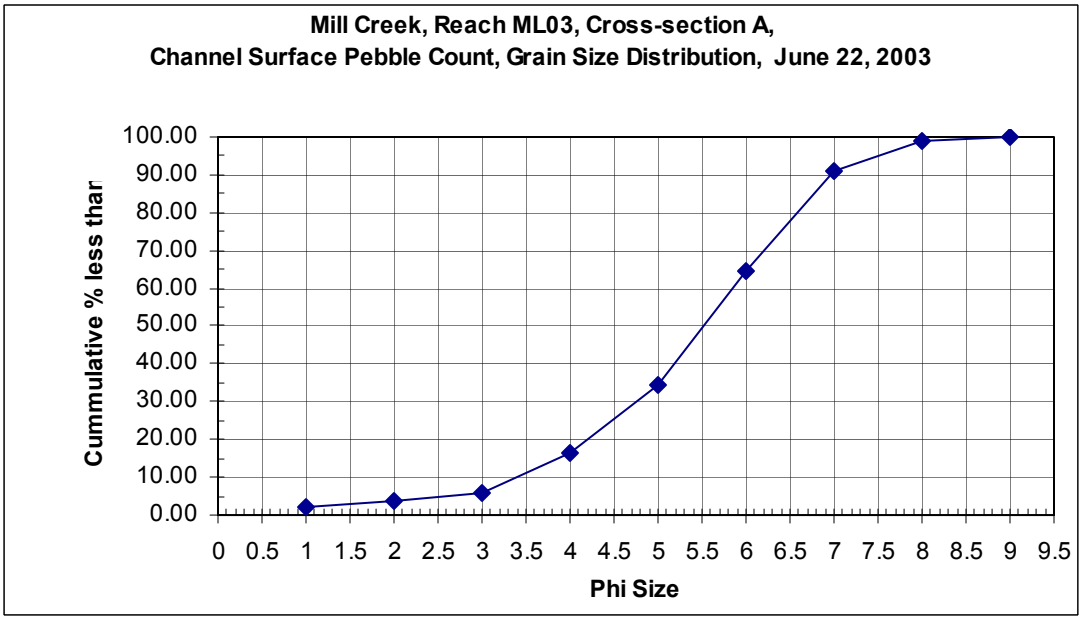
Form #C- ML03

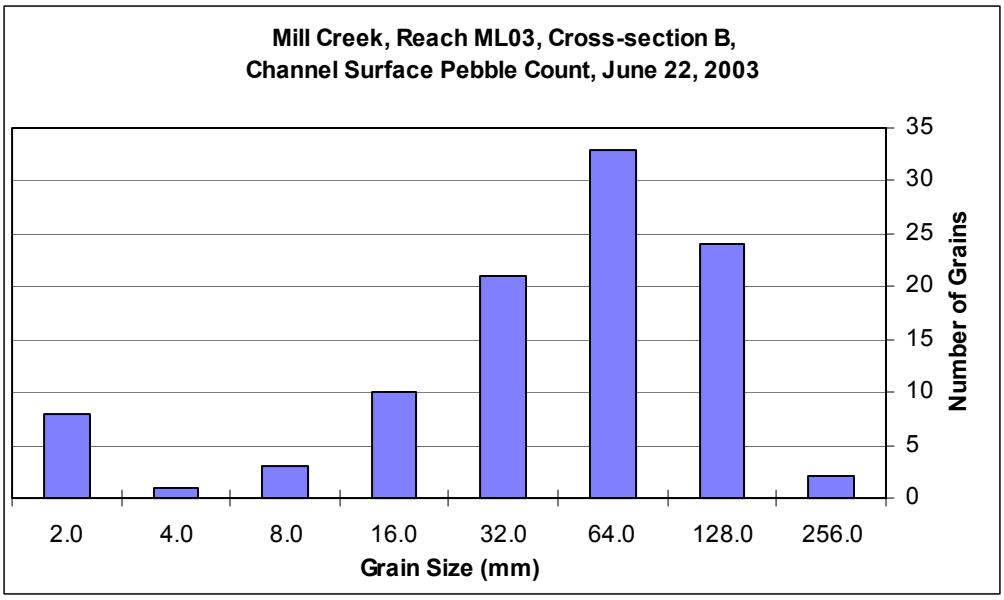

Mill Creek, Reach ML03, Cross-Section A Profile,
June 22, 2003
Channel Elevation
Water Surface Elevatio
Elevation (m)
100.60
100.40
100.20
100.00
99.80
99.60
99.40
99.20
0.00 5.00 10.00 15.00 20.00 25.00 30.00 35.00 40.00 45.00 50.00 55.00 60.00 65.00 70.0
Station (m)

