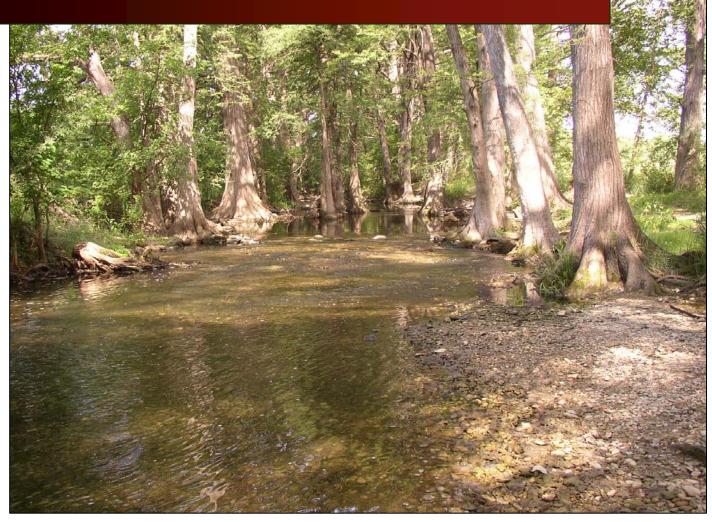
Impairment Verification Monitoring Biological and Habitat Components Segment 1908, Upper Cibolo Creek, Texas April 2005



Ecological Communications Corporation Austin, TX



Impairment Verification Monitoring-Volume 2: Biological and Habitat Components Segment 1908, Upper Cibolo Creek

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Total Maximum Daily Load Program
Texas Commission on Environmental Quality
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ABSTRACT

Ecological Communications Corporation (EComm) conducted biological data collection and analysis as part of an impairment verification monitoring project for Upper Cibolo Creek (Segment 1908). Segment 1908 appears on the State of Texas' 303(d) list as impaired for high aquatic life based on low dissolved oxygen concentrations previously reported by or to the Texas Commission on Environmental Quality (TCEQ) or its predecessor agencies. Due to an insufficient amount of 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 information on the water body to support a use attainability analysis if it was determined that the designated aquatic life use was incorrect.

A separate but related assessment was simultaneously conducted by the Texas Engineering Experiment Station (TEES) and the Conrad Blucher Institute for Surveying and Science (CBI) to facilitate the objective. 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.

Based on data collected by EComm and TEES from 2002 to 2004, this water body was found to be attaining its designated aquatic life use, and will be recommended for delisting.

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APPENDICES

Appendix A Complete Raw Data Set, Biological and Habitat Components, Segment 1908–Upper Cibolo Creek,: September 2002, July 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 were 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 which exceed established criteria. One of these water bodies was Upper Cibolo Creek (Segment 1908). The impairment to

