

Impairment Verification Monitoring-Volume 2:
Biological and Habitat Components
Upper Frio River, Texas
September 2004



Ecological Communications Corporation
Austin, TX

**Impairment Verification Monitoring-Volume 2: Biological and
Habitat Components
Segment 2113, Upper Frio River**

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Under Texas Engineering Experiment Station Project No. 32525-60880 CC
Texas Commission on Environmental Quality Contract No.582-4-58897, Amendment 1

Prepared for
Total Maximum Daily Load Program
Texas Commission on Environmental Quality
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Impairment Verification Monitoring-Volume 2: Biological and Habitat Components
Segment 2113 Upper Frio River

ABSTRACT

As part of an impairment verification monitoring project for the Upper Frio River (Segment 2113), Ecological Communications Corporation (EComm) conducted biological data collections and analyses. Segment 2113 appears on the State of Texas' 303(d) list as impaired for exceptional aquatic life based on low dissolved oxygen concentrations previously identified by the Texas Commission on Environmental Quality (TCEQ). Due to insufficient data to support a re-assessment, this water body remained on the draft 2002 303(d) list. The objective of EComm's data assessment was to assemble enough biological information on the water body to support a use reclassification if it is found that the water quality standard is inappropriate and the change can be supported through agency regulations.

A separate but related assessment (CBI 2004) was simultaneously conducted by the Texas Engineering Experiment Station (TEES) and the Conrad Blucher Institute for Surveying and Science (CBI). The TEES/CBI effort included physical and chemical data collection and analysis in an attempt to provide a comprehensive assessment of the water quality within the stream segment. As part of the overriding TMDL project (TCEQ Contract 582-4-58897), the combined biological, physical, and chemical data collection and analytical activities will result in one of four outcomes:

1. Removal of the water body from the 303(d) list,
2. An evaluation of applicable water quality standards (aquatic life use impairments only),
3. Development of a TMDL, or
4. Additional monitoring to better characterize the impairment.

The biological and habitat data (Regional Index of Biotic Integrity (IBI), Rapid Bioassessment Protocol, and Habitat Quality Index) generally resulted in scores which indicate that Segment 2113 has supports "High" aquatic life use. One exception to this was the Statewide Index of Biotic Integrity Scores which generally indicated an "Intermediate" aquatic life use designation. The Regional IBI, Rapid Bioassessment Protocol, and Habitat Quality Index scores for Segment 2113 all indicate that the existing use for this water body is high aquatic life and should be reassessed for the 2006 305(b) Water Quality Assessment.

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August 2003, October 2003

1.0 INTRODUCTION

In 2000 the Texas Commission on Environmental Quality (TCEQ) initiated a study to investigate water quality impairments in 11 water bodies in Basin Groups D & E identified through the 1999 305(b) Water Quality Inventory as part of a total daily maximum load (TMDL) program. The segments are included on the 1999 State of Texas Clean Water Act 303(d) list as impaired due to concentration levels of dissolved oxygen or bacteria or both. One of these water bodies was



Figure 1. Station 13007

Segment 2113, Upper Frio River, and is included on the State's 303(d) list as impaired for its exceptional aquatic life use designation. The impairment to this portion of the Frio River was caused by an exceedance of the established dissolved oxygen criteria. As an initial phase for TMDL development, Segment 2113 was assessed to verify the aquatic life impairment. This initial assessment was performed so that resources within the program can be efficiently utilized for truly impaired water bodies, preventing TMDL development for a water body that may be delisted or subject to a water quality standards revision at a later date. Chemical, physical, and biological data were collected at three sites within the segment in an effort to determine what course of action, if any, needed to be taken to address impairments. Data collection activities would result in one of four outcomes:

- 1) Removal of the water body from the 303(d) list,
- 2) An evaluation of applicable water quality standards (aquatic life use impairments only),
- 3) TMDL, or
- 4) Additional monitoring to better characterize the impairment.

Segment 2113, the Upper Frio River, is formed by the union of the East and West Frio Rivers in Real County, and extends 47 miles downstream to just above the crossing at U.S. Highway 90 in Uvalde County. This portion of the river experiences significant levels of recreation during the summer months and represents a large part of the regional economy. A location map of the segment is provided in Figure 2. Site 17892 (previously designated internally as site "10000"), known as "Frio River at Apache Bluffs," is located in Real County and falls approximately one kilometer above the impaired segment. Because of heavy recreational activity at the upper portion of the impaired segment, this site was chosen to limit interference during sampling, and to decrease the exposure of the sampling equipment to the general public. Site 13007, Frio River at Magers Crossing, is near the middle of the impaired segment in Uvalde County located just below Garner State Park. Site 13006, Frio River at SH 127 east of Concan, is also located in Uvalde County approximately seven miles south of Garner State Park.

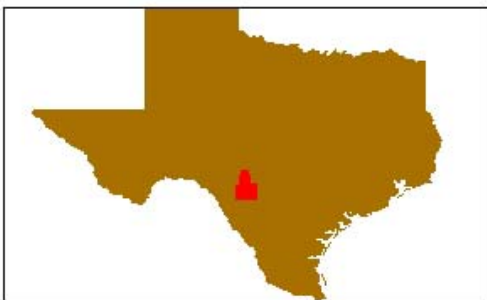
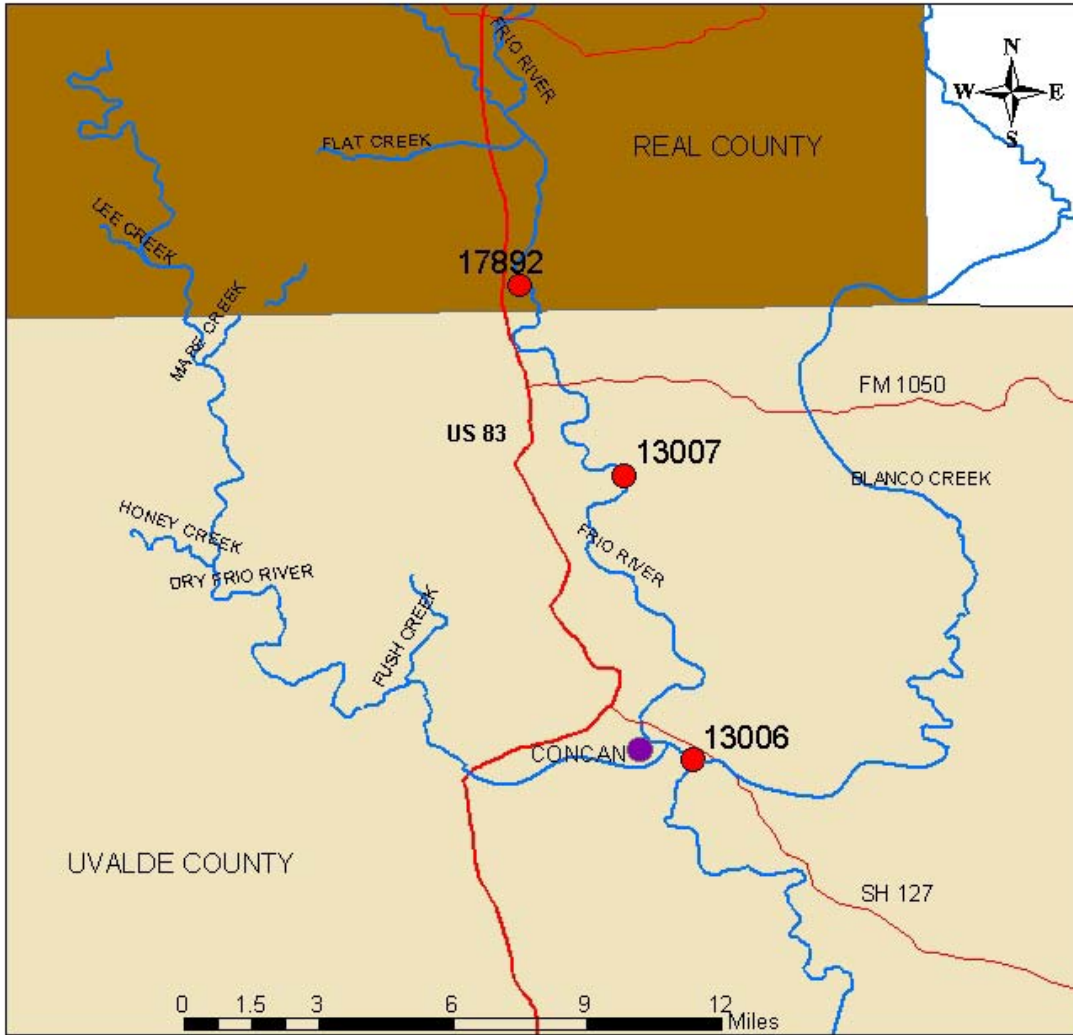


Figure 2
Location Map for Segment 2113, Frio River
Real and Uvalde Counties, TX

2.0 BIOLOGICAL AND HABITAT METHODOLOGY

Biological data (including fish, benthic macroinvertebrates, and habitat) were collected under strict interpretation of the Biological Component and Stream Physical Habitat Component sections of “Receiving Water Assessment (RWA) Procedures Manual,” (Texas Natural Resource Conservation Commission [TNRCC] 1999b). As specified in the RWA manual, EComm evaluated fish sampled in accordance with statewide criteria of Indices of Biotic Integrity (IBI). Additionally, EComm generated IBI scores for all stations using regional criteria developed by Texas Parks and Wildlife Department (2002). The regional criteria consider differences in landforms, soil types, vegetation, climatic conditions, and zoogeographic factors among the ecoregions within Texas. As a result, the regional IBI criteria “provide a better representation of the integrity of fish assemblage” as compared to statewide criteria.



Figure 3. Station 13006

In addition to data collection via RWA guidelines and Surface Water Quality Monitoring (SWQM) Procedures Manual (TNRCC 1999a), EComm captured data for 14 previously uncoded biological and habitat parameters. These new parameters include: the various metrics used in determining regional IBI scores; the final scores for aquatic life use values for both statewide and regional IBI criteria; the final scores for Rapid Bioassessment Protocol (RBP) for benthic macroinvertebrates; and the final scores for Habitat Quality Indices (HQIs). All 14 parameters were assigned unique STORET codes in an effort to create maximum efficiency for data management. The new STORET codes and descriptions, along with other STORET codes captured for this segment, are provided in Table 1.

Segment 2113 had not previously been designated as a segment requiring either a Use Attainability Analysis (UAA) or an Aquatic Life Assessment (ALA). Although the main purpose of the study was to verify impairment, a sampling regime satisfying the minimum UAA data requirements was attempted for this segment. UAA requirements include at least three complete sampling events over two consecutive index periods. One event is required in the early portion of the Index Period (March 15-October 15) in either Year 1 or Year 2, and the other two efforts must be conducted during the Critical Period (July 1 - September 30), including one sampling event during Year 1 and the other during Year 2. Although the required level of effort was met to satisfy UAA requirements, the timing of sampling events do not suffice for a UAA. Biological sampling for Segment 2113 was conducted in September 2002, August 2003, and October 2003; thus, no sampling was conducted during the early portion of an Index Period.

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Table 1. STORET Codes
(New STORET codes captured are temporarily assigned to the "00800" series (*in italics*))

STORET Code	Description	STORET Code	Description
89832	Number of lateral transects	90008	EPT index
89847	Average bank slope	98009	Total number of sucker species
89846	Average bank erosion potential	98010	Total number of intolerant species
89845	Percent of substrate that is gravel or larger	98016	Percent individuals as tolerants (fish)
<i>00800</i>	<i>Channel flow status</i>	98017	Percent individuals as omnivores
89844	Dominant substrate	98021	Percent individuals as insectivores
89843	Total number of riffles	98022	Percent individuals as piscivores
89842	Number of poorly defined stream bends	98023	Total number of individuals in fish sample
89841	Number of moderately defined stream bends	98024	Percent individuals as hybrid
89840	Number of well defined stream bends	98030	Percent with disease
<i>00812</i>	<i>Statewide IBI</i>	98003	Number of fish species
<i>00833</i>	<i>Habitat Quality Index</i>	89905	Number of minutes debris was sampled
84161	Stream order	89851	Percent grass
84159	Percent instream cover	89854	Percentage tree canopy
<i>00813</i>	<i>Number of cyprinidae species</i>	89859	Drainage area
<i>00814</i>	<i>Number of benthic invertebrates</i>	89860	Length of reach
72052	Streambed slope	89861	Average stream width
<i>00816</i>	<i>Percent that are tolerant species, excluding G.affinis</i>	89862	Average stream depth
<i>00817</i>	<i>Number of individuals per seine haul</i>	89864	Maximum pool width
<i>00818</i>	<i>Number of individuals per minute electroshocking</i>	89865	Maximum pool depth
<i>00819</i>	<i>Percentage of individuals as non-native</i>	89866	Average width of riparian vegetation
<i>00820</i>	<i>Regional IBI</i>	90010	Dominant functional feeding group percentage
<i>00832</i>	<i>Total RBP score</i>	89899	Biological rpt unit
89853	Percent other as riparian vegetation	90009	Number of functional feeding groups
89839	Total number of stream bends	89906	Number of individuals in RBA sample
98008	Total number of sunfish species	89941	Seine length
90025	Percentage benthic gatherers	89943	Electrofishing method
90030	Percentage benthic filterers	89944	Electrofishing duration
90035	Percentage benthic shredders	89946	Average mesh size
90036	Percentage benthic predators	89948	Number of seine hauls
<i>00834</i>	<i>Percentage benthic scrapers</i>	89950	Benthic sampling code
90042	Percentage benthic inverts individuals in dominant taxon	89961	Texas ecoregion
90050	Ratio of intolerant to tolerant taxa	89976	Area seined
90052	Number of non-insects	90007	Hilsenhoff biotic index
90054	Percentage of Elmidae	89849	Percent trees
92266	Percentage of Trichoptera that are Hydropsychidae	89867	Aesthetics
92491	Percent Chironomidae	<i>00835</i>	<i>Benthic invertebrate taxa richness</i>
89850	Percent as shrubs	<i>00836</i>	<i>Number instream cover types</i>
98004	Total number of darter species	89904	Minutes spent kicknetting

Biological sampling included the collection of benthic macroinvertebrates, fish and habitat data at each site within the segment (Figure 2).



Figure 4. Macroinvertebrate Collection

Benthic Macroinvertebrate Collections

Collection of benthic macroinvertebrates in the field was conducted using a 12-inch D-frame kicknet in riffle areas traveling a zigzag pattern across the bed in five-minute intervals. Intervals were repeated until the minimum sample size of 100 specimens was approached, met, or exceeded. All individuals collected were transferred from the net and stored in 70% ethanol for lab analysis and identification. The collection of all individuals within a sample assured that no biases were

present for larger, more active, or otherwise more obvious species captured in the net. Most individuals were identified to genus, or as otherwise suggested by the RWA manual. Collections from sites were analyzed using the 12 metrics defined in the RBP in Appendix B of the RWA manual. These metrics include parameters such as species diversity and composition, trophic structure, and species tolerance to adverse environmental conditions.

Nekton Collections

Collection of fish in the field was conducted using Smith-Root LR-24 backpack electrofishing gear powered by either 7 amp-hour or 12 amp-hour 24 volt deep-cycle batteries. Each sampling team consisted of three field personnel, including a field director and two technicians. One team member served as the backpack operator while the other two flanked the operator and collected fish with dip nets. Collected fish were temporarily placed in a five gallon plastic bucket partially filled with water for later identification. Sampling teams moved in an upstream direction, focusing pulses on snags, along vegetated banks, within large boulders or gravel-based riffles, and any other location most likely to contain fish. Active sampling (instances when current was applied to the water) was conducted for a minimum of 900 seconds. Field teams used best judgment to gauge if enough active sampling had been conducted to collect an accurate representation of present species; therefore, the minimum sampling time was exceeded at some sites. Maximum active sampling time for any site was approximately 1010 seconds. Upon completion of electrofishing, fish were immediately identified, recorded, and returned to the stream in order to minimize mortality. Any fish that could not be identified in the field was preserved in either formalin or ethanol for later identification in the laboratory. If more than one fish exhibiting the same characteristics could not be field identified, then only one representative specimen was preserved. Additionally, one individual from each field-identified species was retained as a voucher specimen.



Figure 5. Seining Fish ID

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Electrofishing collections were complemented by seining at all sites where seining was possible. A straight seine measuring 30 ft x 4 ft with 1/8 inch mesh was used. Six seine hauls, each approximately 10 meters long, were taken during each sampling event. Only successful seine hauls were counted. Those that encountered obstacles that could have resulted in the escape of fish (heavy snags or rocks that, or otherwise significantly impaired the lead line from traveling across the bottom substrate) were not included. After each successful haul, collected specimens were identified, recorded, and immediately returned to the stream in an effort to minimize mortality. Species which could not be field-identified were handled in the manner described in the electrofishing section, above.

Collections were analyzed using metrics defined by TNRCC 1999 to generate Statewide IBI. Regional IBI were also calculated using the TPWD 2002. Both calculations use metrics that capture parameters such as species diversity and composition, community trophic structure, and fish abundance and condition.

Habitat Assessment

Various habitat data were collected at each site, including primary attributes (instream channel measurements), secondary attributes (stream morphology), and tertiary attributes (riparian environment) of each site. Data were used to generate a Habitat Quality Index (HQI), which serves the same function as the RBP for macroinvertebrates and IBIs for fish.



Figure 6. Habitat Data Collection

Descriptions of the various data collected are provided in Table 1.