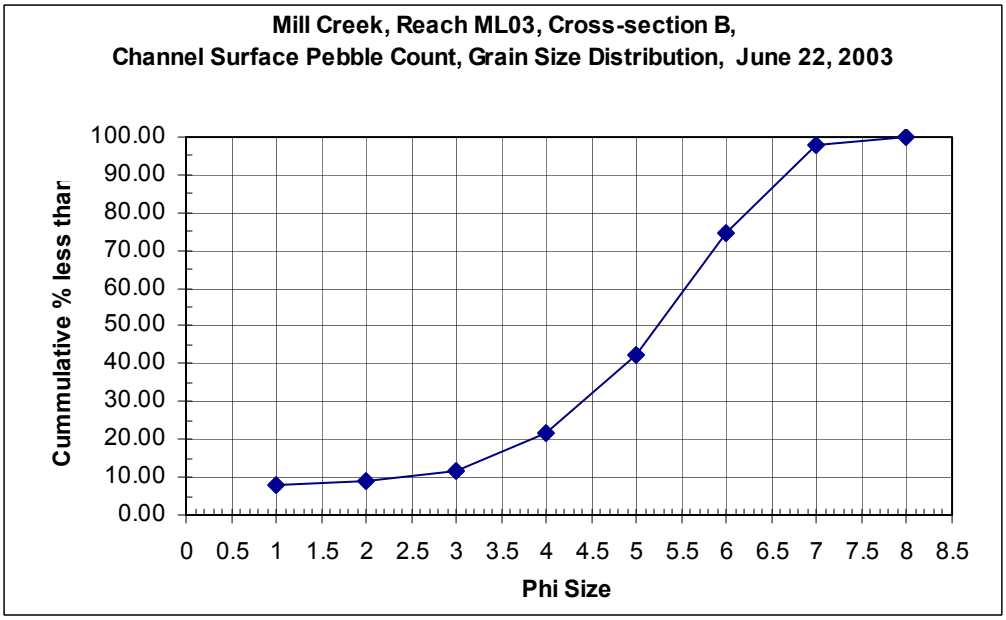

Mill Creek, Reach ML03, Cross-Section B Profile,
June 22, 2003
Channel Elevation
Water Surface Elevation
Elevation (m)
100.30
100.10
99.90
99.70
99.50
99.30
99.10
98.90
98.70
0.00 5.00 10.00 15.00 20.00 25.00 30.00 35.00 40.00 45.00 50.00
Station (m)


Mill Creek, Reach ML03, Longitudinal Bed Profile
June 22, 2003
Channel Elevati
Water Surface Elevation
108.00
107.00
106.00
105.00
104.00
103.00
102.00
101.00
100.00
99.00
98.00
Elevation (m)
0.00
50.00
100.00
150.00
200.00
250.00
Station (m)


Mill Creek, Reach ML03, Cross-section A,
Channel Surface Pebble Count, June 22, 2003
35
30
25
20
15
10
5
0
Number of Grains
2.0
4.0
8.0
16.0
32.0
64.0
128.0
256.0
Grain Size (mm)


Mill Creek, Reach ML03, Cross-section A,
Channel Surface Pebble Count, Grain Size Distribution, June 22, 2003
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Cummulative % less thar
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5 8 8.5 9 9.5
Phi Size


Mill Creek, Reach ML03, Cross-section B,
Channel Surface Pebble Count, June 22, 2003
35
30
25
20
15
10
5
0
Number of Grains
2.0
4.0
8.0
16.0
32.0
64.0
128.0
256.0
Grain Size (mm)


Mill Creek, Reach ML03, Cross-section B,
Channel Surface Pebble Count, Grain Size Distribution, June 22, 2003
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Cummulative % less thar
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5 8 8.5
Phi Size

REACH CHARACTERIZATION FIELD DATA SHEET

STREAM NAME Mill Creek	LOCATION Above Emigrant conf just below upstream Menke property line	
REACH ID # ML04	RIVER BASIN Scott	
UTM (us end) N 0502166 E 4601436	TOPOS	
UTM (ds end) N 0502400 E 4601442	STREAM ORDER 2 ELEVATION	
INVESTIGATORS SL, SR, JAI, JG		
FORM COMPLETED BY JAI, SL, SR, JG	DATE 6/22/03 TIME 3:00 PM	ASSOCIATED SITE ID #s ML04US, ML04DS, ML04XA, ML04XB

WEATHER CONDITIONS

Now		Past 24 hours
☐	storm (heavy rain)	☐
☐	rain (steady rain)	☐
☐	showers (intermittent)	☐
20 % ☑	% cloud cover	☐ ___%
☐	clear/sunny	☑

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air Temperature _____ ^{0}C

Other 0.62' last tuesday

STREAM MORPHOLOGY

Stream Subsystem
☐ Perennial ☑ Intermittent ☐ Tidal

Stream Origin
☐ Glacial ☐ Spring-fed
☑ Non-glacial montane ☐ Mixture of origins
☐ Swamp and bog ☐ Other_____