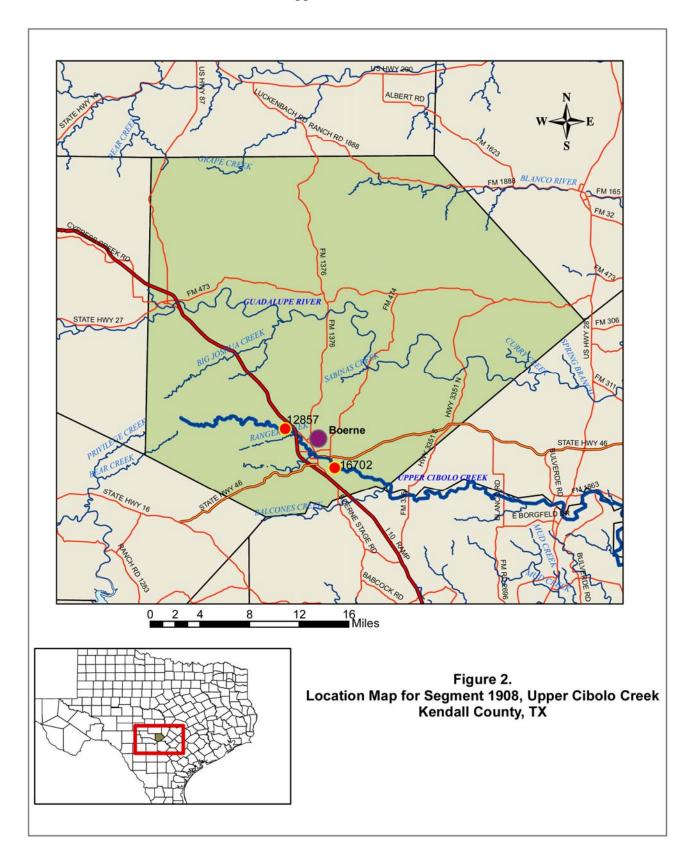


Figure 1. Station 12857

Segment 1908 was caused by an exceedance of the established dissolved oxygen criteria based upon comparisons to the instantaneous grab samples. Because an insufficient number of 24-dissolved oxygen values were available in 2002 to determine if the aquatic life use criterion was supported, Segment 1908 remained on the impaired waters list. As an initial phase in TMDL development, the aquatic life use impairment to Segment 1908 was verified using the latest sampling techniques. The 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 two 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 1908 originates in extreme southwestern Kendall County, Texas. It flows 66 miles to Comal County and forms the boundary for Bexar and Comal Counties. The creek traverses the Edwards Aquifer Recharge zone, and is known to disappear in some areas as it enters the underground water table through cracks and other openings in exposed Edwards formation outcrop. A location map of the segment is provided in Figure 2. Site 12857 (also internally referred to as 10007 during the initial portion of data collection and analysis) is located in Kendall County just above Boerne at IH 10 and Ranger Creek Road. Site 16702 is located below Boerne, at the Cibolo Nature Center off Texas State Highway 46.



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 the 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 (IBIs). Additionally, **EComm** generated IBIs for all stations using regional criteria developed by Texas Parks and Wildlife Department (2002). The regional criteria consider differences in landforms, soil types, climatic conditions, vegetation, zoogeographic factors among the ecoregions and thus "provide a better representation of the integrity of fish assemblage" as compared to statewide criteria.



Figure 3. Station 16702

Also, in addition to data collection via RWA guidelines and TCEQ Surface Water Quality Monitoring (SWQM) Procedures Manual (TNRCC 1999a), EComm captured data for approximately 14 previously uncoded biological and habitat parameters. These 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 1908 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 physical/chemical component of the study was to verify the impairment, a biological sampling regime satisfying the minimum UAA data requirements was conducted. UAA requirements include at least three complete sampling events over two consecutive index periods. One event is required in the early portion (before April 30) 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. Biological sampling for Segment 1908 was conducted in September 2002, July 2003, and October 2003. Since this assessment failed to acquire a sample from the early portion of the index period, more data would be required for this segment of Cibolo Creek if it is determined that the aquatic life uses and criteria should be evaluated within a UAA.

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)
800	Channel flow status	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
812	Statewide IBI	98003	Number of fish species
833	Habitat Quality Index	89905	Number of minutes debris was sampled
84161	Stream order	89851	Percent grass
84159	Percent instream cover	89854	Percentage tree canopy
813	Number of cyprinidae species	89859	Drainage area
814	Number of benthic invertebrates	89860	Length of reach
72052	Streambed slope	89861	Average stream width
816	Percent that are tolerant species, excluding G.affinis	89862	Average stream depth
817	Number of individuals per seine haul	89864	Maximum pool width
818	Number of individuals per minute electroshocking	89865	Maximum pool depth
819	Percentage of individuals as non-native	89866	Average width of riparian vegetation
820	Regional IBI	90010	Dominant functional feeding group percentage
832	Total RBP score	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
834	Percentage benthic scrapers	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	835	Benthic invertebrate taxa richness
89850	Percent as shrubs	836	Number instream cover types
98004	Total number of darter species	89904	Minutes spent kicknetting

^{*} STORET Codes beginning with 8 have yet to be formally established

Benthic Macroinvertebrate Collections

Biological sampling included fish and benthic macroinvertebrate data collection at each site within the segment. A location map of the segment, as well as the two site locations within the segment, is provided in Figure 2. 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. In the event that no riffles were present, snags, leaf packs, and