Several other subjective habitat parameters were used as required by the RWA manual (TNRCC 1999). These include bank erosion potential, aesthetics, dominant types of riparian vegetation, and to a lesser degree, percent instream cover and percent gravel or larger. For the purpose of this project, EComm attempted to standardize such measurements by using the same crews for each segment during as many sampling events as possible. Because this was not always possible, and because individuals within a crew may have different duties for any given sampling event, a training session was conducted prior to fieldwork to help ensure that all crew members were given identical background and similar interpretation of the subjective measurements.

3.0 RESULTS

Aquatic life use determinations were based upon scores for each of the three ecosystem components (fish, benthic macroinvertebrates, and habitat) analyzed for Segment 2113. The fish component resulted in Statewide and Regional IBI scores, the macroinvertebrate component resulted in a RBP score, and the habitat resulted in a HQI score. The scores from each of these calculations in turn relates to a given Aquatic Life Use designation: limited, intermediate, high, or exceptional (Table 2). The Aquatic Life Use designation is used to assess existing uses

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according to the health of the sampled biological communities as compared to established water quality standards. It should be noted that the calculated scores of the Statewide IBI may fall in between two range subcategories (see ranges in Table 2). In these cases, subcategories were assigned as an intermediary between the two subcategories. For example, if a site received a Statewide IBI score of 38, it would fall between the “Limited” and “Intermediate” subcategories, and be considered having an “Limited-Intermediate” Aquatic Life Use subcategory. .

Table 2. Aquatic Life Use Score Ranges and Subcategories for Each Component

Aquatic Life Use Subcategory	Statewide IBI	Regional IBI (Region 30)	RBP	HQI
Limited	<34	<30	<22	<14
Intermediate	40-44	30-41	22-28	14-19
High	48-52	42-51	29-36	20-25
Exceptional	58-60	>51	>36	26-31

Results of the biological and habitat analyses for the three sites over three sampling events are provided in Table 3. Raw data is provided in Appendix A.

Table 3. Results of Biological and Habitat Sampling for Segment 2113, Upper Frio River

FY02	Statewide IBI	Regional IBI	RBP	HQI
17892	42 Intermediate	39 Intermediate	33 High	23 High
13007	38 Limited/Intermediate	42 High	34 High	25 High
13006	40 Intermediate	47 High	33 High	24 High
FY03	Statewide IBI	Regional IBI	RBP	HQI
17892	46 High	51 High	31 High	24 High
13007	38 Limited/Intermediate	46 High	36 High	22 High
13006	44 Intermediate	49 High	31 High	23 High
FY04	Statewide IBI	Regional IBI	RBP	HQI
17892	42 Intermediate	50 High	38 Exceptional	24 High
13007	42 Intermediate	41 Intermediate	36 High	21 High
13006	42 Intermediate	46 High	30 High	23 High

For each component, an average score was calculated using scores from every sampling event. Scores for sampling events for each component that scored within the subcategory “Exceptional” agreed with the designated aquatic life use value for the segment. A subcategory of “Limited”, “Limited-Intermediate”, “Intermediate”, “Intermediate-High” or “High” was considered substandard, as it reflects a poorer level of water quality than that for which the segment is designated. Statewide IBI scores averaged approximately 42 (Intermediate) across all sites over all sampling events. This result was in poor agreement with the designated aquatic life use, which was determined as “Exceptional” (0.0% overall) according the Water Quality Inventory. Regional IBI scores averaged approximately 46 (High), which would still be considered less than

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the designated aquatic life use. RBP scores averaged approximately 34 (High), while HQI averaged 23 (High) both considered below the established aquatic life use.

4.0 DISCUSSION

All analyses generally reflected an aquatic life use designation less than the established standard. Of the 36 aquatic life use calculations generated for Segment 2113, one (3%) scored “Exceptional”, which is the designated aquatic life use. The Statewide IBI calculation resulted in an “Intermediate” aquatic life use designation. This is, however, not unexpected, as the criteria used to calculate the Statewide IBI scores generally tends to underestimate the aquatic life use when compared to other assessment methods (TPWD 2002). Therefore, the Statewide IBI score may be best be used to indicate the need for further study using more refined calculations, such as the Regional IBI. In this case the Regional IBI, along with the RBP and HQI scores appear to indicate that the existing use is lower than the water quality standard.

A gap is present in the field data collected from Station ID 13007 during the September 2002 sampling event. No data was collected regarding riparian vegetation composition and aesthetic appraisal. However, vegetation composition was not a requirement for the HQI calculations, and the aesthetic appraisal gap was addressed using site photos. Aesthetics at the site were determined to be “2) Natural”, resulting in an HQI score of 25, the maximum value within the “High” category. According to the Part I Stream Physical Characteristics Worksheet (TNRCC 1999) for this site, stream uses include agriculture and recreation; therefore, an aesthetic appraisal of “1) Wilderness” would be highly unlikely. An aesthetic appraisal of “3) Common” may be considered, resulting in a score of 24. The change in scoring from 25 to 24 would not affect the aquatic life use based on the HQI, which would remain in the “High” category.

Segment 2113 did show some spatial and temporal variation in aquatic life use scores among and within sites, although there are other stream segments within the overall TMDL project that exhibited this to a greater degree. EComm is currently investigating the causes for this, but it is hypothesized that several factors may contribute including stream flow, time of day of fish sampling, time of year of sampling, temperature, and dissolved oxygen levels.

5.0 CONCLUSION

Based on the Regional IBI, RBP, and HQI scores, the biological and habitat data appear to support the conclusion that existing aquatic life uses are lower than the established standards. It is likely that this segment will be identified as impaired due to the presence of nekton and benthic communities exhibiting aquatic life uses below the established standard. This segment will be reassessed during the 2006 305(b) Water Quality Assessment and a determination of the course of action will be made at that time.

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Segment 2113 Upper Frio River

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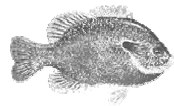
APPENDIX A
COMPLETE RAW DATA SET
SEGMENT 2113-UPPER FRIO RIVER
SEPTEMBER 2002
AUGUST 2003
OCTOBER 2003



Ecological Communications Corporation
Austin, TX

BIOTIC ASSESSMENT – FISH

Species Lists and Preliminary Data Manipulation



FISH COLLECTED

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Upper Frio	9/4/02	10000	Central Stoneroller	12		E	-	H
			Central Stoneroller	2		S	-	H
			Channel Catfish	13		E	T	O
Order=5			Flathead Catfish	1		E	-	P
			Gambusia affinis	3		E	T	IF
			Gambusia affinis	5		S	T	IF
			Greenthroat Darter	20	D	E	I	IF
			Guadalupe Bass	3		E	I	P
			Largemouth Bass	1		S	-	P
			Longear Sunfish	3	SF	E	-	IF
			Longear Sunfish	2	SF	S	-	IF
			Mexican Tetra	2		E	-	IF
			Rio Grande Cichlid	5		E	-	IF
			Rio Grande Cichlid	3		S	-	IF
			Roundnose Minnow	1		E	I	O
			Texas Shiner	7		E	-	IF
Total				83				

KEY:

SF	Sunfish
D	Darter
SU	Sucker
E	Electroshock
S	Seine
V	Visually Observed
I	Intolerant
T	Tolerant
-	Intermediate
O	Omnivore
IF	Invertivore
P	Piscivore
H	Herbivore

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Upper Frio	9/5/02	13007	Blacktail Shiner	1		E	-	IF
			Central Stoneroller	3		E	-	H
			Channel Catfish	20		E	T	O
Order=5			Green Sunfish	3	SF	E	T	P
			Greenthroat Darter	3	D	E	I	IF
			Longear Sunfish	25	SF	E	-	IF
			Red Shiner	5		E	T	IF
			Redbreast Sunfish	1	SF	E	-	IF
			Rio Grande Cichlid	12		E	-	IF
			Roundnose Minnow	1		E	I	O
			Yellow Bullhead	6		E	-	O
Total				80				

FISH COLLECTED

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Upper Frio	9/3/02	13006	Blacktail Shiner	12		E	-	IF
			Blacktail Shiner	26		S	-	IF
			Central Stoneroller	18		E	-	H
Order=5			Central Stoneroller	3		S	-	H
			Channel Catfish	42		E	T	O
			Gambusia affinis	4		E	T	IF
			Gambusia affinis	31		S	T	IF
			Greenthroat Darter	2	D	E	I	IF
			Longear/Spotted Sunfish	9	SF	E	-	IF
			Longear Sunfish	43	SF	S	-	IF
			Red Shiner	23		E	T	IF
			Red Shiner	9		S	T	IF
			Redbreast Sunfish	1	SF	S	-	IF
			Rio Grande Cichlid	10		E	-	IF
			Rio Grande Cichlid	1		S	-	IF
			Roundnose Minnow	13		E	I	O
			Roundnose Minnow	7		S	I	O
			Texas Shiner	10		E	-	IF
			Texas Shiner	157		S	-	IF
			Yellow Bullhead	1		E	-	O
Total				422				

FISH COLLECTED

Stream: U.Frio	Species	N=	Type	Method	Tolerance	Trophic Gp.
Date: 8/4/03	Bass	1		V	~	P
Location: 17892	Blacktail shiner	7	CY	E	~	IF
Stream Order: 5	Blacktail shiner	11	CY	S	~	IF
	Central stoneroller	2	CY	E	~	H
	Central stoneroller	11	CY	S	~	H
	Channel catfish	13		E	T	O
	Channel catfish	1		S	T	O
	Gambusia	4		S	T	IF
	Gambusia	14		S	T	IF
	Green sunfish	1	SF	E	T	P
	Greenthroat darter	1	D	E	I	IF
	Greenthroat darter	1	D	S	I	IF
	Guadalupe bass	1		S	I	P
	Lepomis sp.	1	SF	E	~	IF
	Lepomis sp.	3	SF	S	~	IF
	Longear sunfish	3	SF	E	~	IF
	Nueces roundnose minnow	3	CY	E	I	O
	Nueces roundnose minnow	3	CY	S	I	O
	Rio Grande cichlid	4		E	~	IF
	Rio Grande cichlid	1		S	~	IF
	Texas shiner	3	CY	E	~	IF
	Texas shiner	520	CY	S	~	IF
	Unknown shiner	4	CY	E	~	IF
	Unknown shiner	2	CY	S	~	IF
	Yellow bullhead	2		E	~	O

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Stream: U.Frio	Species	N=	Type	Method	Tolerance	Trophic Gp.
Date: 8/5/03	Blacktail shiner	12	CY	E	~	IF
Location: 13007	Blacktail shiner	33	CY	S	~	IF
Stream Order:	Central stoneroller	19	CY	E	~	H
	Central stoneroller	13	CY	S	~	H
	Channel catfish	9		E	T	O
	Gambusia	4		S	T	IF
	Green sunfish	1	SF	E	T	P
	Lepomis sp.	19	SF	E	~	IF
	Lepomis sp.	1	SF	S	~	IF
	Longear sunfish	15	SF	E	~	IF
	Mexican tetra	2		E	~	IF
	Nueces roundnose minnow	2	CY	E	I	IF
	Red shiner	11	CY	E	T	IF
	Red shiner	14	CY	S	T	IF
	Rio Grande cichlid	16		E	~	IF
	Rio Grande cichlid	3		S	~	IF
	Texas shiner	16	CY	S	~	IF
	Unknown minnow	3	CY	E	~	IF
	Unknown minnow	4	CY	S	~	IF
	Yellow bullhead	2		E	~	O

199

FISH COLLECTED

Stream: U.Frio
Date: 8/5/03
Location: 13006

Stream Order:

Species	N=	Type	Method	Tolerance	Trophic Gp.
Blacktail shiner	5	CY	E	~	IF
Blacktail shiner	16	CY	S	~	IF
Central stoneroller	4	CY	E	~	H
Channel catfish	4		E	T	O
Channel catfish	1		S	T	O
Flathead catfish	2		E	~	P
Gambusia	1		E	T	IF
Gambusia	1		S	T	IF
Greenthroat darter	2	D	E	I	IF
Lepomis	3	SF	E	~	IF
Lepomis	3	SF	S	~	IF
Longear sunfish	7	SF	E	~	IF
Longear sunfish	1	SF	S	~	IF
Nueces roundnose minnow	2	CY	E	I	IF
Nueces roundnose minnow	1	CY	S	I	IF
Red shiner	6	CY	S	T	IF
Redbreast sunfish	1	SF	E	~	IF
Rio Grande cichlid	2		E	~	IF
Texas shiner	5	CY	E	~	IF
Texas shiner	27	CY	S	~	IF
Unknown shiner	5	CY	E	~	IF
Unknown shiner	36	CY	S	~	IF

FISH COLLECTED

Stream: U.Frio	Species	N=	Type	Method	Tolerance	Trophic Gp.
Date: 10/9/03	Blacktail Shiner	6	CY	E		IF
Location: 17892	Blacktail Shiner	71	CY	S		IF
Stream Order: 5	Central Stoneroller	24	CY	E		H
	Central Stoneroller	7	CY	S		H
	Channel Catfish	15		E	T	O
	Flathead Catfish	1		E		P
	Greenthroat Darter	4	D	E	I	IF
	Longear Sunfish	11	SF	E		IF
	Mexican Tetra	1		E		IF
	Nueces Roundnose Minnow	24	CY	E	I	O
	Nueces Roundnose Minnow	14	CY	S	I	O
	Orangethroat Darter	1	D	E		IF
	Red Shiner	8	CY	S	T	IF
	Rio Grande Cichlid	15		E		IF
	Rio Grande Cichlid	1		S		IF
	Texas Shiner	6	CY	E		IF
	Texas Shiner	349	CY	S		IF
	Western Mosquitofish	3		E	T	IF
	Western Mosquitofish	4		S	T	IF
	Yellow Bullhead	2		E		O
		567		454	30	55
				113		480

Stream: U.Frio	Species	N=	Type	Method	Tolerance	Trophic Gp.
Date: 10/9/03	Blacktail Shiner	2	CY	E		IF
Location: 13007	Blacktail Shiner	26	CY	S		IF
Stream Order:	Central Stoneroller	22	CY	E		O
	Channel Catfish	2		E	T	O
	Longear Sunfish	31	SF	E		IF
	Longear Sunfish	7	SF	S		IF
*25 Gambusia with spots	Nueces Roundnose Minnow	7	CY	S	I	O
	Orangethroat Darter	2	D	E		IF
	Red Shiner	2	CY	S	T	IF
	Redbreast Sunfish	5	SF	E		IF
	Rio Grande Cichlid	6		E		IF
	Rio Grande Cichlid	1		S		IF
	Texas Shiner	101	CY	S		IF
	Western Mosquitofish	73		S	T	IF
	Yellow Bullhead	3		E		O
		290		217		256
				73		

FISH COLLECTED

Stream: U.Frio
Date: 10/9/03
Location: 13006

Stream Order:

Species	N=	Type	Method	Tolerance	Trophic Gp.
Blacktail Shiner	8	CY	E		IF
Blacktail Shiner	9	CY	S		IF
Central Stoneroller	29	CY	E		H
Channel Catfish	5		E	T	O
Green Sunfish	1	SF	E	T	P
Greenthroated Darter	1	D	E		IF
Longear Sunfish	12	SF	E		IF
Mexican Tetra	4		E		IF
Nueces Roundnose Minnow	4	CY	E	I	O
Orangethroated Darter	3	D	E		IF
Rebreast Sunfish	5	SF	E		IF
Red Shiner	48	CY	E	T	IF
Red Shiner	31	CY	S	T	IF
Rio Grande Cichlid	13		E		IF
Texas Shiner	6	CY	E		IF
Texas Shiner	25	CY	S		IF
Western Mosquitofish	1		E	T	IF
Yellow Bullhead	1		E		O
		206	65	86	166
			141		

BIOTIC ASSESSMENT – FISH

Indices of Biotic Integrity – Statewide Criteria



**Quantitative Biological Scoring for Evaluating Aquatic Life Use Subcategories Based on Fish
Statewide Criteria**

Stream: U. Frio		Date: 9/4/02	Location: 10000	County: Real
Category	Metric	Value	Score	
Species Richness and Composition	1. Total number of fish species	12	3	
	2. Number of darter species	1	3	
	3. Number of sunfish species (exc. bass)	1	3	
	4. Number of sucker speices	0	1	
	5. Number of intolerant species	3	5	
	6. Percentage of individuals as tolerants	25	1	
Trophic Composition	7. Percentage of individuals as omnivores	17	5	
	8. Percentage of individuals as insectivores	60	3	
	9. Percentage of individuals as piscivores	6	5	
Fish Abundance and Condition	10. Number of individuals in sample	83	3	
	11. Percentage of individuals as hybrids	0	5	
	12. Percentage of individuals with disease/anomalies	0	5	
Aquatic Life Use: INTERMEDIATE			Total Points:	42

**Quantitative Biological Scoring for Evaluating Aquatic Life Use Subcategories Based on Fish
Statewide Criteria**

Stream: U. Frio		Date: 9/5/02	Location: 13007	County: Uvalde
Category	Metric	Value	Score	
Species Richness and Composition	1. Total number of fish species	11	3	
	2. Number of darter species	1	3	
	3. Number of sunfish species (exc. bass)	3	5	
	4. Number of sucker speices	0	1	
	5. Number of intolerant species	2	3	
	6. Percentage of individuals as tolerants	36	1	
Trophic Composition	7. Percentage of individuals as omnivores	34	3	
	8. Percentage of individuals as insectivores	59	3	
	9. Percentage of individuals as piscivores	4	3	
Fish Abundance and Condition	10. Number of individuals in sample	80	3	
	11. Percentage of individuals as hybrids	0	5	
	12. Percentage of individuals with disease/anomalies	0	5	
Aquatic Life Use: LIMITED-INTERMEDIATE		Total Points:	38	