Reach Type
☑ Riffle-Pool ☐ Cascade
☐ Plane-Bed ☐ Bedrock w/alluvial veneer
☐ Step-Pool ☐ Bedrock

Rosgen Type E

WATERSHED FEATURES

Predominant Surrounding Landuse
☑ Forest/Natural ☐ Residential
☑ Field/Pasture ☐ Commercial/Industrial
☐ Agricultural ☐ Other_____

Local Hydrologic Alterations
☐ No Evidence ☐ Augmentation
☐ Dam/Retention ☐ Channelization
☑ Diversion ☑ Other natural channels

SEDIMENT SOURCES

MANAGEMENT ACTIVITIES (include short description)

Timber Harvesting
☐ Yes ☑ No _____

Mining (Hardrock / Placer)
☐ Yes ☑ No _____

Grazing and/or Agriculture
☐ Yes ☑ No _____

Evidence of Fire
☐ Yes ☑ No _____

EROSIONAL FEATURES

Local Hillslopes
☑ No Evidence ☐ Major gullying/rilling
☐ Minor gullying/rilling ☐ Mass wasting (slides,debris)
☐ Moderate gullying/rilling ☐ Other_____

Does sediment reach channel directly?
☐ Yes ☑ No

Roads and related features
☑ No Evidence ☐ Culvert/Bridge
☐ Unpaved ☐ Ditch/Roadcut
☐ Paved ☐ Other_____

Does sediment reach channel directly?
☐ Yes ☑ No

Channel Stability
☐ Stable ☐ Aggrading
☑ Moderately stable ☐ Downcutting
☐ Unstable ☐ Widening

Is the channel armored? ☐ Yes ☑ No
Evidence of bank undercutting? ☑ Yes ☐ No

Percent of streambank with deep binding root mass
☐ >85% ☐ 85-65% ☐ 65-35% ☑ <35%

DEPOSITIONAL FEATURES
☐ Pool In-filling ☐ Floodplain
☐ Lee (DS) deposits ☐ Terraces
☑ Channel bars ☐ Other_____

Degree of instream sedimentation
☑ None ☐ Low ☐ Medium ☐ High

CHANNEL FEATURES

Estimated Reach Length 246 m
Average Stream Width 4.5 m
Average Stream Depth 0.40 m
Sampling Reach Area 1107 m^2
Estimated Manning's n _____

Canopy Cover
☑ Open ☐ Partly shaded ☐ Shaded

Proportion of Reach Represented by Stream Morphology Types
Riffle 55 % Run 10 %
Pool 35 %

Form # D - ML04

REACH CHARACTERIZATION FIELD DATA SHEET

STREAM NAME Mill Creek	LOCATION Above Emigrant conf just below upstream Menke property line

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species present

☐ Trees ☐ Shrubs ☐ Grasses ☑ Herbaceous

dominant species present_____

Extent of Riparian Buffer Zone	Width of Riparian Buffer Zone	Riparian Vegetation Age
☐ None	☑ < 1 Channel width	☑ Immature (< 5yrs)
☐ Fragmentary	☐ 1-5 Channel widths	☐ Established (5-30 yrs)
☑ Continuous	☐ > 5 Channel widths	☐ Mature/Old Growth (>30 yrs)

Extent of vegetation encroachment into stream channel

☑ None ☐ Minimal ☐ Moderate ☐ Heavy ☐ Extreme

LARGE WOODY DEBRIS

☐ Not Present ☐ Present in Cutbank ☑ Present in Channel

Density of LWD _3_____ m^2/km^2 (area of LWD/ reach area)

AQUATIC VEGETATION

Indicate the dominant type

☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free floating

☐ Floating Algae ☐ Attached Algae

Portion of the reach with aquatic vegetation _0___%

WATER QUALITY

Temperature_15.4___ ^{0}C

Specific Conductance_57_____

Dissolved Oxygen___N/A___

pH __7.2____

Turbidity __N/A____

Water Odors

☑ Normal/None ☐ Sewage

☐ Petroleum ☐ Chemical

☐ Fishy ☐ Other_____

Water Surface Oils

☐ Slick ☐ Sheen ☐ Globs ☐ Flecks

☑ None ☐ Other_____

Turbidity (visual)

☑ Clear ☐ Slightly turbid ☐ Turbid

☐ Opaque ☐ Stained ☐ Other_____

DISCHARGE

Velocity-Area Method

Distance from water's edge (m)	Depth (m)	Velocity (m/s)	Discharge (cms)	Notes
0-0.5	0.03	0.0		
0.5-1.0	0.11	0.05	0.009	
1.0-1.5	0.18	0.2	0.058	
1.5-2.0	0.25	0.3	0.1215	
2.0-2.5	0.13	0.1	0.088	
2.5-3.0	0.23	0.1	0.0385	
3.0-3.5	0.14	0.05	0.01125	
3.5-4.0	0.05	0.0		