Figure 4. Macroinvertebrate Collection

other debris were picked for macroinvertebrates. Intervals were repeated until the minimum sample size of 100 specimens was approached, met, or exceeded. All individuals collected within the net or through picking were transferred 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 Rapid Bioassessment Protocol 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 both electrofishing and seine methods to ensure a representative sample was collected at each site. Electrofishing was conducted using Smith-Root LR-24 backpack electrofishers powered by either 7 amp-hour or 12 am-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 with dip nets. Collected fish were temporarily placed in a five-gallon 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 Active sampling (instances contain fish. 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 1,000 seconds. Upon completion of electrofishing, fish were immediately identified, recorded, and returned



Figure 5. Sampling at Site 16702

to the water in order to minimize mortality. Any fish that could not be identified in the field was preserved in either formalin solution or ethanol. If more than one fish exhibiting the same characteristics could not be field identified, then only one representative specimen was preserved for later lab identification. Additionally, one individual from each field-identified species was retained as a youcher.

Electrofishing was complemented by seining at all sites where seining was possible. A straight seine measuring 30' x 4' with 1/8" 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 prevented 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.

Collections were analyzed using metrics defined by TNRCC 1999 to generate Statewide IBI. Regional IBI were also calculated using the TPWD 2002 criteria. 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.

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

Several other subjective habitat parameters were used as required by 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 assure that all crewmembers 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 1908. 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 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 would be considered to have a "Limited-Intermediate" Aquatic Life Use subcategory.

Table 2. Ranges and Subcategories for each component

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 two sites over three sampling events are provided in Table 3. Raw data are provided in Appendix A.

Table 3. Results of Biological and Habitat Sampling for Segment 1908-Upper Cibolo Creek

J. INCOURT	or biological and mabi	tat bamping for t	ocginiciti 1300-0pp	CI OIDOIO OICCK
FY02	Statewide IBI	Regional IBI	RBP	HQI
12857	42 - Intermediate	46 - High	28 - Intermediate	16 - Intermediate
16702	42 - Intermediate	51 - High	34 - High	23 - High
FY03				
12857	44 - Intermediate	53 - Exceptional	35 - High	16 - Intermediate
16702	46 - Intermediate-High	57 - Exceptional	34 - High	23 - High
FY04				
12857	44 - Intermediate	46 - High	28 - Intermediate	17 - Intermediate
16702	44 - Intermediate	42 - High	33 - High	21 - 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 "High" agreed with the designated aquatic life use value for the segment. A subcategory of "Limited", "Limited-Intermediate", "Intermediate", or "Intermediate-High" was considered substandard, as it reflects a poorer level of water quality than that for which the segment is designated. A subcategory of "Exceptional" would be considered exceeding standards for Segment 1908. Statewide IBI scores averaged approximately 43.5 (Intermediate) across all sites over all sampling events, and indicated a poor agreement with the designated aquatic life use (0%), which was determined as "high" according the Water Quality Inventory. Regional IBI scores averaged 49 (High), and represented a higher agreement (67%; 33% above standard). RBP scores averaged 32 (High), a 66.7% agreement (33.3% below standard), while HQI averaged

approximately 19 (Intermediate) in 50% agreement with the aquatic life use (50% below standard).

4.0 DISCUSSION

Other than Statewide IBI and to a lesser extent, Habitat Quality Indices, average scores of all components generally reflected agreement with the high aquatic life use designation for Segment 1908. The general trend in Statewide IBI scores is to underestimate the aquatic life use when compared to other assessment methods (TPWD 2002). Therefore, the lower Statewide IBI scores generated from data collected for this study are most likely not indicative of lower aquatic life use. Lower than standard HQI scores most likely were found as a result of the urban character of site 12857. This site was located directly under IH 10, had an extremely limited vegetative structure and buffer zone, and was relatively shallow and straight. Of the 24 aquatic life use calculations generated for Segment 1908, two (8.3%) scored "Exceptional", a subcategory generally reserved for relatively pristine streams. All four component scores were fairly consistent across sites and across time, which was unusual due to the dynamic climatic conditions within this segment over the two-year sampling period. Dissolved oxygen concentrations throughout the study were consistently above standards.

It should be noted that because this segment traverse the Edwards Aquifer recharge zone, some portions of the creek are intermittent as water enters openings in the surface into underground waterways. Neither site reflected this phenomenon, as waters at both appeared to be perennial. Based on research conducted on other stream segments, portions of Segment 1908 that exhibit this intermittent behavior most likely would score lower than the sampled sites.

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 meeting the established standards.