**Quantitative Biological Scoring for Evaluating Aquatic Life Use Subcategories Based on Fish
Statewide Criteria**

Stream: U. Frio		Date: 9/3/02	Location: 13006	County: Uvalde
Category	Metric	Value	Score	
Species Richness and Composition	1. Total number of fish species	12	3	
	2. Number of darter species	1	3	
	3. Number of sunfish species (exc. bass)	2	5	
	4. Number of sucker speices	0	1	
	5. Number of intolerant species	2	3	
	6. Percentage of individuals as tolerants	26	1	
Trophic Composition	7. Percentage of individuals as omnivores	15	5	
	8. Percentage of individuals as insectivores	80	3	
	9. Percentage of individuals as piscivores	0	1	
Fish Abundance and Condition	10. Number of individuals in sample	422	5	
	11. Percentage of individuals as hybrids	0	5	
	12. Percentage of individuals with disease/anomalies	0	5	
Aquatic Life Use: INTERMEDIATE		Total Points:	40	

Quantitative Biological Scoring for Evaluating Aquatic Life Use Subcategories Based on Fish Statewide Criteria

Date: 8/5/03			Location: 17892			County: Real		
Metric			Value			Score		
1. Total # of fish species			15			3		
2. Number of darter species			1			3		
3. Number of sunfish species (exc. bass)			3			5		
4. Number of sucker species			0			1		
5. Number of intolerant species			3			5		
6. Percentage of individuals as tolerants			5.35			3		
7. Percentage of individuals as omnivores			3.57			5		
8. Percentage of individuals as insectivores			93.8			5		
9. Percentage of individuals as piscivores			0.49			1		
10. Number of individuals in sample			617			5		
11. Percentage of individuals as hybrids			0			5		
12. Percentage of individuals with disease/anomolies			0			5		
Aquatic Life Use: HIGH						Total Points:		46

Date: 8/5/03			Location: 13007			County: Uvalde		
Metric			Value			Score		
1. Total # of fish species			14			3		
2. Number of darter species			0			1		
3. Number of sunfish species (exc. bass)			3			5		
4. Number of sucker species			0			1		
5. Number of intolerant species			1			3		
6. Percentage of individuals as tolerants			19.6			3		
7. Percentage of individuals as omnivores			5.53			5		
8. Percentage of individuals as insectivores			77.89			3		
9. Percentage of individuals as piscivores			0.5			1		
10. Number of individuals in sample			199			3		
11. Percentage of individuals as hybrids			0			5		
12. Percentage of individuals with disease/anomolies			0			5		
Aquatic Life Use: INTERMEDIATE-LIMITED						Total Points:		38

Date: 8/4/03			Location: 13006			County: Uvalde		
Metric			Value			Score		
1. Total # of fish species			14			3		
2. Number of darter species			1			3		
3. Number of sunfish species (exc. bass)			3			5		
4. Number of sucker species			0			1		
5. Number of intolerant species			2			3		
6. Percentage of individuals as tolerants			9.6			3		
7. Percentage of individuals as omnivores			3.7			5		
8. Percentage of individuals as insectivores			91.9			5		
9. Percentage of individuals as piscivores			1.48			3		
10. Number of individuals in sample			135			3		
11. Percentage of individuals as hybrids			0			5		
12. Percentage of individuals with disease/anomolies			0			5		
Aquatic Life Use: INTERMEDIATE						Total Points:		44

Quantitative Biological Scoring for Evaluating Aquatic Life Use Subcategories Based on Fish
Statewide Criteria

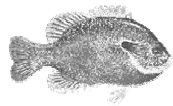
Stream: U.Frio Date: 10/9/03 Location: 17892 County: Real			
Category	Metric	Value	Score
Species Richness and Composition	1. Total # of fish species	14	3
	2. Number of darter species	2	3
	3. Number of sunfish species (exc. bass)	1	3
	4. Number of sucker species	0	1
	5. Number of intolerant species	2	3
	6. Percentage of individuals as tolerants	5.291005291	3
Trophic Composition	7. Percentage of individuals as omnivores	9.700176367	5
	8. Percentage of individuals as insectivores	84.65608466	5
	9. Percentage of individuals as piscivores	0.176366843	1
Fish Abundance and Condition	10. Number of individuals in sample	567	5
	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: INTERMEDIATE		Total Points:	42

Stream: U.Frio Date: 10/9/03 Location: 13007 County: Uvalde			
Category	Metric	Value	Score
Species Richness and Composition	1. Total # of fish species	12	3
	2. Number of darter species	1	3
	3. Number of sunfish species (exc. bass)	2	5
	4. Number of sucker species	0	1
	5. Number of intolerant species	1	3
	6. Percentage of individuals as tolerants	26.55172414	1
Trophic Composition	7. Percentage of individuals as omnivores	11.72413793	5
	8. Percentage of individuals as insectivores	88.27586207	5
	9. Percentage of individuals as piscivores	0	1
Fish Abundance and Condition	10. Number of individuals in sample	290	5
	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: INTERMEDIATE		Total Points:	42

Stream: U.Frio Date: 10/9/03 Location: 13006 County: Uvalde			
Category	Metric	Value	Score
Species Richness and Composition	1. Total # of fish species	15	3
	2. Number of darter species	2	3
	3. Number of sunfish species (exc. bass)	3	5
	4. Number of sucker species	0	1
	5. Number of intolerant species	1	3
	6. Percentage of individuals as tolerants	41.74757282	1
Trophic Composition	7. Percentage of individuals as omnivores	4.854368932	5
	8. Percentage of individuals as insectivores	80.58252427	5
	9. Percentage of individuals as piscivores	0.485436893	1
Fish Abundance and Condition	10. Number of individuals in sample	206	5
	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: INTERMEDIATE		Total Points:	42

BIOTIC ASSESSMENT – FISH

Indices of Biotic Integrity – Regional Criteria



Quantitative Biological Scoring for Evaluating Aquatic Life Use Subcategories Based on Fish Regional Criteria

Stream: U. Frio			Date: 9/4/02			Location: 17892			County: Real		
Metric						Value			Score		
1. Total number of fish species						12			3		
2. Number of native cyprinid species						3			3		
3. Number of benthic invertevora species						1			3		
4. Number of sunfish species						1			1		
5. Number of intolerant species						3			5		
6. % of individuals as tolerant species (exc. G. affinis)						16			5		
7. % individuals as omnivores						17			1		
8. % of individuals as invertevora						60			3		
9. % of individuals as piscivores						6			3		
10. Number of individuals in a sample						83			-		
a. Number of individuals/seine haul						2			1		
b. Number of ind./min. electrofishing						4.6			3		
11. % of individuals as non-native species						0			5		
12. % of individuals with disease or other anomaly						0			5		
Aquatic Life Use: INTERMEDIATE						Total Points:			39		

Quantitative Biological Scoring for Evaluating Aquatic Life Use Subcategories Based on Fish Regional Criteria

Stream: U. Frio			Date: 9/5/02	Location: 13007	County: Uvalde
Metric	Value	Score			
1. Total number of fish species	11	3			
2. Number of native cyprinid species	4	3			
3. Number of benthic invertevore species	1	3			
4. Number of sunfish species	3	3			
5. Number of intolerant species	2	5			
6. % of individuals as tolerant species (exc. G. affinis)	35	3			
7. % individuals as omnivores	34	1			
8. % of individuals as invertevores	59	3			
9. % of individuals as piscivores	4	3			
10. Number of indivudals in a sample	80	-			
a. Number of individuals/seine hual	No seine	5			
b. Number of ind./min. electrofishing	5.3	5			
11. % of individuals as non-native species	1.25	5			
12. % of individuals with disease or other anomaly	0	5			
Aquatic Life Use: HIGH	Total Points:	42			

Quantitative Biological Scoring for Evaluating Aquatic Life Use Subcategories Based on Fish Regional Criteria

Stream: U. Frio			Date: 9/3/02	Location: 13006	County: Real
Metric	Value	Score			
1. Total number of fish species	12	3			
2. Number of native cyprinid species	5	5			
3. Number of benthic invertevore species	1	3			
4. Number of sunfish species	2	3			
5. Number of intolerant species	2	5			
6. % of individuals as tolerant species (exc. G. affinis)	17.3	5			
7. % individuals as omnivores	15	3			
8. % of individuals as invertevores	80	5			
9. % of individuals as piscivores	0	1			
10. Number of indivudals in a sample	422	-			
a. Number of individuals/seine hual	46.33	3			
b. Number of ind./min. electrofishing	9.6	5			
11. % of individuals as non-native species	0.24	5			
12. % of individuals with disease or other anomaly	0	5			
Aquatic Life Use: HIGH	Total Points:	47			

Quantitative Biological Scoring for Evaluating Aquatic Life Use Subcategories Based on Fish Regional Criteria

Stream: U.Frio (30) Date: 8/4/03 Location: 17892 County: Real		
Metric	Value	Score
1. Total # of fish species	15	5
2. Total Number of cyprinid species	5	5
3. Number of benthic invertivore species	1	3
4. Number of sunfish species (exc. bass)	3	3
5. Number of intolerant species	3	5
6. Percentage of individuals as tolerants (exc. <i>G. affinis</i>)	2.4	5
7. Percentage of individuals as omnivores	3.57	5
8. Percentage of individuals as insectivores	93.8	5
9. Percentage of individuals as piscivores	0.49	1
10. Number of individuals in sample	~	~
a. Number of individuals/seine haul	95.3	5
b. Number of individuals/min. electroshocking	2.93	3
11. Percentage of individuals as non-native species	0	5
12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: HIGH	Total Points:	51
Stream: U.Frio (30) Date: 8/5/03 Location: 13007 County: Uvalde		
Metric	Value	Score
1. Total # of fish species	14	5
2. Total Number of cyprinid species	6	5
3. Number of benthic invertivore species	0	1
4. Number of sunfish species (exc. bass)	3	3
5. Number of intolerant species	1	3
6. Percentage of individuals as tolerants (exc. <i>G. affinis</i>)	17.6	5
7. Percentage of individuals as omnivores	5.5	5
8. Percentage of individuals as insectivores	77.9	5
9. Percentage of individuals as piscivores	0.5	1
10. Number of individuals in sample	~	~
a. Number of individuals/seine haul	14.7	1
b. Number of individuals/min. electroshocking	7.3	5
11. Percentage of individuals as non-native species	0	5
12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: HIGH	Total Points:	46
Stream: U.Frio (30) Date: 8/5/03 Location: 13006 County: Uvalde		
Metric	Value	Score
1. Total # of fish species	14	5
2. Total Number of cyprinid species	6	5
3. Number of benthic invertivore species	1	3
4. Number of sunfish species (exc. bass)	3	3
5. Number of intolerant species	2	5
6. Percentage of individuals as tolerants (exc. <i>G. affinis</i>)	8.1	5
7. Percentage of individuals as omnivores	3.7	5
8. Percentage of individuals as insectivores	91.9	5
9. Percentage of individuals as piscivores	1.48	1
10. Number of individuals in sample	~	~
a. Number of individuals/seine haul	15.3	1
b. Number of individuals/min. electroshocking	2.87	3
11. Percentage of individuals as non-native species	0.74	5
12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: HIGH	Total Points:	49

Quantitative Biological Scoring for Evaluating Aquatic Life Use Subcategories Based on Fish Regional Criteria

Stream: U.Frio (30) Date: 10/9/03 Location: 17892 County: Real		
Metric	Value	Score
1. Total # of fish species	14	5
2. Total Number of cyprinid species	5	5
3. Number of benthic invertivore species	2	5
4. Number of sunfish species (exc. bass)	1	1
5. Number of intolerant species	2	5
6. Percentage of individuals as tolerants (exc. <i>G. affinis</i>)	4.05643739	5
7. Percentage of individuals as omnivores	9.700176367	3
8. Percentage of individuals as insectivores	84.65608466	5
9. Percentage of individuals as piscivores	0.176366843	1
10. Number of individuals in sample		~
a. Number of individuals/seine haul	75.66666667	5
b. Number of individuals/min. electroshocking	7.533333333	5
11. Percentage of individuals as non-native species	0	5
12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: HIGH	Total Points:	50

Stream: U.Frio (30) Date: 10/9/03 Location: 13007 County: Uvalde		
Metric	Value	Score
1. Total # of fish species	12	3
2. Total Number of cyprinid species	5	5
3. Number of benthic invertivore species	1	3
4. Number of sunfish species (exc. bass)	2	3
5. Number of intolerant species	1	3
6. Percentage of individuals as tolerants (exc. <i>G. affinis</i>)	1.379310345	5
7. Percentage of individuals as omnivores	11.72413793	3
8. Percentage of individuals as insectivores	88.27586207	5
9. Percentage of individuals as piscivores	0	1
10. Number of individuals in sample		~
a. Number of individuals/seine haul	36.16666667	1
b. Number of individuals/min. electroshocking	4.866666667	3
11. Percentage of individuals as non-native species	1.724137931	3
12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: INTERMEDIATE	Total Points:	41

Stream: U.Frio (30) Date: 10/9/03 Location: 13006 County: Uvalde		
Metric	Value	Score
1. Total # of fish species	15	5
2. Total Number of cyprinid species	5	5
3. Number of benthic invertivore species	2	5
4. Number of sunfish species (exc. bass)	3	3
5. Number of intolerant species	1	3
6. Percentage of individuals as tolerants (exc. <i>G. affinis</i>)	41.26213592	3
7. Percentage of individuals as omnivores	4.854368932	5
8. Percentage of individuals as insectivores	80.58252427	5
9. Percentage of individuals as piscivores	0.485436893	1
10. Number of individuals in sample		~
a. Number of individuals/seine haul	10.83333333	1
b. Number of individuals/min. electroshocking	9.4	5
11. Percentage of individuals as non-native species	2.427184466	3
12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: HIGH	Total Points:	46

BIOTIC ASSESSMENT – BENTHIC MACROINVERTEBRATES

Species Lists and Preliminary Data Manipulation



Benthic Macroinvertebrates - Kick Sample (Qualitative)

Stream	Date	ID	Taxa	N=	Func.Gp.	Tolerance	HBI
U.Frio	9/4/02	10000	Odonata-Coenagrionidae- <i>Argia</i>	5	P	6	0.3370787
			Ephemeroptera-Tricorythidae- <i>Leptohypes</i>	5	CG/SCR	2	0.1123596
			Ephemeroptera-Leptophlebiidae- <i>Thraulodes</i>	28	CG/SCR	2	0.6292135
Func.Gp	N=		Ephemeroptera-Heptageniidae- <i>Stenonema</i>	2	SCR/CG	4	0.0898876
P	10		Ephemeroptera-Baetidae- <i>Baetis</i>	11	SCR/CG	4	0.494382
SCR	31		Hemiptera-Naucoridae- <i>Ambrysus</i>	3	P	-	-
CG	34		Trichoptera-Hydropsychidae- <i>Cheumatopsyche</i>	9	FC	6	0.6067416
FC	17		Trichoptera-Philopotamidae- <i>Chimarra</i>	8	FC	3	0.2696629
SHR	0		Coleoptera-Elmidae- <i>Macrelmis</i> (L) (<i>Elsianus</i>)	3	CG/SCR	2	0.0674157
			Coleoptera-Elmidae- <i>Hexacylloepus</i> (A)	6	CG/SCR	2	0.1348315
			Coleoptera-Elmidae- <i>Microcyloepus</i> (A)	6	CG/SCR	2	0.1348315
			Coleoptera-Elmidae- <i>Neoelmis</i> (A)	1	CG/SCR	2	0.0224719
			Diptera-Athericeridae- <i>Atherix</i>	1	P	4	0.0449438
			Oligochaeta	1	CG	8	0.0898876
			Tricladida (Oligochaeta)	2	CG	8	0.1797753
			Gastropoda (Limnophila)-Planorbidae- <i>Drepanotrema</i>	2	-	-	-
			Hydracarina	1	P	6	0.0674157
Total				92	89		3.2808989
Intolerant/Tolerant				3.94			

Stream	Date	ID	Taxa	N=	Func.Gp.	Tolerance	HBI
U.Frio	9/5/02	13007	Odonata-Coenagrionidae- <i>Argia</i>	6	P	6	0.3564356
			Ephemeroptera-Leptophlebiidae- <i>Thraulodes</i>	36	CG/SCR	2	0.7128713
			Ephemeroptera-Baetidae- <i>Baetis</i>	8	SCR/CG	4	0.3168317
Func.Gp	N=		Ephemeroptera-Baetidae- <i>Camelobaetidium</i> (<i>Dactylobaetis</i>)	2	SCR/CG	4	0.0792079
P	20		Hemiptera-Naucoridae- <i>Ambrysus</i>	3	P	-	-
SCR	37		Hemiptera-Naucoridae-Cryphocricos	2	P	-	-
CG	37		Megaloptera-Corydalidae- <i>Corydalus</i>	5	P	6	0.2970297
FC	10		Trichoptera-Hydropsychidae- <i>Cheumatopsyche</i>	1	FC	6	0.0594059
SHR	2		Trichoptera-Philopotamidae- <i>Chimarra</i>	9	FC	3	0.2673267
			Trichoptera-Odonticeridae- <i>Marilia</i>	2	SHR	0	0
			Coleoptera-Elmidae- <i>Macrelmis</i> (L) (<i>Elsianus</i>)	13	CG/SCR	2	0.2574257
			Coleoptera-Elmidae- <i>Macrelmis</i> (A) (<i>Elsianus</i>)	2	CG/SCR	2	0.039604
			Coleoptera-Elmidae- <i>Hexacylloepus</i> (A)	1	CG/SCR	2	0.019802
			Coleoptera-Elmidae- <i>Microcyloepus</i> (A)	1	CG/SCR	2	0.019802
			Diptera-Chironomidae	11	SCR/CG	4	0.4356436
			Diptera-Tabanidae- <i>Tabanus</i>	1	P	7	0.0693069
			Tricladida (<i>Dugesia</i>)	3	P	7.5	0.2227723
Total				106	101		3.1534653
Intolerant/Tolerant				5.31			