Total Discharge (cms) 0.32625

Float Method

	Width (m)	Avg Depth (m)	Float Distance (m)	Time (s)	Discharge (cms)
XS 1	5.0	0.10	7.0	18, 17	0.19, 0.21
XS 2	5.0	0.10	7.0	18	0.19

Estimated Discharge (cms) 0.197

Form # D2 - ML04

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS

STREAM NAME Mill Creek	LOCATION Menke property just below property line above confluence	
STATION # _ REACH ID# ML04	STREAM CLASS 2	
UTM N _ UTM E _	RIVER BASIN Scott	
STORET #	AGENCY	
INVESTIGATORS JAI, JMG, SML, SR		
FORM COMPLETED BY JAI, SR, SML, JMG	DATE 6/22/03 TIME 1:00 PM	REASON FOR SURVEY

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 16	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE 16	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE 10	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 13	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE 10	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS

Parameters to be evaluated broader than sampling reach

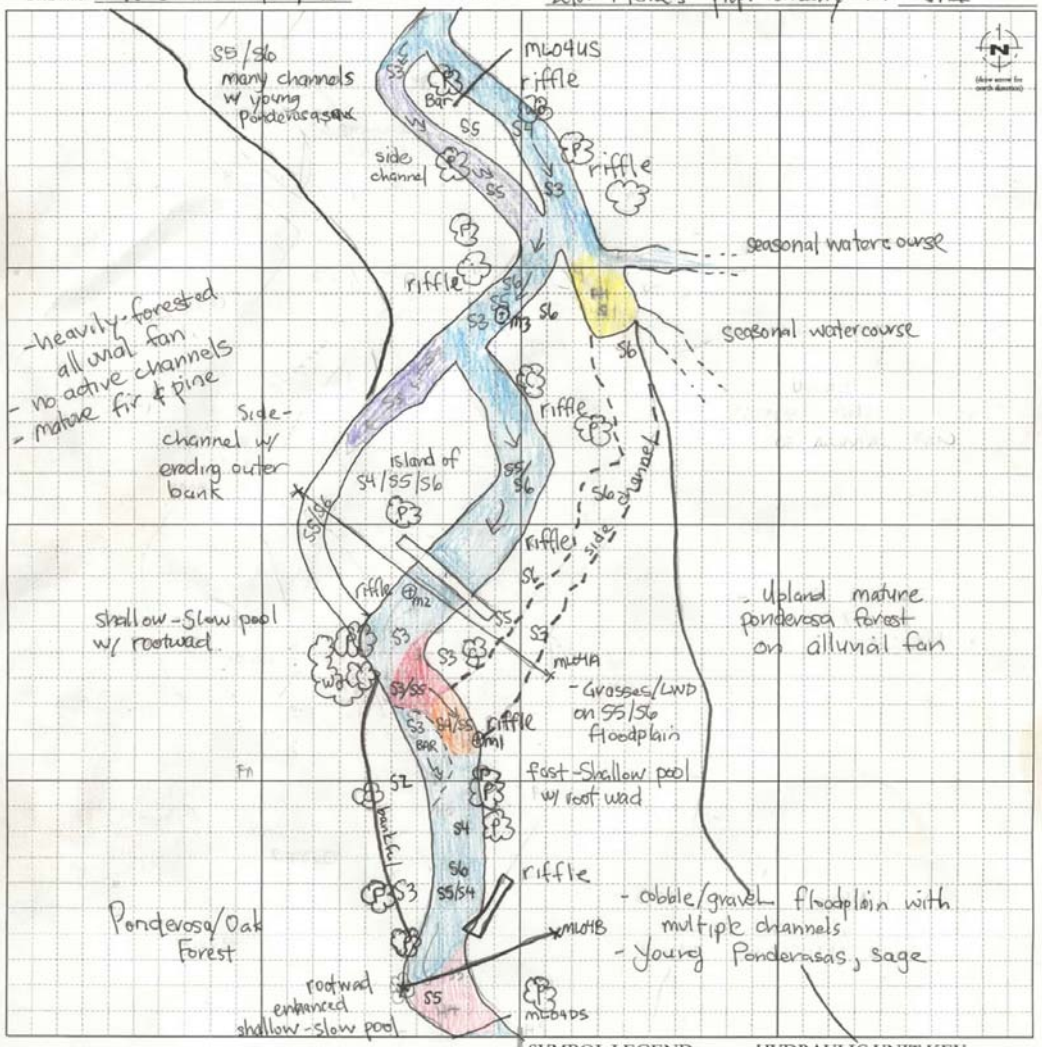
Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE 19	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE 13	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE 5 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE 3 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE 2 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE 2 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE 10 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE 10 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 129