REFERENCES

- CONRAD BLUCHER INSTITUTE FOR SURVEYING AND SCIENCE (CBI) 2005. Impairment Verification Monitoring –Volume 1: Physical and Chemical Components; Segment 1908, Upper Cibolo Creek.
- CBI 2003. Total Daily Maximum Load Project: Basin Groups D & E Dissolved Oxygen and Bacteria Impairments, Draft Monitoring Plan. August 2003.
- Sullivan, Andrew, Mark Beaman, Frank Kelly, Victor Palma, and Jeremy Walther.

 Impairment Verification Monitoring in Eleven Texas Waterbodies: Step 1 for the Development of Successful and Cost Effective TMDLs. September 2004.
- TEXAS NATURAL RESOURCE CONSERVATION COMMISSION. 1999a. Surface Water Quality Monitoring Procedures Manual. Water Quality Division. Surface Water Quality Monitoring Program. GI-252. June 1999.
- ______. 1999b. *Receiving Water Assessment Procedures Manual*. Water Quality Division, Surface Water Quality Monitoring Program. GI-253. June 1999.
- TPWD 2002. *Regionalization of the Index of Biotic Integrity for Texas Streams*. Gordon W. Linam, Leroy J. Kleinsasser, and Kevin B. Mayes, Resource Protection Division. River Studies Report No. 17. June 2002.

Appendix A
Complete Raw Data Set
Biological and Habitat Components
Segment 1908-Upper Cibolo Creek, Texas
September 2002
July 2003
October 2003