Benthic Macroinvertebrates - Kick Sample (Qualitative)

Stream	Date	ID	Taxa	N=	Func.Gp.	Tolerance	HBI
U.Frio	9/3/02	13006	Odonata-Coenagrionidae- <i>Argia</i>	18	P	6	1.3170732
			Ephemeroptera-Tricorythidae- <i>Leptohypes</i>	1	CG/SCR	2	0.0243902
			Ephemeroptera-Leptophlebiidae- <i>Thraulodes</i>	11	CG/SCR	2	0.2682927
			Ephemeroptera-Heptageniidae- <i>Stenonema</i>	2	SCR/CG	4	0.097561
			Hemiptera-Naucoridae- <i>Ambrysus</i>	1	P	-	-
			Hemiptera-Naucoridae- <i>Cryphocricos</i>	1	P	-	-
			Megaloptera-Corydalidae- <i>Corydalus</i>	8	P	6	0.5853659
			Trichoptera-Hydropsychidae- <i>Cheumatopsyche</i>	2	FC	6	0.1463415
			Trichoptera-Philopotamidae- <i>Chimarra</i>	9	FC	3	0.3292683
			Trichoptera-Odonticeridae- <i>Marilia</i>	1	SHR	0	0
			Coleoptera-Elmidae- <i>Macrelmis</i> (A) (<i>Elsianus</i>)	13	CG/SCR	2	0.3170732
			Coleoptera-Elmidae- <i>Macrelmis</i> (L) (<i>Elsianus</i>)	10	CG/SCR	2	0.2439024
			Coleoptera-Elmidae- <i>Neoelmis</i>	2	CG/SCR	2	0.0487805
			Diptera-Chironomidae	4	SCR/CG	4	0.195122
			Diptera-Simuliidae- <i>Simulium</i>	1	FC	4	0.0487805
			Total	84	82		3.6219512
			Intolerant/Tolerant				1.93

Benthic Macroinvertebrates - Kick Sample (Qualitative)

Stream: U.Frio		Species	N=	Tolerance	FFG	HBI
Date: 08/05/03		<i>Argia</i>	5	6	P	0.309278351
Location: 17892		<i>Hetaerina</i>	4	6	P	0.24742268
		<i>Tricorythodes</i>	12	5	CG	0.618556701
P	20	<i>Leptohypes</i>	2	2	CG/SCR	0.041237113
SCR	20.5	<i>Baetis</i>	8	4	SCR/CG	0.329896907
CG	34.5	<i>Isonychia</i>	7	3	FC	0.216494845
FC	28	<i>Thraulodes</i>	16	2	CG/SCR	0.329896907
SHR	3	<i>Ambrysus</i>	5	-	P	-
	106	<i>Cryphocricos</i>	2	-	P	-
		<i>Cheumatopsyche</i>	19	6	FC	1.175257732
		<i>Chimarra</i>	2	3	FC	0.06185567
		<i>Marilia</i>	3	0	SHR	0
		<i>Microcylloepus</i> (A)	4	2	CG/SCR	0.082474227
		<i>Hexacylloepus</i> (A)	1	2	CG/SCR	0.020618557
		<i>Macrelmis</i> (L)	6	2	CG/SCR	0.12371134
		<i>Macrelmis</i> (A)	3	2	CG/SCR	0.06185567
		<i>Celina</i> (A)	1	-	P	-
		<i>Lutrochus</i> (A)	1	-	CG	-
		<i>Helichus</i> (A)	1	4	SCR/CG	0.041237113
		Hydracarina	1	6	P	0.06185567
		Oligochaeta	1	8	CG	0.082474227
		Tricladida	2	7.5	P	0.154639175
			106	2.03125		3.958762887

Stream: U.Frio		Species	N=	Tolerance	FFG	HBI
Date: 08/05/03		<i>Argia</i>	19	6	P	1.151515152
Location: 13007		<i>Brechmorhoga</i>	1	6	P	0.060606061
		<i>Tricorythodes</i>	2	5	CG	0.101010101
P	30.6666667	<i>Camelobaetidius</i>	1	4	SCR/CG	0.04040404
SCR	25	<i>Isonychia</i>	3	3	FC	0.090909091
CG	13.6666667	<i>Cryphocricos</i>	1	-	P	-
FC	32.6666667	<i>Corydalus</i>	8	6	P	0.484848485
SHR	0	<i>Cheumatopsyche</i>	2	6	FC	0.121212121
	102	<i>Chimarra</i>	26	3	FC	0.787878788
		<i>Microcylloepus</i> (A)	4	2	CG/SCR	0.080808081
		<i>Microcylloepus</i> (L)	2	2	CG/SCR	0.04040404
		<i>Hexacylloepus</i> (A)	1	2	CG/SCR	0.02020202
		<i>Macrelmis</i> (L)	8	2	CG/SCR	0.161616162
		<i>Macrelmis</i> (A)	2	2	CG/SCR	0.04040404
		<i>Lutrochus</i> (A)	1	-	CG	-
		<i>Lutrochus</i> (L)	1	-	CG	-
		Chironomidae	2	6	P/CG/FC	0.121212121
		<i>Simulium</i>	1	4	FC	0.04040404
		<i>Atherix</i>	1	7	P	0.070707071
		<i>Physella</i>	15	9	SCR	1.363636364
		<i>Planorbula</i>	1	7	SCR	0.070707071
			102	1.02040816		3.181818182

Benthic Macroinvertebrates - Kick Sample (Qualitative)

Stream: U.Frio
Date: 08/06/03
Location: 13006

		Species	N=	Tolerance	FFG	HBI
		<i>Argia</i>	15	6	P	1.011235955
		<i>Tricorythodes</i>	4	5	CG	0.224719101
		<i>Leptohypes</i>	1	2	CG/SCR	0.02247191
P	39.6666667	<i>Camelobaetidius</i>	9	4	SCR/CG	0.404494382
SCR	13.5	<i>Baetodes</i>	1	4	SCR	0.04494382
CG	23.5	<i>Isonychia</i>	3	3	FC	0.101123596
FC	30.6666667	<i>Ambrysus</i>	2	-	P	-
SHR	0.66666667	<i>Cryphocricos</i>	11	-	P	-
	108	<i>Corydalus</i>	4	6	P	0.269662921
		<i>Cheumatopsyche</i>	12	6	FC	0.808988764
		<i>Hydropsyche</i>	1	5	FC	0.056179775
		<i>Chimarra</i>	12	3	FC	0.404494382
		<i>Cymellus</i>	1			-
		<i>Neureclipsis</i>	2	4	FC/SHR/P	0.08988764
		<i>Microcyloepus (A)</i>	8	2	CG/SCR	0.179775281
		<i>Microcyloepus (L)</i>	5	2	CG/SCR	0.112359551
		<i>Lutrochus (A)</i>	1	-	CG	-
		<i>Lutrochus (L)</i>	5	-	CG	-
		Chironomidae	6	6	P/CG/FC	0.404494382
		<i>Atherix</i>	5	7	P	0.393258427
		<i>Physella</i>	1	9	SCR	0.101123596
			108	1.06976744		4.629213483

Benthic Macroinvertebrates - Kick Sample (Qualitative)

Stream: U.Frio		Species	N=	Tolerance	FFG	HBI
Date: 10/9/03		<i>Argia</i>	9	6	P	0.519230769
Location: 17892		<i>Tricorythodes</i>	11	5	CG	0.528846154
		<i>Camelobaetidius</i>	4	4	SCR/CG	0.153846154
P	20.333333	<i>Fallceon</i>	10	4	SCR/CG	0.384615385
SCR	20	<i>Baetodes</i>	1	4	SCR	0.038461538
CG	30.333333	<i>Stenonema</i>	3	4	SCR/CG	0.115384615
FC	38.333333	<i>Isonychia</i>	16	3	FC	0.461538462
SHR	0	<i>Thraulodes</i>	17	2	SCR/CG	0.326923077
	109	<i>Ambrysus</i>	3	-	P	-
		<i>Cryphocricos</i>	2	-	P	-
		<i>Corydalus</i>	2	6	P	0.115384615
		<i>Cheumatopsyche</i>	2	6	FC	0.115384615
		<i>Chimarra</i>	15	3	FC	0.432692308
		<i>Cerrotina</i>	2	6	P	0.115384615
		<i>Helichus (A)</i>	4	4	SCR/CG	0.153846154
		Chironomidae	1	6	P/CG/FC	0.057692308
		<i>Simulium</i>	5	4	FC	0.192307692
		Hirudinea	1	8	P	0.076923077
		Tricladida	1	7.5	P	0.072115385
			104	4.77777778		3.860576923

Stream: U.Frio		Species	N=	Tolerance	FFG	HBI
Date: 10/9/03		<i>Argia</i>	17	6	P	0.910714286
Location: 13007		<i>Tricorythodes</i>	2	5	CG	0.089285714
		<i>Leptohypes</i>	1	2	CG	0.017857143
P	24.666667	<i>Camelobaetidius</i>	2	4	SCR/CG	0.071428571
SCR	17	<i>Fallceon</i>	3	4	SCR/CG	0.107142857
CG	22.666667	<i>Stenonema</i>	8	4	SCR/CG	0.285714286
FC	48.666667	<i>Isonychia</i>	7	3	FC	0.1875
SHR	0	<i>Thraulodes</i>	1	2	SCR/CG	0.017857143
	113	<i>Corydalus</i>	2	6	P	0.107142857
		<i>Chimarra</i>	32	3	FC	0.857142857
		<i>Microcylloepus (A)</i>	1	2	SCR/CG	0.017857143
		<i>Macrelmis</i>	19	2	SCR/CG	0.339285714
		<i>Lutrochus (L)</i>	1	-	CG	-
		Chironomidae	2	6	P/CG/FC	0.107142857
		<i>Simulium</i>	9	4	FC	0.321428571
		Oligochaeta	1	8	CG	0.071428571
		Tricladida	5	7.5	P	0.334821429
			112	3.14814815		3.84375

Benthic Macroinvertebrates - Kick Sample (Qualitative)

Stream: U.Frio
 Date: 10/9/03
 Location: 13006

		Species	N=	Tolerance	FFG	HBI
		<i>Argia</i>	27	6	P	1.62
		<i>Leptohypes</i>	1	2	CG	0.02
		<i>Camelobaetidius</i>	2	4	SCR/CG	0.08
P	45.333333	<i>Fallceon</i>	6	4	SCR/CG	0.24
SCR	27.5	<i>Stenonema</i>	13	4	SCR/CG	0.52
CG	29.833333	<i>Isonychia</i>	2	3	FC	0.06
FC	9.3333333	<i>Thraulodes</i>	17	2	SCR/CG	0.34
SHR	0	<i>Choroterpes</i>	1	2	SCR/CG	0.02
	112	<i>Caenis</i>	1	7	CG/SCR	0.07
		<i>Ambrysus</i>	7	-	P	-
		<i>Cryphocricos</i>	4	-	P	-
		<i>Corydalus</i>	2	6	P	0.12
		<i>Cheumatopsyche</i>	6	6	FC	0.36
		<i>Chimarra</i>	1	3	FC	0.03
		<i>Macrelmis</i> (L)	14	2	SCR/CG	0.28
		<i>Lutrochus</i> (L)	1	-	CG	-
		<i>Helichus</i> (A)	1	4	SCR/CG	0.04
		Chironomidae	1	6	P/CG/FC	0.06
		Tricladida	5	7.5	P	0.375
			100	1.38095238		4.235

BIOTIC ASSESSMENT – BENTHIC MACROINVERTEBRATES

Rapid Bioassessment Protocol



Stream: U.Frio Date: 9/4/02 Location: 10000		County: Real	
Metric	Value	Score	
1. Taxa Richness	17	3	
2. EPT Taxa Abundance	6	2	
3. Biotic Index (HBI)	3.28	4	
4. % Chironomidae	0	1	
5. % Dominant Taxon	30.43478261	3	
6. % Dominant FFG	36.95652174	3	
7. % Predators	10.86956522	4	
8. Ratio of Intolerant:Tolerant Taxa	3.94	3	
9. % of Total Trichoptera as Hydropsychidae	52.94117647	2	
10. # of Non-insect Taxa	4	3	
11. % Collector-Gatherers	36.95652174	2	
12. % of Total Number as Elmidae	14.13043478	3	
Aquatic Life Use: HIGH	Total Score:	33	

Stream: U.Frio Date: 9/5/02 Location: 13007		County: Uvalde	
Metric	Value	Score	
1. Taxa Richness	16	3	
2. EPT Taxa Abundance	6	2	
3. Biotic Index (HBI)	3.15	4	
4. % Chironomidae	10.37735849	2	
5. % Dominant Taxon	33.96226415	2	
6. % Dominant FFG	34.90566038	4	
7. % Predators	18.86792453	3	
8. Ratio of Intolerant:Tolerant Taxa	5.31	4	
9. % of Total Trichoptera as Hydropsychidae	8.333333333	4	
10. # of Non-insect Taxa	1	1	
11. % Collector-Gatherers	34.90566038	2	
12. % of Total Number as Elmidae	16.03773585	3	
Aquatic Life Use: HIGH	Total Score:	34	

Stream: U.Frio Date: 9/3/02 Location: 13006		County: Uvalde	
Metric	Value	Score	
1. Taxa Richness	14	2	
2. EPT Taxa Abundance	6	2	
3. Biotic Index (HBI)	3.62	4	
4. % Chironomidae	4.761904762	3	
5. % Dominant Taxon	21.42857143	4	
6. % Dominant FFG	33.33333333	4	
7. % Predators	33.33333333	2	
8. Ratio of Intolerant:Tolerant Taxa	1.93	2	
9. % of Total Trichoptera as Hydropsychidae	16.66666667	4	
10. # of Non-insect Taxa	0	1	
11. % Collector-Gatherers	25.5952381	3	
12. % of Total Number as Elmidae	29.76190476	2	
Aquatic Life Use: HIGH	Total Score:	33	

Stream: U.Frio Date: 8/5/03 Location: 17892		County: Real	
Metric	Value	Score	
1. Taxa Richness	21	3	
2. EPT Taxa Abundance	8	3	
3. Biotic Index (HBI)	3.96	3	
4. % Chironomidae	0	1	
5. % Dominant Taxon	17.9245283	4	
6. % Dominant FFG	32.54716981	4	
7. % Predators	18.86792453	3	
8. Ratio of Intolerant:Tolerant Taxa	2.03	2	
9. % of Total Trichoptera as Hydropsychidae	79.16666667	1	
10. # of Non-insect Taxa	3	2	
11. % Collector-Gatherers	32.54716981	2	
12. % of Total Number as Elmidae	13.20754717	3	
Aquatic Life Use: HIGH	Total Score:	31	

Stream: U.Frio Date: 8/5/03 Location: 13007		County: Uvalde	
Metric	Value	Score	
1. Taxa Richness	18	3	
2. EPT Taxa Abundance	5	2	
3. Biotic Index (HBI)	3.18	4	
4. % Chironomidae	1.960784314	4	
5. % Dominant Taxon	25.49019608	3	
6. % Dominant FFG	32.02647059	4	
7. % Predators	30.06568627	2	
8. Ratio of Intolerant:Tolerant Taxa	1.02	1	
9. % of Total Trichoptera as Hydropsychidae	7.142857143	4	
10. # of Non-insect Taxa	2	2	
11. % Collector-Gatherers	13.39901961	4	
12. % of Total Number as Elmidae	16.66666667	3	
Aquatic Life Use: HIGH	Total Score:	36	

Stream: U.Frio Date: 8/6/03 Location: 13006		County: Uvalde	
Metric	Value	Score	
1. Taxa Richness	19	3	
2. EPT Taxa Abundance	10	4	
3. Biotic Index (HBI)	4.63	2	
4. % Chironomidae	5.555555556	3	
5. % Dominant Taxon	13.88888889	4	
6. % Dominant FFG	36.7287037	3	
7. % Predators	36.7287037	1	
8. Ratio of Intolerant:Tolerant Taxa	1.07	1	
9. % of Total Trichoptera as Hydropsychidae	46.42857143	3	
10. # of Non-insect Taxa	1	1	
11. % Collector-Gatherers	21.75925926	3	
12. % of Total Number as Elmidae	12.03703704	3	
Aquatic Life Use: HIGH	Total Score:	31	