Stream Assessment Field Sketch Form

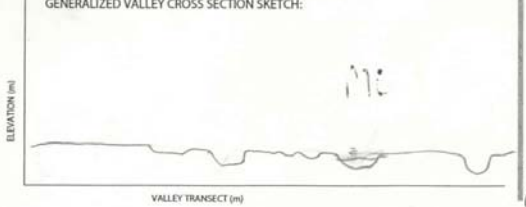
River/Stream: Mill Creek Reach ID: ML04

Date/Time: 10:00 am 6/22/03 Location: below Mentels prop. boundary Map by: JAI



Map Scale (if applicable): 1 ☐ = _____

GENERALIZED VALLEY CROSS SECTION SKETCH:



SYMBOL LEGEND:

- Geomorphic Unit Boundary
- Flow Direction
- UTM Coordinate Location: RS-1
- Fish Sampling Location & ID: F1
- Invertebrate Sampling Location & ID: I1
- Cross-section Location: x ---- x
- P = Ponderosa
- C = Cedar
- Wo = White Oak

HYDRAULIC UNIT KEY:

Flow Types:

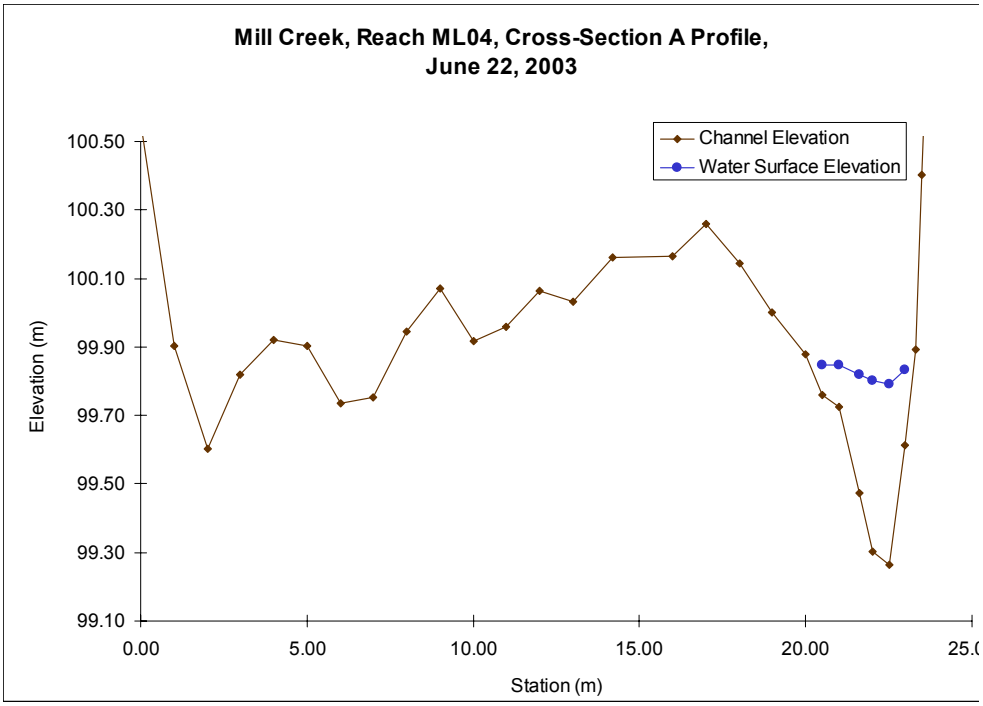
- ☐ H9 Free Fall
- ☐ H8 Chute
- ☐ H7 Broken standing waves
- ☐ H6 Unbroken standing waves
- ☐ H5 Rippled
- ☐ H4 Upwelling
- ☐ H3 Smooth surface flow
- ☐ H2 Scarcely perceptible flow
- ☐ H1 Standing water