Ecological Communications Corporation Austin, TX

BIOTIC ASSESSMENT – BENTHIC MACROINVERTEBRATES

Species Lists and Preliminary Data Manipulation



Stream	Date	ID	Taxa	N=	Func.Gp.	Tolerance	HBI
U.Cibolo	9/4/02	12857	Odonata-Coenagrionidae-Argia	13	Р	6	0.8297872
			Odonata-Calopterygidae-Hetaerina	5	Р	6	0.3191489
			Odonata-Libellulidae-Brechmorhoga	4	Р	6	0.2553191
Func.Gp	N=		Ephemeroptera-Leptophlebiidae-Thraulodes	7	CG/SCR	2	0.1489362
Р	36.6337		Ephemeroptera-Leptophlebiidae-Farrodes	2	CG/SCR	2	0.0425532
SCR	7.42574		Ephemeroptera-Heptageniidae-Stenonema	1	SCR/CG	4	0.0425532
CG	10.396		Ephemeroptera-Baetidae-Baetis	2	SCR/CG	4	0.0851064
FC	45.5446		Hemiptera-Veliidae-Rhagovelia	4	Р	-	-
SHR	0		Megaloptera-Corydalidae-Corydalus	2	Р	6	0.1276596
	100		Trichoptera-Polycentropidae-Cernotina	1	Р	6	0.0638298
			Trichoptera-Hydropsychidae-Cheumatopsyche	23	FC	6	1.4680851
			Trichoptera-Philopotamidae-Chimarra	23	FC	3	0.7340426
			Coleoptera-Elmidae-Microcylloepus (A)	3	CG/SCR	2	0.0638298
			Coleoptera-Lutrochidae-Lutrochus	3	CG	-	-
			Diptera-Tabanidae-Tabanus	8	Р	7	0.5957447
			Total	101	94		4.7765957
			Intolerant/Tolerant	0.68			
			Intolerant/Tolerant	0.68			
Stream	Date	ID	Intolerant/Tolerant Taxa	0.68 N =	Func.Gp.	Tolerance	НВІ
Stream U.Cibolo	Date 9/5/02	ID 16702			Func.Gp.	Tolerance 6	HBI 0.3846154
			Таха	N=	•		
			Taxa Odonata-Coenagrionidae- <i>Argia</i>	N= 5	Р	6	0.3846154
			Taxa Odonata-Coenagrionidae- <i>Argia</i> Odonata-Calopterygidae- <i>Hetaerina</i>	N= 5 2	P P	6 6	0.3846154 0.1538462
U.Cibolo	9/5/02		Taxa Odonata-Coenagrionidae- <i>Argia</i> Odonata-Calopterygidae- <i>Hetaerina</i> Odonata-Libellulidae- <i>Brechmorhoga</i>	N= 5 2 6	Р Р	6 6 6	0.3846154 0.1538462 0.4615385
U.Cibolo Func.Gp	9/5/02 N=		Taxa Odonata-Coenagrionidae- <i>Argia</i> Odonata-Calopterygidae- <i>Hetaerina</i> Odonata-Libellulidae- <i>Brechmorhoga</i> Ephemeroptera-Tricorythidae- <i>Tricorythodes</i>	N= 5 2 6 1	P P P CG	6 6 6 5	0.3846154 0.1538462 0.4615385 0.0641026
U.Cibolo Func.Gp	9/5/02 N= 37.5		Taxa Odonata-Coenagrionidae-Argia Odonata-Calopterygidae-Hetaerina Odonata-Libellulidae-Brechmorhoga Ephemeroptera-Tricorythidae-Tricorythodes Ephemeroptera-Leptophlebiidae-Thraulodes	N= 5 2 6 1 26	P P P CG CG/SCR	6 6 6 5 2	0.3846154 0.1538462 0.4615385 0.0641026 0.6666667
U.Cibolo Func.Gp P SCR	9/5/02 N= 37.5 22.1154		Taxa Odonata-Coenagrionidae-Argia Odonata-Calopterygidae-Hetaerina Odonata-Libellulidae-Brechmorhoga Ephemeroptera-Tricorythidae-Tricorythodes Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Farrodes	N= 5 2 6 1 26 2	P P CG CG/SCR CG/SCR	6 6 6 5 2 2	0.3846154 0.1538462 0.4615385 0.0641026 0.6666667 0.0512821
U.Cibolo Func.Gp P SCR CG	9/5/02 N= 37.5 22.1154 19.2308		Taxa Odonata-Coenagrionidae-Argia Odonata-Calopterygidae-Hetaerina Odonata-Libellulidae-Brechmorhoga Ephemeroptera-Tricorythidae-Tricorythodes Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Farrodes Ephemeroptera-Baetidae-Baetis	N= 5 2 6 1 26 2 6	P P CG CG/SCR CG/SCR SCR/CG	6 6 6 5 2 2	0.3846154 0.1538462 0.4615385 0.0641026 0.6666667 0.0512821
U.Cibolo Func.Gp P SCR CG FC	9/5/02 N= 37.5 22.1154 19.2308 21.1538		Taxa Odonata-Coenagrionidae-Argia Odonata-Calopterygidae-Hetaerina Odonata-Libellulidae-Brechmorhoga Ephemeroptera-Tricorythidae-Tricorythodes Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Farrodes Ephemeroptera-Baetidae-Baetis Hemiptera-Naucoridae-Ambrysus	N= 5 2 6 1 26 2 6 14	P P CG CG/SCR CG/SCR SCR/CG P	6 6 6 5 2 2	0.3846154 0.1538462 0.4615385 0.0641026 0.6666667 0.0512821