Stream: U.Frio Date: 10/9/03 Location: 17892 County: Real		
Metric	Value	Score
1. Taxa Richness	19	3
2. EPT Taxa Abundance	10	4
3. Biotic Index (HBI)	3.86	3
4. % Chironomidae	0.917431193	4
5. % Dominant Taxon	15.59633028	4
6. % Dominant FFG	35.13761468	4
7. % Predators	18.65137615	3
8. Ratio of Intolerant:Tolerant Taxa	4.78	3
9. % of Total Trichoptera as Hydropsychidae	10.52631579	4
10. # of Non-insect Taxa	2	2
11. % Collector-Gatherers	27.79816514	3
12. % of Total Number as Elmidae	0	1
Aquatic Life Use: EXCEPTIONAL	Total Score:	38

Stream: U.Frio Date: 10/9/03 Location: 13007 County: Uvalde		
Metric	Value	Score
1. Taxa Richness	17	3
2. EPT Taxa Abundance	8	3
3. Biotic Index (HBI)	3.84	3
4. % Chironomidae	1.769911504	4
5. % Dominant Taxon	28.31858407	3
6. % Dominant FFG	43.07079646	3
7. % Predators	21.83185841	3
8. Ratio of Intolerant:Tolerant Taxa	3.15	2
9. % of Total Trichoptera as Hydropsychidae	0	4
10. # of Non-insect Taxa	2	2
11. % Collector-Gatherers	20.0619469	3
12. % of Total Number as Elmidae	17.69911504	3
Aquatic Life Use: HIGH	Total Score:	36

Stream: U.Frio Date: 10/9/03 Location: 13006 County: Uvalde		
Metric	Value	Score
1. Taxa Richness	19	3
2. EPT Taxa Abundance	10	4
3. Biotic Index (HBI)	4.24	3
4. % Chironomidae	0.892857143	4
5. % Dominant Taxon	24.10714286	3
6. % Dominant FFG	40.44642857	3
7. % Predators	40.44642857	1
8. Ratio of Intolerant:Tolerant Taxa	1.38	1
9. % of Total Trichoptera as Hydropsychidae	85.71428571	1
10. # of Non-insect Taxa	1	1
11. % Collector-Gatherers	26.63392857	3
12. % of Total Number as Elmidae	12.5	3
Aquatic Life Use: HIGH	Total Score:	30

HABITAT ASSESSMENT

Part I – Stream Physical Characteristics Worksheet



Table B-12. Part 1. Stream Physical Characteristics Worksheet

Part I - Stream Physical Characteristics Worksheet

Observers: _____ Date: ___ Time: ___ Weather conditions: _____

Stream: _____ Location of site: _____ Length of stream reach: _____

Stream Segment No.: ___ Observed Stream Uses: _____ Aesthetics (circle one): (1) wilderness (2) natural (3) common (4) offensive

Stream Type (Circle One): perennial or intermittent w/ perennial pools Stream Bends: No. Well Defined; No. Moderately Defined; No. Poorly Defined

Channel Obstructions/Modifications: _____ No. of Riffles: ___ Channel Flow Status (circle one): high moderate low no flow

Riparian Vegetation (%):

Left Bank: Trees_ Shrubs_ Grasses, Forbs_ Cult. Fields_ Other_

Right Bank: Trees_ Shrubs_ Grasses, Forbs_ Cult. Fields_ Other_

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)	
				Thalweg Depth:													
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type				Dominant Types Riparian Vegetation: Left Bank:				Right Bank:				% Gravel or Larger		
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:				Instream Cover Types:				% Instream Cover						

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)	
				Thalweg Depth:													
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type				Dominant Types Riparian Vegetation: Left Bank:				Right Bank:				% Gravel or Larger		
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:				Instream Cover Types:				% Instream Cover						

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)		
				Thalweg Depth:														
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type					Dominant Types Riparian Vegetation: Left Bank: Right Bank:					% Gravel or Larger					
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:					Instream Cover Types:					% Instream Cover					

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)		
				Thalweg Depth:														
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type					Dominant Types Riparian Vegetation: Left Bank: Right Bank:					% Gravel or Larger					
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:					Instream Cover Types:					% Instream Cover					

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)		
				Thalweg Depth:														
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type					Dominant Types Riparian Vegetation: Left Bank: Right Bank:					% Gravel or Larger					
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:					Instream Cover Types:					% Instream Cover					

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)		
				Thalweg Depth:														
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type					Dominant Types Riparian Vegetation: Left Bank: Right Bank:					% Gravel or Larger					
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:					Instream Cover Types:					% Instream Cover					

Table B-12. Part 1. Stream Physical Characteristics Worksheet

Part I - Stream Physical Characteristics Worksheet

Observers: _____ Date: ___ Time: ___ Weather conditions: _____

Stream: _____ Location of site: _____ Length of stream reach: _____

Stream Segment No.: ___ Observed Stream Uses: _____ Aesthetics (circle one): (1) wilderness (2) natural (3) common (4) offensive

Stream Type (Circle One): perennial or intermittent w/ perennial pools Stream Bends: No. Well Defined; No. Moderately Defined; No. Poorly Defined

Channel Obstructions/Modifications: _____ No. of Riffles: ___ Channel Flow Status (circle one): high moderate low no flow

Riparian Vegetation (%):

Left Bank: Trees_ Shrubs_ Grasses, Forbs_ Cult. Fields_ Other_

Right Bank: Trees_ Shrubs_ Grasses, Forbs_ Cult. Fields_ Other_

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)	
				Thalweg Depth:													
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type				Dominant Types Riparian Vegetation: Left Bank:				Right Bank:				% Gravel or Larger		
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:				Instream Cover Types:				% Instream Cover						

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)	
				Thalweg Depth:													
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type				Dominant Types Riparian Vegetation: Left Bank:				Right Bank:				% Gravel or Larger		
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:				Instream Cover Types:				% Instream Cover						

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)		
				Thalweg Depth:														
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type					Dominant Types Riparian Vegetation: Left Bank: Right Bank:					% Gravel or Larger					
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:					Instream Cover Types:					% Instream Cover					

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)		
				Thalweg Depth:														
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type					Dominant Types Riparian Vegetation: Left Bank: Right Bank:					% Gravel or Larger					
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:					Instream Cover Types:					% Instream Cover					

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)		
				Thalweg Depth:														
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type					Dominant Types Riparian Vegetation: Left Bank: Right Bank:					% Gravel or Larger					
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:					Instream Cover Types:					% Instream Cover					

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)		
				Thalweg Depth:														
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type					Dominant Types Riparian Vegetation: Left Bank: Right Bank:					% Gravel or Larger					
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:					Instream Cover Types:					% Instream Cover					

Table B-12. Part 1. Stream Physical Characteristics Worksheet

Part I - Stream Physical Characteristics Worksheet

Observers: _____ Date: ___ Time: ___ Weather conditions: _____

Stream: _____ Location of site: _____ Length of stream reach: _____

Stream Segment No.: ___ Observed Stream Uses: _____ Aesthetics (circle one): (1) wilderness (2) natural (3) common (4) offensive

Stream Type (Circle One): perennial or intermittent w/ perennial pools Stream Bends: No. Well Defined; No. Moderately Defined; No. Poorly Defined

Channel Obstructions/Modifications: _____ No. of Riffles: ___ Channel Flow Status (circle one): high moderate low no flow

Riparian Vegetation (%):

Left Bank: Trees_ Shrubs_ Grasses, Forbs_ Cult. Fields_ Other_

Right Bank: Trees_ Shrubs_ Grasses, Forbs_ Cult. Fields_ Other_

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)	
				Thalweg Depth:													
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type			Dominant Types Riparian Vegetation: Left Bank: Right Bank:						% Gravel or Larger					
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:			Instream Cover Types:						% Instream Cover					

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)	
				Thalweg Depth:													
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type			Dominant Types Riparian Vegetation: Left Bank: Right Bank:						% Gravel or Larger					
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:			Instream Cover Types:						% Instream Cover					

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)		
				Thalweg Depth:														
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type					Dominant Types Riparian Vegetation: Left Bank: Right Bank:					% Gravel or Larger					
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:					Instream Cover Types:					% Instream Cover					

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)		
				Thalweg Depth:														
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type					Dominant Types Riparian Vegetation: Left Bank: Right Bank:					% Gravel or Larger					
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:					Instream Cover Types:					% Instream Cover					

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)		
				Thalweg Depth:														
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type					Dominant Types Riparian Vegetation: Left Bank: Right Bank:					% Gravel or Larger					
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:					Instream Cover Types:					% Instream Cover					

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)		
				Thalweg Depth:														
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type					Dominant Types Riparian Vegetation: Left Bank: Right Bank:					% Gravel or Larger					
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: RB:					Instream Cover Types:					% Instream Cover					

5/16/02

Ripple - ~~THH~~
 Glide - 1
 Run - 1
 Pool - 11
 Bend - WW

Table B-12. Part 1. Stream Physical Characteristics Worksheet

Part 1 - Stream Physical Characteristics Worksheet

Observers: WJG Date: 5/16/02 Time: 2 Weather conditions: 3
 Stream: UT-1 Location of site: 600m Length of stream reach: 150m
 Stream Segment No.: Observed Stream Uses: 2, 3, 4 Aesthetics (circle one): (1) wilderness (2) natural (3) common (4) effective
 Stream Type (Circle One): perennial or intermittent w/ potential pools Stream Beds: No, Well Defined; No, Moderately Defined; No, Poorly Defined;
 Channel Obstructions/Modifications: 1, 2, 3, 4 No. of Riffles: Channel Flow Status (circle one): high moderate low no flow
 Riparian Vegetation (%):
 Left Bank: Trees, Shrubs, Grasses, Forbs, Cult. Fields, Other
 Right Bank: Trees, Shrubs, Grasses, Forbs, Cult. Fields, Other

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect					Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)				
				Thalweg Depth	0.16	0.18	0.22	0.27				0.28	0.31	0.31	
U1	8.45m	5°	0%	0.06	0.09	0.09	0.16	0.18	0.22	0.27	0.28	0.31	0.31	0%	19
Habitat Type (Circle One): <u>Gliding Pool</u>				Dominant Substrate Type: <u>Cobble</u>					Dominant Types Riparian Vegetation: <u>Forb, Forb, Forb</u>				% Gravel or Larger: <u>95%</u>		
Algae or Macrophytes (Circle One): <u>Absent</u>				Width of Natural Buffer Vegetation (m): <u>10</u>					Instream Cover Types: <u>Cobble, Rockweed, Gravel, Macrophytes, b</u>				% Instream Cover: <u>20%</u>		

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect					Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)				
				Thalweg Depth	0.07	0.09	0.09	0.14				0.03	0.06	0.06	0.01
U2 <u>down from U1</u>	8.8m	6°	85%	0.02	0.07	0.09	0.08	0.14	0.03	0.06	0.06	0.01	0.01	0%	1.5
Habitat Type (Circle One): <u>Gliding Pool</u>				Dominant Substrate Type: <u>Sand</u>					Dominant Types Riparian Vegetation: <u>Forb, Forb, Forb</u>				% Gravel or Larger: <u>40%</u>		
Algae or Macrophytes (Circle One): <u>Absent</u>				Width of Natural Buffer Vegetation (m): <u>10</u>					Instream Cover Types: <u>Algae, Macrophytes, Cobble, Gravel, Oakleaf, Forbs</u>				% Instream Cover: <u>45%</u>		

Location of Transect	Stream Width (m)	Left Bank Slope (%)	Left Bank Erosion Potential (%)	Stream Depth (m) at Points Across Transect					Right Bank Slope (%)	Right Bank Erosion Potential (%)	Tree Canopy (%)				
				1	2	3	4	5							
V3 100m down from V2	13.8m	51°	80%	0.30	0.63	0.57	0.55	0.51	0.16	0.21	0.17	0.02	5°	40%	5.5
Habitat Type (Circle One): Bank Run Glide Pool				Thalweg Depth: 0.26											
Algae or Macrophytes (Circle One): None Almond Comm. None Rare Absent				Dominant Substrate Type: Cobble											
Width of Natural Buffer (m): 7.5 L.B.: 7.5 R.B.: 7.0				Instream Cover Types: Cobble, Gravel, Roots, Algae, Artificial											
% Gravel or Larger: 90%				% Instream Cover: 30%											

Location of Transect	Stream Width (m)	Left Bank Slope (%)	Left Bank Erosion Potential (%)	Stream Depth (m) at Points Across Transect					Right Bank Slope (%)	Right Bank Erosion Potential (%)	Tree Canopy (%)						
				1	2	3	4	5									
V4 90m down from V3	13.1m	118°	75%	0.67	0.20	1.61	1.52	1.36	1.33	1.07	0.41	0.19	0.15	0.06	7°	5%	3
Habitat Type (Circle One): Bank Run Glide Pool				Thalweg Depth: 0.29													
Algae or Macrophytes (Circle One): None Almond Comm. None Rare Absent				Dominant Substrate Type: Gravel													
Width of Natural Buffer (m): 4.5 L.B.: 4.5 R.B.: 2.0				Instream Cover Types: Swampy, Cobble, Gravel, Undercut Veg, Algae													
% Gravel or Larger: 80%				% Instream Cover: 45%													

Location of Transect	Stream Width (m)	Left Bank Slope (%)	Left Bank Erosion Potential (%)	Stream Depth (m) at Points Across Transect					Right Bank Slope (%)	Right Bank Erosion Potential (%)	Tree Canopy (%)					
				1	2	3	4	5								
V5 90m down from V4 C access pt	13.1m	12°	5%	0.01	0.14	0.36	0.42	0.45	0.44	0.33	0.20	0.16	0.04	9°	5%	2.5
Habitat Type (Circle One): Bank Run Glide Pool				Thalweg Depth: 0.22												
Algae or Macrophytes (Circle One): None Almond Comm. None Rare Absent				Dominant Substrate Type: Cobble												
Width of Natural Buffer (m): 7.0 L.B.: 7.0 R.B.: 7.0				Instream Cover Types: Algae, Cobble, Gravel												
% Gravel or Larger: 100%				% Instream Cover: 30%												

Location of Transect	Stream Width (m)	Left Bank Slope (%)	Left Bank Erosion Potential (%)	Stream Depth (m) at Points Across Transect					Right Bank Slope (%)	Right Bank Erosion Potential (%)	Tree Canopy (%)					
				1	2	3	4	5								
V6 75m down	14m	45°	35%	3.74	1.15	1.67	1.19	0.82	0.50	0.28	0.46	0.20	0.02	25°	50%	16.5 (65/17)
Habitat Type (Circle One): Bank Run Glide Pool				Thalweg Depth: 0.46												
Algae or Macrophytes (Circle One): None Almond Comm. None Rare Absent				Dominant Substrate Type: Gravel												
Width of Natural Buffer (m): 7.0 L.B.: 7.0 R.B.: 7.0				Instream Cover Types: undercut bank												
% Gravel or Larger: 90%				% Instream Cover: 20% <i>(cobble, gravel, algae, roots, overhung veg, 20%)</i>												

Part II 8/26/03

R.N.C.
Pool 11
Barrel -
Grille 11
Run 11
P. bend 1

Table B-12, Part 1. Stream Physical Characteristics Worksheet

Part I - Stream Physical Characteristics Worksheet

Observer: JW, BH Date: 8/16/03 Time: 3 Weather conditions: 2
 Stream: 067's Location of site: 300ft Length of stream reach: 2
 Stream Segment No.: 1 Observed Stream User: None Aesthetics (circle one): (1) wilderness (2) natural (3) common (4) offensive
 Stream Type (Circle One): perennial or intermittent w/ perennial pools Stream Banks: No, Well Defined; No, Moderately Defined; No, Poorly Defined,
 Channel Obstructions/Modifications: None No. of Riffles: None Channel Flow Status (circle one): high (moderate) low no flow

Riparian Vegetation (%):
 Left Bank: Trees, Shrubs, Grasses, Forbs, Cult. Fields, Other
 Right Bank: Trees, Shrubs, Grasses, Forbs, Cult. Fields, Other

Location of Transect	Stream Width (m)	Left Bank Slope (%)	Left Bank Erosion Potential (%)	Stream Depth (m) at Points Across Transect	Stream Depth (m) at Points Across Transect			Right Bank Slope (%)	Right Bank Erosion Potential (%)	Tree Canopy (%)							
					1	2	3										
D1 @ Spring pool island	13.5	19	15	50	49	77	63	80	77	57	21	2	15	0%	46	65	17
	Habitat Type (Circle One): Grill Run Grill Pool		Dominant Substrate Type: bedrock	Dominant Types Riparian Vegetation: Left Bank: 10% tree, 30% other, 10% forb Right Bank: 5% tree, 95% other	Instream Cover Types: gravel, cobbles, boulders, rocks, logs, 94%				% Gravel or Larger: 95%		% Instream Cover: 15						
D2 100 m up stream from D1	30	36	5%	90	4	2	0	35	75	60	64	55	36	1	19	5%	110
	Habitat Type (Circle One): Riffle Run Grill Pool		Dominant Substrate Type: cobble	Dominant Types Riparian Vegetation: Left Bank: 5% tree, 45% grass, 50% other Right Bank: 5% tree, 2% grass, 93% other	Instream Cover Types: gravel, cobbles, logs, 20%				% Gravel or Larger: 80		% Instream Cover: 10						

Location of Transect D3 80 m upstream	Stream Width (m)	5.0 - 6.5	Left Bank Slope (%)	15	Left Bank Erosion Potential (5)	0	Stream Depth (m) at Points Across Transect				Right Bank Slope (%)	20	Right Bank Erosion Potential (5)	50	Tree Canopy (%)	9/17
	Thalweg Depth:				3	4.7	5.5	0	0	0	0	10.5	12	6.2	% Gravel or Larger	
Major Type (Circle One) <i>Gravel</i>		Dominant Substrate Type		Cobble		Dominant Vegetation		Left Bank: 5% grass, 2% forb, 45% other Right Bank: 10% grass, 5% other, 65% other								
Align or Macrophytes (Circle One) <i>None</i>		Width of Natural Buffer (m)		7.0		Stream Cover Type		gravel, rubble boulder, roots, deep woodcut bank								
Align or Macrophytes (Circle One) <i>None</i>		Width of Natural Buffer (m)		7.0		Stream Cover Type		gravel, rubble boulder, roots, deep woodcut bank								