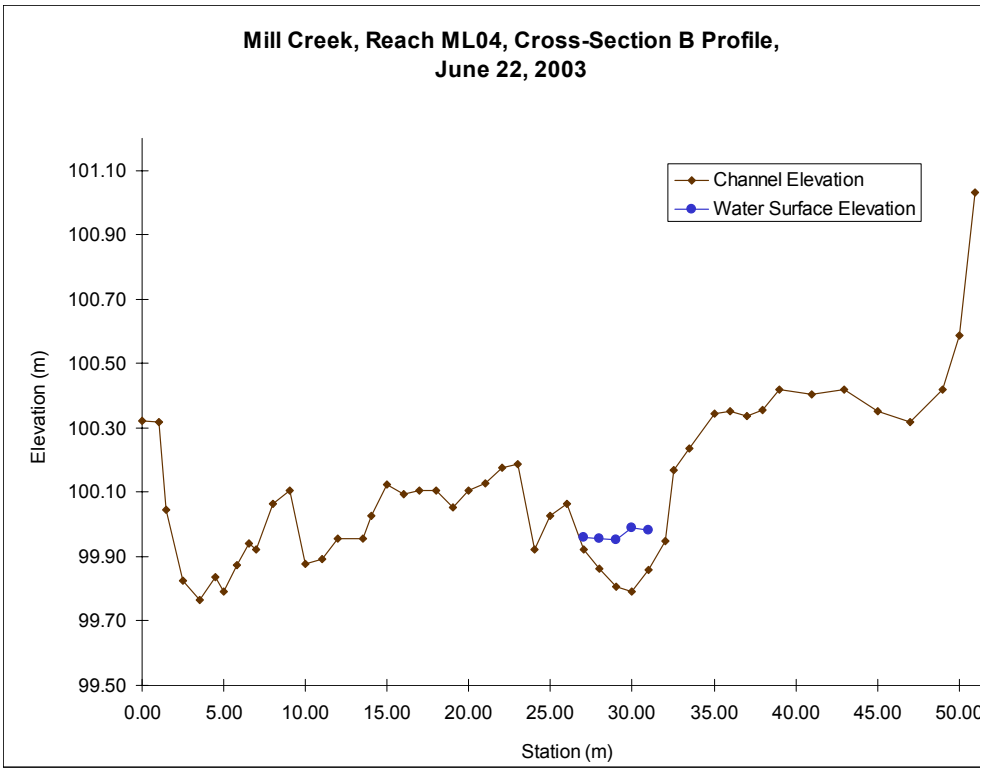
Substrate Categories:

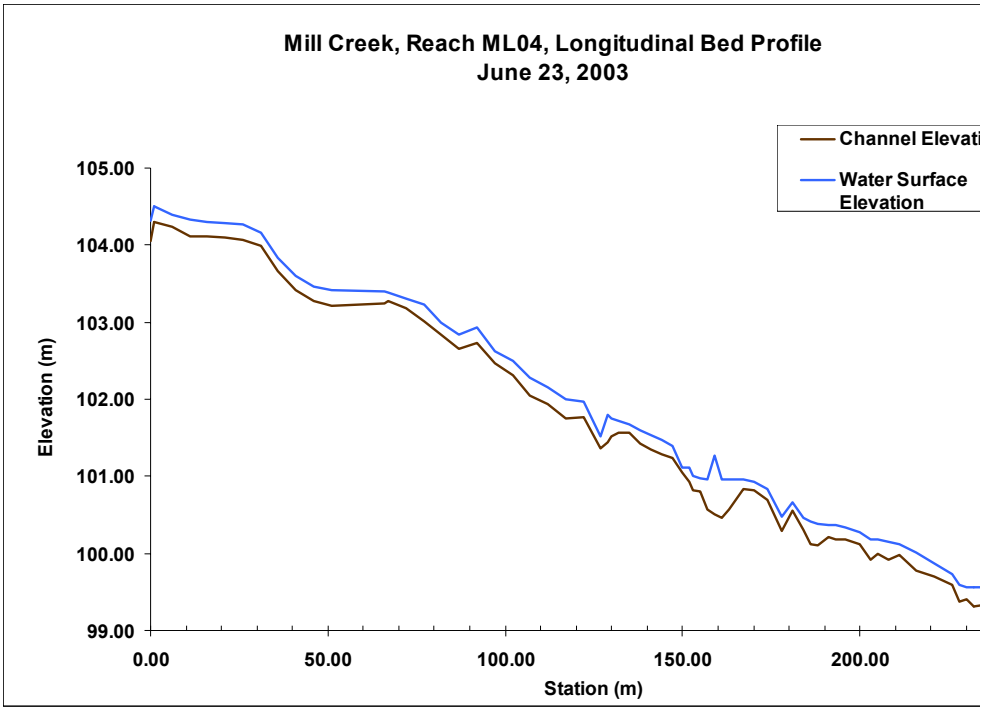
- ☐ S1 Silt
- ☐ S2 Sand
- ☐ S3 Gravel
- ☐ S4 Cobble Sm.
- ☐ S5 Cobble Lg.
- ☐ S6 Boulder Sm.
- ☐ S7 Boulder Lg.
- ☐ S8 Bimodal