Location of Transect D4 90 m down stream from confluence	Stream Width (m)	17	Left Bank Slope (%)	38	Left Bank Erosion Potential (5)	10	Stream Depth (m) at Points Across Transect				Right Bank Slope (%)	14	Right Bank Erosion Potential (5)	0	Tree Canopy (%)	2/17
	Thalweg Depth:				3	4.1	6.7	7.0	6.5	5.7	3.2	2.3	2.7	1.5	4	% Gravel or Larger
Major Type (Circle One) <i>Gravel</i>		Dominant Substrate Type		Cobble		Dominant Vegetation		Left Bank: 5% grass, 2% forb, 73% other Right Bank: 55% tree, 25% forb, 20% other								
Align or Macrophytes (Circle One) <i>None</i>		Width of Natural Buffer (m)		7.0		Stream Cover Type		gravel, rubble, boulder, optif, algae								
Align or Macrophytes (Circle One) <i>None</i>		Width of Natural Buffer (m)		7.0		Stream Cover Type		gravel, rubble, boulder, optif, algae								

Location of Transect D5 on side of low water	Stream Width (m)	50	Left Bank Slope (%)	9	Left Bank Erosion Potential (5)	0	Stream Depth (m) at Points Across Transect				Right Bank Slope (%)	80	Right Bank Erosion Potential (5)	75%	Tree Canopy (%)	15/17
	Thalweg Depth:				2.7	4.0	4.9	10.0	9.0	9.6	10.8	10.5	9.5	10.5	9.5	% Gravel or Larger
Major Type (Circle One) <i>Gravel</i>		Dominant Substrate Type		Gravel		Dominant Vegetation		Left Bank: 15% forb, 50% grass, 35% other Right Bank: 5% tree, 80% grass, 15% other								
Align or Macrophytes (Circle One) <i>None</i>		Width of Natural Buffer (m)		7.0		Stream Cover Type		gravel, rubble, boulder, algae, optif, macrophytes								
Align or Macrophytes (Circle One) <i>None</i>		Width of Natural Buffer (m)		7.0		Stream Cover Type		gravel, rubble, boulder, algae, optif, macrophytes								

Location of Transect D6 100 m upstream from confluence	Stream Width (m)	20	Left Bank Slope (%)	6	Left Bank Erosion Potential (5)	0	Stream Depth (m) at Points Across Transect				Right Bank Slope (%)	55	Right Bank Erosion Potential (5)	65	Tree Canopy (%)	1/17
	Thalweg Depth:				2	1.8	3.7	6.1	7.6	10.2	11.2	16.0	14.8	14.8	14.8	% Gravel or Larger
Major Type (Circle One) <i>Gravel</i>		Dominant Substrate Type		Cobble		Dominant Vegetation		Left Bank: 45% other, 5% grass Right Bank: 20% tree, 70% grass, 28% other								
Align or Macrophytes (Circle One) <i>None</i>		Width of Natural Buffer (m)		7.0		Stream Cover Type		cobble, boulder, algae, optif, roots, macrophytes								
Align or Macrophytes (Circle One) <i>None</i>		Width of Natural Buffer (m)		7.0		Stream Cover Type		cobble, boulder, algae, optif, roots, macrophytes								

2/10/13

Run 11
 Little 1111
 Pool
 WD Bend
 C-1 side 11
 P Bend 1

Table B-12. Part 1. Stream Physical Characteristics Worksheet

Part 1 - Stream Physical Characteristics Worksheet

Observers: David L. Williams Date: 1/16/13 Time: 5:00 Weather conditions: S
 Stream: Little Run Location of site: WD Bend Length of stream reach: 200m
 Stream Segment No.: 1450 Observed Stream Uses: Artificial (circle one); (1) wilderness (2) nature (3) common (4) offensive
 Stream Type (Circle One): perennial or intermittent w/ permanent pools Stream Beds: No, Well Defined; No, Modernily Defined; No, Poorly Defined,
 Channel Obstructions/Modifications: dam No. of Buffers: 2 Channel Flow Status (circle one): high/moderate low no flow

Riparian Vegetation (%):
 Left Bank: Trees, Shrubs, Grasses, Forbs, Cult. Fields, Other
 Right Bank: Trees, Shrubs, Grasses, Forbs, Cult. Fields, Other

Location of Transect	Stream Width (m)	Left Bank Slope (%)	Left Bank Erosion Potential (%)	Stream Depth (m) at Points Across Transect						Right Bank Slope (%)	Right Bank Erosion Potential (%)	Tree Canopy (%)					
				1	2	3	4	5	6								
D1	9.6	12.0	75%	20	20	39	52	56	58	61	40	25	15	2	90	0%	15.5%
Habitat Type (Circle One) Right Bank: <u>Glide Pool</u>		Dominant Substrate Type: <u>cobble</u>															
Algae or Microphytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer LB: <u>220</u> RB: <u>770</u>															
Algae or Microphytes (Circle One) Abundant Common Rare Absent		Substrate Cover Types: <u>algae, wood, gravel bank, cobble, boxelder roots</u>															

Location of Transect	Stream Width (m)	Left Bank Slope (%)	Left Bank Erosion Potential (%)	Stream Depth (m) at Points Across Transect						Right Bank Slope (%)	Right Bank Erosion Potential (%)	Tree Canopy (%)				
				1	2	3	4	5	6							
D2	13.1	0.0	50	3	26	40	61	55	34	23	20	25	2	50	0	2.5/17
Habitat Type (Circle One) Right Bank: <u>Glide Pool</u>		Dominant Substrate Type: <u>cobble</u>														
Algae or Microphytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer LB: <u>330</u> RB: <u>720</u>														
Algae or Microphytes (Circle One) Abundant Common Rare Absent		Substrate Cover Types: <u>gravel, cobble, boulder, algae, roots, moss, silt, silt/clay</u>														

Location of Transect D2 75 m up from D2	Stream Width (m) 17.3	Left Bank Slope (°) 20	Left Bank Erosion Potential (%) 0	Thalweg Depth 4.5	Stream Depth (m) at Points Across Transect 0.81					Right Bank Slope (%) 0	Tree Canopy (%) 0				
	17.3	20	0	2	24	29	40	48	45	30	13	25	3	22	0
	Habitat Type (Circle One) Open Field		Dominant Substrate Type boulder		Dominant Types Riparian Vegetation: Left Bank: 5% tree, 8% other, 0% forb Right Bank:										
	Algae or Macrophytes (Circle One) Algal/Plant Community		Width of Natural Buffer Vegetation (m) LB: 20 RB: 220		Instream Cover Type boulders, cobble, algae, snag, artich.										
	Stream Type (Circle One) High Flow		Width of Natural Buffer Vegetation (m) LB: 20 RB: 220		Instream Cover Type boulders, cobble, algae, snag, artich.										

Location of Transect D1 75 m up from D2	Stream Width (m) 17.3	Left Bank Slope (°) 28	Left Bank Erosion Potential (%) 0	Thalweg Depth 0.31	Stream Depth (m) at Points Across Transect 0.31					Right Bank Slope (%) 0	Tree Canopy (%) 0				
	17.3	28	0	2	26	41	66	64	26	23	30	25	4	8	0
	Habitat Type (Circle One) Open Field		Dominant Substrate Type cobble		Dominant Types Riparian Vegetation: Left Bank: 20% tree, 60% other, 20% grass Right Bank: 20% tree, 75% other, 5% forb										
	Algae or Macrophytes (Circle One) Algal/Plant Community		Width of Natural Buffer Vegetation (m) LB: 20 RB: 700		Instream Cover Type cobble, snag, algae, macrophyte, gravel, boulders										
	Stream Type (Circle One) High Flow		Width of Natural Buffer Vegetation (m) LB: 20 RB: 700		Instream Cover Type cobble, snag, algae, macrophyte, gravel, boulders										

Location of Transect D5 25 m DS of X-ing	Stream Width (m) 22.6	Left Bank Slope (°) 4	Left Bank Erosion Potential (%) 0	Thalweg Depth 6.2	Stream Depth (m) at Points Across Transect 0.27					Right Bank Slope (%) 0	Tree Canopy (%) 0				
	22.6	4	0	4	19	37	10	21	20	38	62	35	3	70	0
	Habitat Type (Circle One) Open Field		Dominant Substrate Type cobble		Dominant Types Riparian Vegetation: Left Bank: 15% tree, 85% other Right Bank: 60% other, 10% tree, 10% forb										
	Algae or Macrophytes (Circle One) Algal/Plant Community		Width of Natural Buffer Vegetation (m) LB: 720 RB: 720		Instream Cover Type cobble, algae, gravel, snag										
	Stream Type (Circle One) High Flow		Width of Natural Buffer Vegetation (m) LB: 720 RB: 720		Instream Cover Type cobble, algae, gravel, snag										

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Thalweg Depth	Stream Depth (m) at Points Across Transect					Right Bank Slope (%)	Tree Canopy (%)				
	Habitat Type (Circle One) Open Field		Dominant Substrate Type		Dominant Types Riparian Vegetation: Left Bank: Right Bank:										
	Algae or Macrophytes (Circle One) Algal/Plant Community		Width of Natural Buffer Vegetation (m) LB: 20 RB:		Instream Cover Type										
	Stream Type (Circle One) High Flow		Width of Natural Buffer Vegetation (m) LB: 20 RB:		Instream Cover Type										

12/30/03

Run - 1
 Riffle - 11
 bend - 11 (well defined)
 Slide - 1
 Pool - 1

Table B-12. Part 1. Stream Physical Characteristics Worksheet

Observers: JN, ME Date: 12/30/03 Time: 9am Part I - Stream Physical Characteristics Worksheet
 Weather conditions: Cloudy

Stream: V, Frio Location of site: 12812 Length of stream reach: 455

Stream Segment No.: Observed Stream Uses: Rec Aesthetics (circle one): (1) wilderness (2) natural (3) common (4) offensive

Stream Type (Circle One): perennial or intermittent w/ perennial pools Stream Bends: No. Well Defined: 1 No. Moderately Defined: 1 No. Poorly Defined: 0
 Channel Obstructions/Modifications: Down No. of Riffles: 11 Channel Flow Status (circle one): High moderate low no flow

Riparian Vegetation (%):
 Left Bank: Trees 0 Shrubs 0 Grasses, Forbs 0 Cult. Fields 0 Other 0
 Right Bank: Trees 0 Shrubs 0 Grasses, Forbs 0 Cult. Fields 0 Other 0

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)					
				Thalweg Depth:																		
U1	9.90	3	0	6.19											30	30	14.5/17					
				Dominant Substrate Type: <u>cobble</u>																		
Habitat Type (Circle One) <u>Riffle</u> <u>Run</u> <u>Glide</u> <u>Pool</u>			Width of Natural Buffer Vegetation (m): LB: <u>20</u> RB: <u>20</u>			Instream Cover Types: <u>cobble, boulder snags, algae, macro, roots</u>											% Gravel or Larger: <u>100%</u>					
Algae or Macrophytes (Circle One) <u>Abundant</u> <u>Common</u> <u>Rare</u> <u>Absent</u>			Dominant Types Riparian Vegetation: Left Bank: <u>15 tree</u> <u>15 forbs</u> <u>70 other</u> Right Bank: <u>10 tree</u> <u>15 forbs</u> <u>75 other</u>			% Instream Cover: <u>30</u>																
U2	11.2	70	50	6.90											3	0	14.5/17					
				Dominant Substrate Type: <u>cobble</u>																		
Habitat Type (Circle One) <u>Riffle</u> <u>Run</u> <u>Glide</u> <u>Pool</u>			Width of Natural Buffer Vegetation (m): LB: <u>20</u> RB: <u>20</u>			Instream Cover Types: <u>macro, overhangs veg, gravel, cobble, boulder, algae, snags, undercut bank, rock, leaf pack</u>											% Gravel or Larger: <u>100%</u>					
Algae or Macrophytes (Circle One) <u>Abundant</u> <u>Common</u> <u>Rare</u> <u>Absent</u>			Dominant Types Riparian Vegetation: Left Bank: <u>5 tree</u> <u>10 forbs</u> <u>85 other</u> Right Bank: <u>10 tree</u> <u>10 forbs</u> <u>80 other</u>			% Instream Cover: <u>35</u>																

Location of Transect		Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Thalweg Depth: 0.41 Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)				
U3 100m down from U2		15.8	80	80	0.04	1.04	1.38	1.07	1.05	0.95	0.65	0.24	0.14	0.09	0.01	15	5	15/17			
Habitat Type (Circle One) Rifle Run Glide Pool		Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer LB: 2.8 RB: 7.20		Instream Cover Types: algae, macro, gravel, cobble, snags		Dominant Types Riparian Vegetation: Left Bank: 5 trees 40 grass 55 other Right Bank: 10 tree 10 shrub 10 forbes 70 other										% Gravel or Larger		% Instream Cover	

Location of Transect		Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Thalweg Depth: 0.30 Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)				
U4 100m down from U3		9.65	48	0	0.04	0.43	0.58	0.57	0.51	0.49	0.46	0.16	0.09	0.03	0.01	45	50	2.5/7			
Habitat Type (Circle One) Rifle Run Glide Pool		Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer LB: 2.0 RB: 2.0		Instream Cover Types: macro, gravel, cobble, overhanging veg		Dominant Types Riparian Vegetation: Left Bank: 10 tree 20 shrub 30 forbes 70 other Right Bank: 5 tree 10 shrub 20 forbes 65 other										% Gravel or Larger		% Instream Cover	

Location of Transect		Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Thalweg Depth: 0.49 Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)				
U5 90m down from U4 at access point		9.8	4	0	0.01	0.08	0.12	0.18	0.29	0.40	0.55	0.75	0.85	1.15	1.03	45	40	9/17			
Habitat Type (Circle One) Rifle Run Glide Pool		Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer LB: 2.8 RB: 5		Instream Cover Types: gravel, cobble, boulder, algae, bank		Dominant Types Riparian Vegetation: Left Bank: 10 tree 10 shrub 30 grass 50 other Right Bank: 5 tree 5 other 90 grass										% Gravel or Larger		% Instream Cover	

Location of Transect		Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Thalweg Depth: 6.43 Stream Depths (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)				
U6 75m down from U5		10	45	30	0.67	0.81	1.05	1.20	1.71	1.16	1.16	0.91	0.70	0.77	0.65	100	30	11/7			
Habitat Type (Circle One) Rifle Run Glide Pool		Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer LB: 2.0 RB: 0		Instream Cover Types: macro, roots		Dominant Types Riparian Vegetation: Left Bank: 20 tree 20 forbes 60 other Right Bank: 95 grass 5 other										% Gravel or Larger		% Instream Cover	

2/30/03

RICELE-111
Run - 11

Table B-12. Part I. Stream Physical Characteristics Worksheet

Part I - Stream Physical Characteristics Worksheet

Observers: W, M, B Date: 10/1/02 Weather conditions: R
 Stream: V. Fine Location of site: 13006 Length of stream reach: 300m
 Stream Segment No.: Observed Stream Uses: Aq Aesthetics (circle one): (1) wilderness (2) natural (3) common (4) offensive
 Stream Type (Circle One): (overbank) or intermittent w/ perennial pools Stream Bands: No. Well Defined: 1; No. Moderately Defined: 1; No. Poorly Defined: 1
 Channel Obstructions/Modifications: Down No. of Riffles: 0 Channel Flow Status (circle one): high moderate low no flow
 Riparian Vegetation (%):
 Left Bank: Trees 0 Shrubs 0 Grasses, Forbs 0 Cult. Fields 0 Other 0
 Right Bank: Trees 0 Shrubs 0 Grasses, Forbs 0 Cult. Fields 0 Other 0

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Thalweg Depth: <u>6.09</u>										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)	
				Stream Depth (m) at Points Across Transect													
<u>D1 O T</u> <u>access down</u> <u>point access</u>	<u>8.4</u>	<u>15</u>	<u>5</u>	<u>0.3</u>	<u>1.9</u>	<u>5.0</u>	<u>0.4</u>	<u>0.2</u>	<u>5.7</u>	<u>3.8</u>	<u>1.3</u>	<u>0.5</u>	<u>0.3</u>	<u>0.1</u>	<u>8</u>	<u>0</u>	<u>16/17</u>
Habitat Type (Circle One) Riffle Run Glide Pool	Algae or Macrophytes (Circle One) Abundant Common Rare Absent			Width of Natural Buffer LB: <u>>>></u> RB: <u>>>></u>			Instream Cover Types: <u>Gravel cobble boulder algae macro roots</u>			% Gravel or Larger <u>100</u>			% Instream Cover <u>20</u>				

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Thalweg Depth: <u>0.91</u>										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)	
				Stream Depth (m) at Points Across Transect													
<u>45m up</u> <u>Can D1</u> <u>at access</u> <u>D2 point</u>	<u>10.90</u>	<u>80</u>	<u>50</u>	<u>1.68</u>	<u>0.64</u>	<u>5.1</u>	<u>1.60</u>	<u>7.5</u>	<u>9.1</u>	<u>8.5</u>	<u>4.5</u>	<u>1.4</u>	<u>0.9</u>	<u>0.1</u>	<u>7</u>	<u>0</u>	<u>85/17</u>
Habitat Type (Circle One) Riffle Run Glide Pool	Algae or Macrophytes (Circle One) Abundant Common Rare Absent			Width of Natural Buffer LB: <u>>>></u> RB: <u>>>></u>			Instream Cover Types: <u>Gravel, cobble boulder, arthropods</u> <u>5ms, roots, macro, algae, overhangs</u>			% Gravel or Larger <u>100</u>			% Instream Cover <u>15</u>				

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depth (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)			
	19	35	0	0.94	0.05	0.35	0.40	0.45	0.52	0.44	0.49	0.34	0.33	0.36	0.04	18	10	0	
D3 75 m up from D2	Habitat Type: Circle One) Riffle Run Gilled Pool	Dominant Substrate Type: Cobble		Stream Cover Types: Grass, Cobble, Boulder, Macro, algae, roots										Dominant Types Riparian Vegetation: Left Bank: 25 tree 5 grasses 25 other Right Bank: 10 tree 5 grasses 25 other		% Gravel or Larger: 85		% Instream Cover: 30	
Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer (m) LB: RB: 20 20		Instream Depth:		Stream Depth (m) at Points Across Transect										Right Bank Slope (°)		Right Bank Erosion Potential (%)	Tree Canopy (%)

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depth (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)			
	18	20	0	0.75	0.03	0.26	0.41	0.60	0.45	0.40	0.34	0.20	0.10	0.09	0.02	4	0	0	
D4 75 m up from D3	Habitat Type: Circle One) Riffle Run Gilled Pool	Dominant Substrate Type: Cobble		Stream Cover Types: algae, macro, gravel, cobble, boulder										Dominant Types Riparian Vegetation: Left Bank: 10 tree 3 shrub 30 grasses 55 other Right Bank: 5 tree 5 grasses 20 other		% Gravel or Larger: 100		% Instream Cover: 20	
Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer (m) LB: RB: 20 20		Instream Depth:		Stream Depth (m) at Points Across Transect										Right Bank Slope (°)		Right Bank Erosion Potential (%)	Tree Canopy (%)

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depth (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)			
	13.2	16	0	0.36	0.09	0.40	0.40	0.46	0.35	0.45	0.54	0.53	0.42	0.24	0.03	25	0	0	
D5 100 m down from LWC 75 m up from D4	Habitat Type: Circle One) Riffle Run Gilled Pool	Dominant Substrate Type: Cobble		Stream Cover Types: algae, macro, gravel, cobble, boulder										Dominant Types Riparian Vegetation: Left Bank: 8 tree 10 grasses 86 other Right Bank: 5 tree 25 grasses 70 other		% Gravel or Larger: 100		% Instream Cover: 20	
Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer (m) LB: RB: 20 20		Instream Depth:		Stream Depth (m) at Points Across Transect										Right Bank Slope (°)		Right Bank Erosion Potential (%)	Tree Canopy (%)

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depth (m) at Points Across Transect										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)			
	Habitat Type: Circle One) Riffle Run Gilled Pool	Dominant Substrate Type:		Stream Cover Types:										Dominant Types Riparian Vegetation: Left Bank: Right Bank:		% Gravel or Larger:		% Instream Cover:	
Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer (m) LB: RB:		Instream Depth:		Stream Depth (m) at Points Across Transect										Right Bank Slope (°)		Right Bank Erosion Potential (%)	Tree Canopy (%)

12/30/03

Slide -1
Pool -1
Run -1

Table B-12. Part 1. Stream Physical Characteristics Worksheet

Part I - Stream Physical Characteristics Worksheet

Observers: MB, JW Date: 12/1/03 Time: 10:00 AM Weather conditions: R
 Stream: V. Frio Location of site: 13007 Length of stream reach: 500m
 Stream Segment No.: Observed Stream Uses: Rec Aesthetics (circle one): (1) wilderness (2) natural (3) common (4) offensive
 Stream Type (Circle One): perennial or intermittent w/ perennial pools Stream Bends: No. Well Defined: 1; No. Moderately Defined: 1; No. Poorly Defined: 1
 Channel Obstructions/Modifications: LMC No. of Riffles: 1 Channel Flow Status (circle one): high/moderate/low no flow
 Riparian Vegetation (%):
 Left Bank: Trees 100 Shrubs 0 Grasses, Forbs 0 Cult. Fields 0 Other 0
 Right Bank: Trees 100 Shrubs 0 Grasses, Forbs 0 Cult. Fields 0 Other 0

Location of Transect	Stream Width (m)	Left Bank Slope (%)	Left Bank Erosion Potential (%)	Thalweg Depth:	Stream Depths (m) at Points Across Transect										Right Bank Slope (%)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	13.95	30	0		0.163	05	34	166	82	90	86	91	85	85	144	08	40
Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type			Width of Natural Buffer Vegetation (m) LB: <u>20</u> RB: <u>20</u>	Dominant Types Riparian Vegetation:										% Riparian Vegetation	% Gravel or Larger	
	bedrock				Left Bank: <u>10 tree 5 grass 85 other</u> Right Bank: <u>5 tree 95 other</u>												
Location of Transect	Stream Width (m)	Left Bank Slope (%)	Left Bank Erosion Potential (%)	Thalweg Depth:	Stream Depths (m) at Points Across Transect										Right Bank Slope (%)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	28	30	0		6.11	101	18	105	17	37	56	44	39	26	01	25	0
Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type			Width of Natural Buffer Vegetation (m) LB: <u>15</u> RB: <u>20</u>	Dominant Types Riparian Vegetation:										% Riparian Vegetation	% Gravel or Larger	
	cobble				Left Bank: <u>5 tree 5 cobbles 90 other</u> Right Bank: <u>5 tree 10 shrub 30 forbs 55 other</u>												
Location of Transect	Algae or Macrophytes Abundant Common Rare Absent			Width of Natural Buffer Vegetation (m) LB: <u>20</u> RB: <u>20</u>	Stream Cover Types:										% Stream Cover		
	Rare Absent				Gravel, cobble, boulders, roots, snags algae												
Location of Transect	Algae or Macrophytes Abundant Common Rare Absent			Width of Natural Buffer Vegetation (m) LB: <u>15</u> RB: <u>20</u>	Stream Cover Types:										% Stream Cover		
	Abundant Common				Gravel, cobble, boulders, algae, snags												

Location of Transect	Stream Width (m)	Left Bank Slope (%)	Left Bank Erosion Potential (%)	Thalweg Depth:	Stream Depths (m) at Points Across Transect										Right Bank Slope (%)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	100m upstream from D1	28	30		0	6.11	101	18	105	17	37	56	44	39	26	01	25
Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type			Width of Natural Buffer Vegetation (m) LB: <u>15</u> RB: <u>20</u>	Dominant Types Riparian Vegetation:										% Riparian Vegetation	% Gravel or Larger	
	cobble				Left Bank: <u>5 tree 5 cobbles 90 other</u> Right Bank: <u>5 tree 10 shrub 30 forbs 55 other</u>												
Location of Transect	Algae or Macrophytes Abundant Common Rare Absent			Width of Natural Buffer Vegetation (m) LB: <u>15</u> RB: <u>20</u>	Stream Cover Types:										% Stream Cover		
	Abundant Common				Gravel, cobble, boulders, algae, snags												

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Location of Transect	Stream Width (m)	Left Bank Slope (%)	Left Bank Erosion Potential (%)	Thalweg Depth:										Right Bank Slope (%)	Right Bank Erosion Potential (%)	Tree Canopy (%)	
	D3	57	22	0	0.3	0.95	1.04	0.55	0	0	0	0.34	0.36	0.40	0.19	75	80
100 m up from D2	Habitat Type (Circle One) Riffle Run Gully Pool	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Dominant Substrate Type	Stream Cover Types: gravel, cobble, boulder, algae, rock										% Gravel or Larger	% Instream Cover		
			cobble	Dominant Types Riparian Vegetation: Left Bank: 10 tree 15 shrubs 75 other Right Bank: 15 tree 5 shrubs 80 other										100	30		

Location of Transect	Stream Width (m)	Left Bank Slope (%)	Left Bank Erosion Potential (%)	Thalweg Depth:										Right Bank Slope (%)	Right Bank Erosion Potential (%)	Tree Canopy (%)	
	D4	19	30	0	1.02	1.39	1.45	1.40	1.40	0.53	0.50	0.42	0.42	0.23	0.03	25	0
100 m up from D3	Habitat Type (Circle One) Riffle Run Gully Pool	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Dominant Substrate Type	Stream Cover Types: gravel, cobble, boulder, algae										% Gravel or Larger	% Instream Cover		
			cobble	Dominant Types Riparian Vegetation: Left Bank: 5 tree 5 shrubs 90 other Right Bank: 10 tree 5 shrubs 85 other										100	20		

Location of Transect	Stream Width (m)	Left Bank Slope (%)	Left Bank Erosion Potential (%)	Thalweg Depth:										Right Bank Slope (%)	Right Bank Erosion Potential (%)	Tree Canopy (%)	
	D5	62	9	0	1.05	1.20	1.14	1.01	0.79	0.70	0.94	0.75	1.14	1.35	1.15	100	95
D5 side of LWC	Habitat Type (Circle One) Riffle Run Gully Pool	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Dominant Substrate Type	Stream Cover Types: gravel, cobble, boulder, algae, macro										% Gravel or Larger	% Instream Cover		
			cobble	Dominant Types Riparian Vegetation: Left Bank: 10 tree 5 shrubs 85 other Right Bank: 50 shrubs 50 other										100	25		

Location of Transect	Stream Width (m)	Left Bank Slope (%)	Left Bank Erosion Potential (%)	Thalweg Depth:										Right Bank Slope (%)	Right Bank Erosion Potential (%)	Tree Canopy (%)	
	D6	28	3	0	0.05	0.20	0.30	0.46	0.05	0.80	0.97	1.19	1.25	1.30	0.90	80	85
100 m from LWC	Habitat Type (Circle One) Riffle Run Gully Pool	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Dominant Substrate Type	Stream Cover Types: gravel, cobble, boulder, algae, macro										% Gravel or Larger	% Instream Cover		
			cobble	Dominant Types Riparian Vegetation: Left Bank: 5 tree 10 shrubs 85 other Right Bank: 10 tree 5 shrubs 15 shrubs 70 other										100	20		

HABITAT ASSESSMENT

Part II – Summary of Physical Characteristics of Water Body



Part II - Summary of Physical Characteristics of Water Body

Stream name	U. Frio 10000
Date of assessment	9/4/2002
Stream bed slope over evaluated reach	0.0051
Approximate drainage area above transect furthest downstream	776km ²
Stream order	5
Length of stream evaluated	360m
Number of lateral transects made	6
Average stream width	18.7m
Average stream depth	0.44m
Instantaneous flow	56.08 ft ³ /sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	10m
Maximum pool depth	>1m
Total number of stream bends	3
Number of well defined bends	1
Number of moderately defined bends	1
Number of poorly defined bends	1
Total number of riffles	3
Dominant substrate type	Gravel
Average percent of substrate gravel sized or larger	100%
Average percent instream cover	50%
Number of stream cover types	7
Average percent stream bank erosion potential	65%
Average stream bank slope	37°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	18.00%
Shrubs	4%
Grasses/Forbes	8.0%
Cultivated Fields	
Other	70%
Average percent tree canopy coverage	32%
Overall aesthetic appraisal of stream	Common

Part II - Summary of Physical Characteristics of Water Body

Stream name	U. Frio 13007
Date of assessment	9/5/2002
Stream bed slope over evaluated reach	0.0027
Approximate drainage area above transect furthest downstream	831km ²
Stream order	5
Length of stream evaluated	460m
Number of lateral transects made	6
Average stream width	32m
Average stream depth	0.31m
Instantaneous flow	78.28 ft ³ /sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	14m
Maximum pool depth	0.5 - 1m
Total number of stream bends	4
Number of well defined bends	0
Number of moderately defined bends	3
Number of poorly defined bends	1
Total number of riffles	5
Dominant substrate type	Cobble
Average percent of substrate gravel sized or larger	97%
Average percent instream cover	52%
Number of stream cover types	6
Average percent stream bank erosion potential	73%
Average stream bank slope	36°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	
Shrubs	
Grasses/Forbes	
Cultivated Fields	
Other	
Average percent tree canopy coverage	36%
Overall aesthetic appraisal of stream	Natural?

Part II - Summary of Physical Characteristics of Water Body

Stream name	U. Frio 13006
Date of assessment	9/3/2002
Stream bed slope over evaluated reach	0.0013
Approximate drainage area above transect furthest downstream	1,019km ²
Stream order	5
Length of stream evaluated	460m
Number of lateral transects made	6
Average stream width	24.2m
Average stream depth	0.48m
Instantaneous flow	103.35 ft ³ /sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	35m
Maximum pool depth	>1m
Total number of stream bends	2
Number of well defined bends	1
Number of moderately defined bends	1
Number of poorly defined bends	0
Total number of riffles	4
Dominant substrate type	Boulder
Average percent of substrate gravel sized or larger	100%
Average percent instream cover	88%
Number of stream cover types	8
Average percent stream bank erosion potential	70%
Average stream bank slope	39°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	5%
Shrubs	5%
Grasses/Forbes	15%
Cultivated Fields	
Other	75%
Average percent tree canopy coverage	14%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	U. Frio 17892
Date of assessment	8/5/2003
Stream bed slope over evaluated reach	0.0051
Approximate drainage area above transect furthest downstream	776km ²
Stream order	5
Length of stream evaluated	360m
Number of lateral transects made	6
Average stream width	11.9m
Average stream depth	0.47m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	13m
Maximum pool depth	>1m
Total number of stream bends	2
Number of well defined bends	2
Number of moderately defined bends	0
Number of poorly defined bends	0
Total number of riffles	5
Dominant substrate type	Cobble
Average percent of substrate gravel sized or larger	83%
Average percent instream cover	27%
Number of stream cover types	8
Average percent stream bank erosion potential	32%
Average stream bank slope	42°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	15.00%
Shrubs	2%
Grasses/Forbes	27.0%
Cultivated Fields	
Other	56%
Average percent tree canopy coverage	35%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	U. Frio 13007
Date of assessment	8/6/2003
Stream bed slope over evaluated reach	0.0027
Approximate drainage area above transect furthest downstream	831km ²
Stream order	5
Length of stream evaluated	460m
Number of lateral transects made	6
Average stream width	31m
Average stream depth	0.54m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	30m
Maximum pool depth	>1m
Total number of stream bends	1
Number of well defined bends	0
Number of moderately defined bends	0
Number of poorly defined bends	1
Total number of riffles	3
Dominant substrate type	Cobble
Average percent of substrate gravel sized or larger	91%
Average percent instream cover	28%
Number of stream cover types	8
Average percent stream bank erosion potential	22%
Average stream bank slope	34°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	7%
Shrubs	0%
Grasses/Forbes	24%
Cultivated Fields	
Other	
Average percent tree canopy coverage	69%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	U. Frio 13006
Date of assessment	8/6/2003
Stream bed slope over evaluated reach	0.0013
Approximate drainage area above transect furthest downstream	1,019km ²
Stream order	5
Length of stream evaluated	300m
Number of lateral transects made	5
Average stream width	16.0m
Average stream depth	0.30m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	22m
Maximum pool depth	0.5m - 1m
Total number of stream bends	1
Number of well defined bends	0
Number of moderately defined bends	0
Number of poorly defined bends	1
Total number of riffles	4
Dominant substrate type	Cobble
Average percent of substrate gravel sized or larger	98%
Average percent instream cover	36%
Number of stream cover types	9
Average percent stream bank erosion potential	12%
Average stream bank slope	30°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	11%
Shrubs	0%
Grasses/Forbes	12%
Cultivated Fields	
Other	77%
Average percent tree canopy coverage	27%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	U. Frio 17892
Date of assessment	10/8/2003
Stream bed slope over evaluated reach	0.0051
Approximate drainage area above transect furthest downstream	776km ²
Stream order	5
Length of stream evaluated	455m
Number of lateral transects made	6
Average stream width	12m
Average stream depth	0.51m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	16m
Maximum pool depth	1.4m
Total number of stream bends	2
Number of well defined bends	2
Number of moderately defined bends	0
Number of poorly defined bends	0
Total number of riffles	3
Dominant substrate type	Cobble
Average percent of substrate gravel sized or larger	97%
Average percent instream cover	27%
Number of stream cover types	9
Average percent stream bank erosion potential	26%
Average stream bank slope	39
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	9.00%
Shrubs	3%
Grasses/Forbes	31.0%
Cultivated Fields	
Other	57%
Average percent tree canopy coverage	42%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	U. Frio 13007
Date of assessment	10/9/2003
Stream bed slope over evaluated reach	0.0027
Approximate drainage area above transect furthest downstream	831km ²
Stream order	5
Length of stream evaluated	500m
Number of lateral transects made	6
Average stream width	42m
Average stream depth	0.48m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	62m
Maximum pool depth	1.4m
Total number of stream bends	1
Number of well defined bends	0
Number of moderately defined bends	0
Number of poorly defined bends	1
Total number of riffles	1
Dominant substrate type	Cobble
Average percent of substrate gravel sized or larger	100%
Average percent instream cover	18%
Number of stream cover types	9
Average percent stream bank erosion potential	22%
Average stream bank slope	38
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	8%
Shrubs	1%
Grasses/Forbes	12%
Cultivated Fields	
Other	79%
Average percent tree canopy coverage	28%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	U. Frio 13006
Date of assessment	10/9/2003
Stream bed slope over evaluated reach	0.0013
Approximate drainage area above transect furthest downstream	1,019km ²
Stream order	5
Length of stream evaluated	300m
Number of lateral transects made	5
Average stream width	13.9m
Average stream depth	0.35m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	19m
Maximum pool depth	>1m
Total number of stream bends	1
Number of well defined bends	0
Number of moderately defined bends	0
Number of poorly defined bends	1
Total number of riffles	3
Dominant substrate type	Cobble
Average percent of substrate gravel sized or larger	97%
Average percent instream cover	21%
Number of stream cover types	8
Average percent stream bank erosion potential	7%
Average stream bank slope	19
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	10%
Shrubs	1%
Grasses/Forbes	9%
Cultivated Fields	
Other	80%
Average percent tree canopy coverage	29%
Overall aesthetic appraisal of stream	Natural