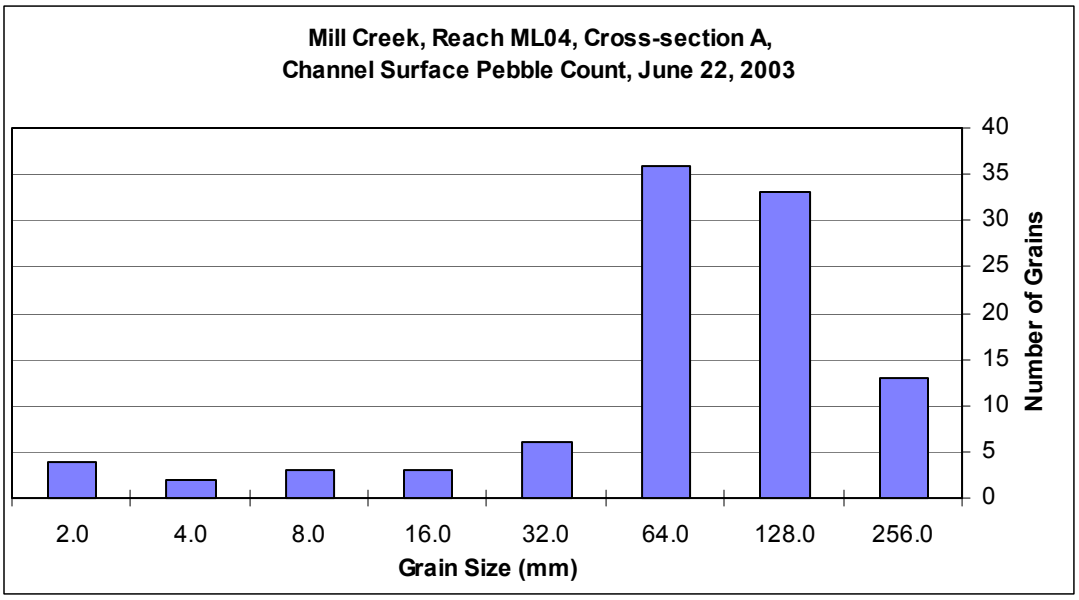
S9 SILT/COBBLE

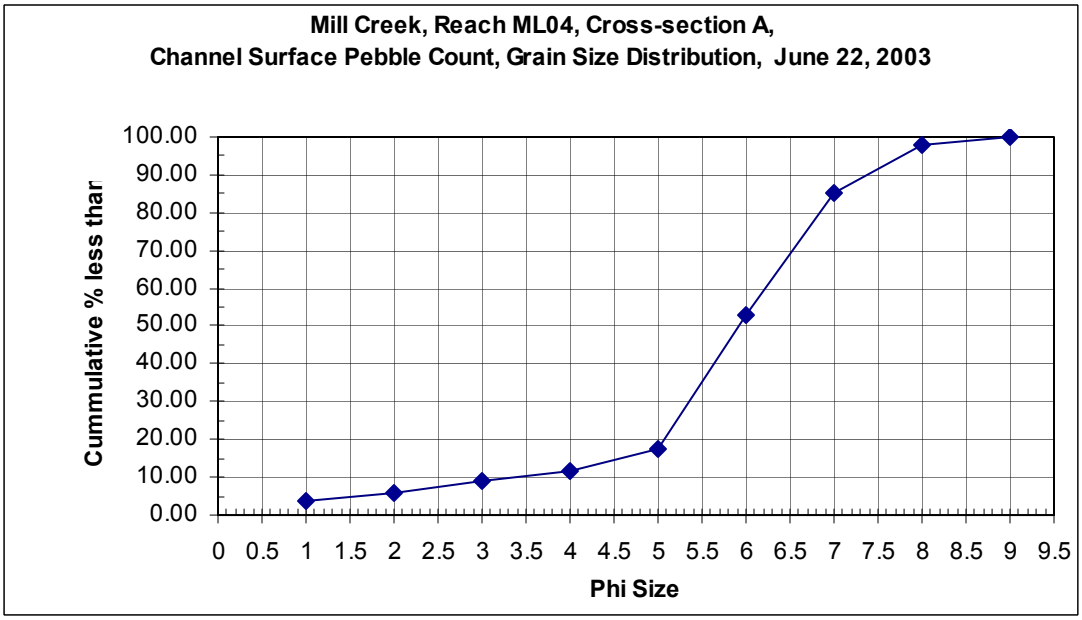
Form # C - ML04

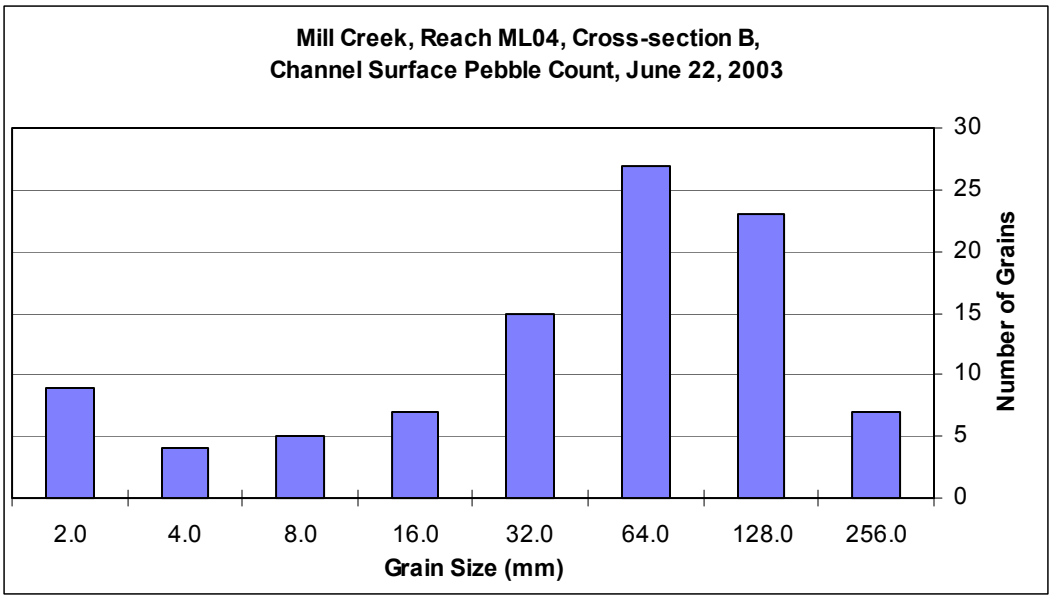

Mill Creek, Reach ML04, Cross-Section A Profile,
June 22, 2003
Channel Elevation
Water Surface Elevation
Elevation (m)
100.50
100.30
100.10
99.90
99.70
99.50
99.30
99.10
0.00
5.00
10.00
15.00
20.00
Station (m)

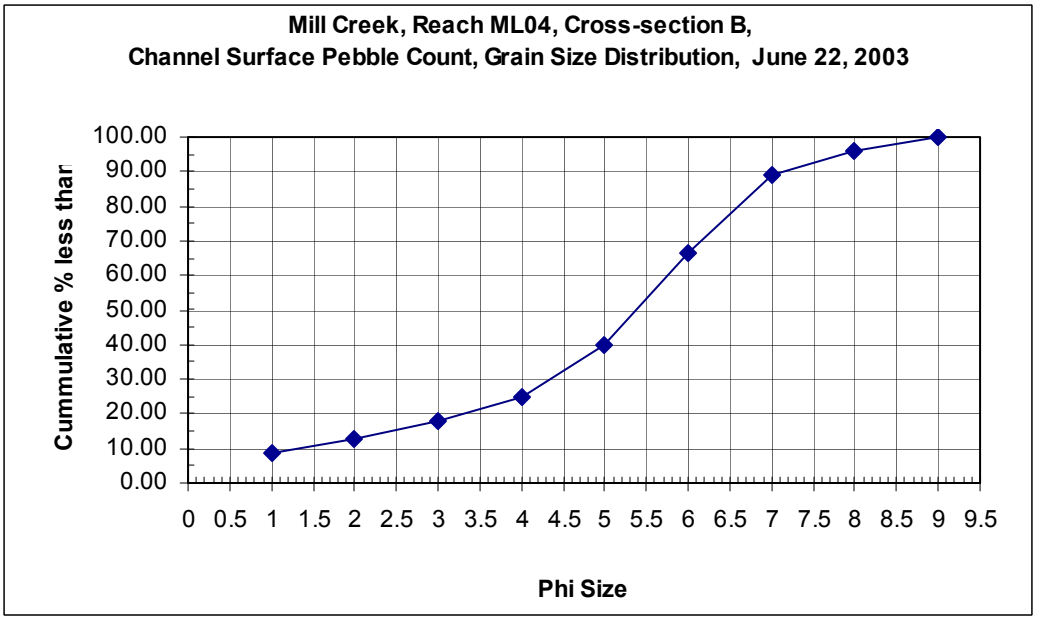

Mill Creek, Reach ML04, Cross-Section B Profile,
June 22, 2003
Channel Elevation
Water Surface Elevation
Elevation (m)
101.10
100.90
100.70
100.50
100.30
100.10
99.90
99.70
99.50
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
Station (m)


Mill Creek, Reach ML04, Longitudinal Bed Profile
June 23, 2003
Channel Elevati
Water Surface Elevation
105.00
104.00
103.00
102.00
101.00
100.00
99.00
Elevation (m)
0.00
50.00
100.00
150.00
200.00
Station (m)


Mill Creek, Reach ML04, Cross-section A,
Channel Surface Pebble Count, June 22, 2003
40
35
30
25
20
15
10
5
0
Number of Grains
2.0
4.0
8.0
16.0
32.0
64.0
128.0
256.0
Grain Size (mm)


Mill Creek, Reach ML04, Cross-section A,
Channel Surface Pebble Count, Grain Size Distribution, June 22, 2003
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Cummulative % less thar
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5 8 8.5 9 9.5
Phi Size


Mill Creek, Reach ML04, Cross-section B,
Channel Surface Pebble Count, June 22, 2003
30
25
20
15
10
5
0
Number of Grains
2.0
4.0
8.0
16.0
32.0
64.0
128.0
256.0
Grain Size (mm)


Mill Creek, Reach ML04, Cross-section B,
Channel Surface Pebble Count, Grain Size Distribution, June 22, 2003
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Cummulative % less thar
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5 8 8.5 9 9.5
Phi Size