HABITAT ASSESSMENT

Part III – Habitat Quality Indices



Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 10000	Date: 9/4/02
Available Instream Cover	Abundant >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	Common 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	Rare 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Absent <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 4	4	3	2	1
Bottom Substrate Stability	Stable >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	Moderately Stable 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	Moderately Unstable 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	Unstable <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 4	4	3	2	1
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	Abundant ≥5 riffles	Common 2-4 riffles	Rare 1 riffle	Absent No riffles
Score: 3	4	3	2	1
Dimensions of Largest Pool	Large Pool covers more than 50% of the channel width; maximum depth is > 1m	Moderate Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1	Small Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	Absent No existing pools; only shallow auxiliary pockets
Score: 3	3	2	1	0
Channel Flow Status	High Water reaches the base of both the lower banks; <5% of channel substrate is exposed	Moderate Water fills <75% of the channel; or <25% of channel substrate is exposed	Low Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	No Flow Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 3	3	2	1	0
Bank Stability	Stable Little evidence (<10%) of erosion bank failure; bank angles average <30°	Moderately Stable Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	Moderately Unstable Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	Unstable Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°
Score: 0	3	2	1	0
Channel Sinuosity	High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	Moderate 1 well-defined bend OR ≥3 moderately-defined bends present	Low <3 moderately-defined bends OR only poorly-defined bends present	None Straight channel; may be channelized
Score: 2	3	2	1	0
Riparian Buffer Vegetation	Extensive Width of natural buffer is >20 meters	Wide Width of natural buffer is 10.1-20 meters	Moderate Width of natural buffer is 5-10 meters	Narrow Width of natural buffer is <5 meters
Score: 3	3	2	1	0
Aesthetics of Reach	Wilderness Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	Natural Area Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	Common Setting Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	Offensive Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 1	3	2	1	0
Total Score: 23	HIGH			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 13007	Date: 9/5/02
Available Instream Cover	Abundant >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	Common 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	Rare 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Absent <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 4	4	3	2	1
Bottom Substrate Stability	Stable >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	Moderately Stable 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	Moderately Unstable 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	Unstable <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 4	4	3	2	1
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	Abundant ≥5 riffles	Common 2-4 riffles	Rare 1 riffle	Absent No riffles
Score: 4	4	3	2	1
Dimensions of Largest Pool	Large Pool covers more than 50% of the channel width; maximum depth is > 1m	Moderate Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	Small Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	Absent No existing pools; only shallow auxiliary pockets
Score: 2	3	2	1	0
Channel Flow Status	High Water reaches the base of both the lower banks; <5% of channel substrate is exposed	Moderate Water fills <75% of the channel; or <25% of channel substrate is exposed	Low Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	No Flow Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 3	3	2	1	0
Bank Stability	Stable Little evidence (<10%) of erosion bank failure; bank angles average <30°	Moderately Stable Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	Moderately Unstable Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	Unstable Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°
Score: 1	3	2	1	0
Channel Sinuosity	High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	Moderate 1 well-defined bend OR ≥3 moderately-defined bends present	Low <3 moderately-defined bends OR only poorly-defined bends present	None Straight channel; may be channelized
Score: 2	3	2	1	0
Riparian Buffer Vegetation	Extensive Width of natural buffer is >20 meters	Wide Width of natural buffer is 10.1-20 meters	Moderate Width of natural buffer is 5-10 meters	Narrow Width of natural buffer is <5 meters
Score: 3	3	2	1	0
Aesthetics of Reach	Wilderness Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	Natural Area Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	Common Setting Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	Offensive Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 2	3	2	1	0
Total Score: 25	HIGH			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 13006	Date: 9/3/02
Available Instream Cover	Abundant >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	Common 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	Rare 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Absent <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 4	4	3	2	1
Bottom Substrate Stability	Stable >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	Moderately Stable 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	Moderately Unstable 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	Unstable <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 4	4	3	2	1
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	Abundant ≥5 riffles	Common 2-4 riffles	Rare 1 riffle	Absent No riffles
Score: 3	4	3	2	1
Dimensions of Largest Pool	Large Pool covers more than 50% of the channel width; maximum depth is > 1m	Moderate Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	Small Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	Absent No existing pools; only shallow auxiliary pockets
Score: 3	3	2	1	0
Channel Flow Status	High Water reaches the base of both the lower banks; <5% of channel substrate is exposed	Moderate Water fills <75% of the channel; or <25% of channel substrate is exposed	Low Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	No Flow Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 3	3	2	1	0
Bank Stability	Stable Little evidence (<10%) of erosion bank failure; bank angles average <30°	Moderately Stable Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	Moderately Unstable Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	Unstable Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°
Score: 0	3	2	1	0
Channel Sinuosity	High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	Moderate 1 well-defined bend OR ≥3 moderately-defined bends present	Low <3 moderately-defined bends OR only poorly-defined bends present	None Straight channel; may be channelized
Score: 2	3	2	1	0
Riparian Buffer Vegetation	Extensive Width of natural buffer is >20 meters	Wide Width of natural buffer is 10.1-20 meters	Moderate Width of natural buffer is 5-10 meters	Narrow Width of natural buffer is <5 meters
Score: 3	3	2	1	0
Aesthetics of Reach	Wilderness Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	Natural Area Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	Common Setting Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	Offensive Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 2	3	2	1	0
Total Score: 24	HIGH			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category			Location: 17892	Date: 8/5/03
Available Instream Cover	Abundant >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	Common 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	Rare 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed		Absent <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 2	4	3	2		1
Bottom Substrate Stability	Stable >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	Moderately Stable 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	Moderately Unstable 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes		Unstable <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 4	4	3	2		1
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	Abundant ≥5 riffles	Common 2-4 riffles	Rare 1 riffle		Absent No riffles
Score: 4	4	3	2		1
Dimensions of Largest Pool	Large Pool covers more than 50% of the channel width; maximum depth is > 1m	Moderate Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	Small Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter		Absent No existing pools; only shallow auxiliary pockets
Score: 3	3	2	1		0
Channel Flow Status	High Water reaches the base of both the lower banks; <5% of channel substrate is exposed	Moderate Water fills <75% of the channel; or <25% of channel substrate is exposed	Low Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed		No Flow Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 2	3	2	1		0
Bank Stability	Stable Little evidence (<10%) of erosion bank failure; bank angles average <30°	Moderately Stable Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	Moderately Unstable Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°		Unstable Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°
Score: 1	3	2	1		0
Channel Sinuosity	High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	Moderate 1 well-defined bend OR ≥3 moderately-defined bends present	Low <3 moderately-defined bends OR only poorly-defined bends present		None Straight channel; may be channelized
Score: 3	3	2	1		0
Riparian Buffer Vegetation	Extensive Width of natural buffer is >20 meters	Wide Width of natural buffer is 10.1-20 meters	Moderate Width of natural buffer is 5-10 meters		Narrow Width of natural buffer is <5 meters
Score: 3	3	2	1		0
Aesthetics of Reach	Wilderness Outstanding natural beauty; usually wooded or ungrazed area; water clarity is usually exceptional	Natural Area Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	Common Setting Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored		Offensive Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 2	3	2	1		0
Total Score: 24	HIGH				

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category			Location: 13007	Date: 8/6/03
Available Instream Cover	Abundant >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	Common 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	Rare 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Absent <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking	
Score: 2	4	3	2	1	
Bottom Substrate Stability	Stable >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	Moderately Stable 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	Moderately Unstable 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	Unstable <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock	
Score: 4	4	3	2	1	
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	Abundant ≥5 riffles	Common 2-4 riffles	Rare 1 riffle	Absent No riffles	
Score: 3	4	3	2	1	
Dimensions of Largest Pool	Large Pool covers more than 50% of the channel width; maximum depth is > 1m	Moderate Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	Small Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	Absent No existing pools; only shallow auxiliary pockets	
Score: 3	3	2	1	0	
Channel Flow Status	High Water reaches the base of both the lower banks; <5% of channel substrate is exposed	Moderate Water fills <75% of the channel; or <25% of channel substrate is exposed	Low Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	No Flow Very little water in the channel and mostly present in standing pools; or stream is dry	
Score: 2	3	2	1	0	
Bank Stability	Stable Little evidence (<10%) of erosion bank failure; bank angles average <30°	Moderately Stable Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	Moderately Unstable Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	Unstable Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°	
Score: 2	3	2	1	0	
Channel Sinuosity	High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	Moderate 1 well-defined bend OR ≥3 moderately-defined bends present	Low <3 moderately-defined bends OR only poorly-defined bends present	None Straight channel; may be channelized	
Score: 1	3	2	1	0	
Riparian Buffer Vegetation	Extensive Width of natural buffer is >20 meters	Wide Width of natural buffer is 10.1-20 meters	Moderate Width of natural buffer is 5-10 meters	Narrow Width of natural buffer is <5 meters	
Score: 3	3	2	1	0	
Aesthetics of Reach	Wilderness Outstanding natural beauty; usually wooded or ungrazed area; water clarity is usually exceptional	Natural Area Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	Common Setting Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	Offensive Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored	
Score: 2	3	2	1	0	
Total Score: 22	HIGH				

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 13006	Date: 8/6/03
Available Instream Cover	Abundant >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	Common 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	Rare 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Absent <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 3	4	3	2	1
Bottom Substrate Stability	Stable >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	Moderately Stable 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	Moderately Unstable 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	Unstable <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 4	4	3	2	1
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	Abundant ≥5 riffles	Common 2-4 riffles	Rare 1 riffle	Absent No riffles
Score: 3	4	3	2	1
Dimensions of Largest Pool	Large Pool covers more than 50% of the channel width; maximum depth is > 1m	Moderate Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	Small Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	Absent No existing pools; only shallow auxiliary pockets
Score: 2	3	2	1	0
Channel Flow Status	High Water reaches the base of both the lower banks; <5% of channel substrate is exposed	Moderate Water fills <75% of the channel; or <25% of channel substrate is exposed	Low Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	No Flow Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 3	3	2	1	0
Bank Stability	Stable Little evidence (<10%) of erosion bank failure; bank angles average <30°	Moderately Stable Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	Moderately Unstable Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	Unstable Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°
Score: 2	3	2	1	0
Channel Sinuosity	High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	Moderate 1 well-defined bend OR ≥3 moderately-defined bends present	Low <3 moderately-defined bends OR only poorly-defined bends present	None Straight channel; may be channelized
Score: 1	3	2	1	0
Riparian Buffer Vegetation	Extensive Width of natural buffer is >20 meters	Wide Width of natural buffer is 10.1-20 meters	Moderate Width of natural buffer is 5-10 meters	Narrow Width of natural buffer is <5 meters
Score: 3	3	2	1	0
Aesthetics of Reach	Wilderness Outstanding natural beauty; usually wooded or ungrazed area; water clarity is usually exceptional	Natural Area Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	Common Setting Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	Offensive Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 2	3	2	1	0
Total Score: 23	HIGH			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category			Location: 17892	Date: 10/8/03
Available Instream Cover	Abundant >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	Common 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	Rare 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Absent <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking	
Score: 2	4	3	2	1	
Bottom Substrate Stability	Stable >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	Moderately Stable 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	Moderately Unstable 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	Unstable <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock	
Score: 4	4	3	2	1	
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	Abundant ≥5 riffles	Common 2-4 riffles	Rare 1 riffle	Absent No riffles	
Score: 3	4	3	2	1	
Dimensions of Largest Pool	Large Pool covers more than 50% of the channel width; maximum depth is > 1m	Moderate Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	Small Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	Absent No existing pools; only shallow auxiliary pockets	
Score: 3	3	2	1	0	
Channel Flow Status	High Water reaches the base of both the lower banks; <5% of channel substrate is exposed	Moderate Water fills <75% of the channel; or <25% of channel substrate is exposed	Low Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	No Flow Very little water in the channel and mostly present in standing pools; or stream is dry	
Score: 2	3	2	1	0	
Bank Stability	Stable Little evidence (<10%) of erosion bank failure; bank angles average <30°	Moderately Stable Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	Moderately Unstable Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	Unstable Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°	
Score: 2	3	2	1	0	
Channel Sinuosity	High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	Moderate 1 well-defined bend OR ≥3 moderately-defined bends present	Low <3 moderately-defined bends OR only poorly-defined bends present	None Straight channel; may be channelized	
Score: 3	3	2	1	0	
Riparian Buffer Vegetation	Extensive Width of natural buffer is >20 meters	Wide Width of natural buffer is 10.1-20 meters	Moderate Width of natural buffer is 5-10 meters	Narrow Width of natural buffer is <5 meters	
Score: 3	3	2	1	0	
Aesthetics of Reach	Wilderness Outstanding natural beauty; usually wooded or ungrazed area; water clarity is usually exceptional	Natural Area Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	Common Setting Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	Offensive Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored	
Score: 2	3	2	1	0	
Total Score: 24	HIGH				

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category			Location: 13007	Date: 10/9/03
Available Instream Cover	Abundant >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	Common 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	Rare 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Absent <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking	
Score: 2	4	3	2	1	
Bottom Substrate Stability	Stable >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	Moderately Stable 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	Moderately Unstable 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	Unstable <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock	
Score: 4	4	3	2	1	
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	Abundant ≥5 riffles	Common 2-4 riffles	Rare 1 riffle	Absent No riffles	
Score: 2	4	3	2	1	
Dimensions of Largest Pool	Large Pool covers more than 50% of the channel width; maximum depth is > 1m	Moderate Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	Small Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	Absent No existing pools; only shallow auxiliary pockets	
Score: 3	3	2	1	0	
Channel Flow Status	High Water reaches the base of both the lower banks; <5% of channel substrate is exposed	Moderate Water fills <75% of the channel; or <25% of channel substrate is exposed	Low Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	No Flow Very little water in the channel and mostly present in standing pools; or stream is dry	
Score: 2	3	2	1	0	
Bank Stability	Stable Little evidence (<10%) of erosion bank failure; bank angles average <30°	Moderately Stable Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	Moderately Unstable Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	Unstable Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°	
Score: 2	3	2	1	0	
Channel Sinuosity	High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	Moderate 1 well-defined bend OR ≥3 moderately-defined bends present	Low <3 moderately-defined bends OR only poorly-defined bends present	None Straight channel; may be channelized	
Score: 1	3	2	1	0	
Riparian Buffer Vegetation	Extensive Width of natural buffer is >20 meters	Wide Width of natural buffer is 10.1-20 meters	Moderate Width of natural buffer is 5-10 meters	Narrow Width of natural buffer is <5 meters	
Score: 3	3	2	1	0	
Aesthetics of Reach	Wilderness Outstanding natural beauty; usually wooded or ungrazed area; water clarity is usually exceptional	Natural Area Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	Common Setting Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	Offensive Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored	
Score: 2	3	2	1	0	
Total Score: 21	HIGH				

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category			Location: 13006	Date: 10/9/03
Available Instream Cover	Abundant >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	Common 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	Rare 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Absent <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking	
Score: 2	4	3	2	1	
Bottom Substrate Stability	Stable >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	Moderately Stable 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	Moderately Unstable 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	Unstable <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock	
Score: 4	4	3	2	1	
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	Abundant ≥5 riffles	Common 2-4 riffles	Rare 1 riffle	Absent No riffles	
Score: 3	4	3	2	1	
Dimensions of Largest Pool	Large Pool covers more than 50% of the channel width; maximum depth is > 1m	Moderate Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	Small Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	Absent No existing pools; only shallow auxiliary pockets	
Score: 3	3	2	1	0	
Channel Flow Status	High Water reaches the base of both the lower banks; <5% of channel substrate is exposed	Moderate Water fills <75% of the channel; or <25% of channel substrate is exposed	Low Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	No Flow Very little water in the channel and mostly present in standing pools; or stream is dry	
Score: 2	3	2	1	0	
Bank Stability	Stable Little evidence (<10%) of erosion bank failure; bank angles average <30°	Moderately Stable Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	Moderately Unstable Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	Unstable Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°	
Score: 3	3	2	1	0	
Channel Sinuosity	High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	Moderate 1 well-defined bend OR ≥3 moderately-defined bends present	Low <3 moderately-defined bends OR only poorly-defined bends present	None Straight channel; may be channelized	
Score: 1	3	2	1	0	
Riparian Buffer Vegetation	Extensive Width of natural buffer is >20 meters	Wide Width of natural buffer is 10.1-20 meters	Moderate Width of natural buffer is 5-10 meters	Narrow Width of natural buffer is <5 meters	
Score: 3	3	2	1	0	
Aesthetics of Reach	Wilderness Outstanding natural beauty; usually wooded or ungrazed area; water clarity is usually exceptional	Natural Area Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	Common Setting Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	Offensive Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored	
Score: 2	3	2	1	0	
Total Score: 23	HIGH				