U.Cibolo Func.Gp P SCR CG FC	9/5/02 N= 37.5 22.1154 19.2308 21.1538 0		Taxa Odonata-Coenagrionidae-Argia Odonata-Calopterygidae-Hetaerina Odonata-Libellulidae-Brechmorhoga Ephemeroptera-Tricorythidae-Tricorythodes Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Farrodes Ephemeroptera-Baetidae-Baetis Hemiptera-Naucoridae-Ambrysus Hemiptera-Naucoridae-Cryphocricos	N= 5 2 6 1 26 2 6 14 10	P P CG CG/SCR CG/SCR SCR/CG P	6 6 6 5 2 2 4 -	0.3846154 0.1538462 0.4615385 0.0641026 0.6666667 0.0512821
U.Cibolo Func.Gp P SCR CG FC	9/5/02 N= 37.5 22.1154 19.2308 21.1538 0		Taxa Odonata-Coenagrionidae-Argia Odonata-Calopterygidae-Hetaerina Odonata-Libellulidae-Brechmorhoga Ephemeroptera-Tricorythidae-Tricorythodes Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Farrodes Ephemeroptera-Baetidae-Baetis Hemiptera-Naucoridae-Ambrysus Hemiptera-Naucoridae-Cryphocricos Hemiptera-Veliidae-Rhagovelia	N= 5 2 6 1 26 2 6 14 10 2	P P CG CG/SCR CG/SCR SCR/CG P P	6 6 6 5 2 2 4 -	0.3846154 0.1538462 0.4615385 0.0641026 0.6666667 0.0512821 0.3076923
U.Cibolo Func.Gp P SCR CG FC	9/5/02 N= 37.5 22.1154 19.2308 21.1538 0		Taxa Odonata-Coenagrionidae-Argia Odonata-Calopterygidae-Hetaerina Odonata-Libellulidae-Brechmorhoga Ephemeroptera-Tricorythidae-Tricorythodes Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Farrodes Ephemeroptera-Baetidae-Baetis Hemiptera-Naucoridae-Ambrysus Hemiptera-Naucoridae-Cryphocricos Hemiptera-Veliidae-Rhagovelia Trichoptera-Hydropsychidae-Cheumatopsyche	N= 5 2 6 1 26 2 6 14 10 2 7	P P CG CG/SCR CG/SCR SCR/CG P P F	6 6 5 2 2 4 -	0.3846154 0.1538462 0.4615385 0.0641026 0.6666667 0.0512821 0.3076923 - - - - 0.5384615
U.Cibolo Func.Gp P SCR CG FC	9/5/02 N= 37.5 22.1154 19.2308 21.1538 0		Taxa Odonata-Coenagrionidae-Argia Odonata-Calopterygidae-Hetaerina Odonata-Libellulidae-Brechmorhoga Ephemeroptera-Tricorythidae-Tricorythodes Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Farrodes Ephemeroptera-Baetidae-Baetis Hemiptera-Naucoridae-Ambrysus Hemiptera-Naucoridae-Cryphocricos Hemiptera-Veliidae-Rhagovelia Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Philopotamidae-Chimarra	N= 5 2 6 1 26 2 6 14 10 2 7 13	P P CG CG/SCR CG/SCR SCR/CG P P FC FC	6 6 5 2 2 4 - - 6 3	0.3846154 0.1538462 0.4615385 0.0641026 0.6666667 0.0512821 0.3076923 - - - 0.5384615 0.5
U.Cibolo Func.Gp P SCR CG FC	9/5/02 N= 37.5 22.1154 19.2308 21.1538 0		Taxa Odonata-Coenagrionidae-Argia Odonata-Calopterygidae-Hetaerina Odonata-Libellulidae-Brechmorhoga Ephemeroptera-Tricorythidae-Tricorythodes Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Farrodes Ephemeroptera-Baetidae-Baetis Hemiptera-Naucoridae-Ambrysus Hemiptera-Naucoridae-Cryphocricos Hemiptera-Veliidae-Rhagovelia Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Philopotamidae-Chimarra Coleoptera-Psephenidae-Psephenus	N= 5 2 6 1 26 2 6 14 10 2 7 13 4	P P CG CG/SCR CG/SCR SCR/CG P F FC FC SCR	6 6 5 2 2 4 - - 6 3	0.3846154 0.1538462 0.4615385 0.0641026 0.6666667 0.0512821 0.3076923 0.5384615 0.5 0.2051282
U.Cibolo Func.Gp P SCR CG FC	9/5/02 N= 37.5 22.1154 19.2308 21.1538 0		Taxa Odonata-Coenagrionidae-Argia Odonata-Calopterygidae-Hetaerina Odonata-Libellulidae-Brechmorhoga Ephemeroptera-Tricorythidae-Tricorythodes Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Farrodes Ephemeroptera-Baetidae-Baetis Hemiptera-Naucoridae-Ambrysus Hemiptera-Naucoridae-Cryphocricos Hemiptera-Veliidae-Rhagovelia Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Philopotamidae-Chimarra Coleoptera-Psephenidae-Psephenus Coleoptera-Elmidae-Macrelmis (A)	N= 5 2 6 1 26 2 6 14 10 2 7 13 4 1	P P CG CG/SCR CG/SCR SCR/CG P P FC FC SCR CG/SCR	6 6 6 5 2 2 4 - - 6 3 4 2	0.3846154 0.1538462 0.4615385 0.0641026 0.6666667 0.0512821 0.3076923 - - 0.5384615 0.5 0.2051282 0.025641
U.Cibolo Func.Gp P SCR CG FC	9/5/02 N= 37.5 22.1154 19.2308 21.1538 0		Taxa Odonata-Coenagrionidae-Argia Odonata-Calopterygidae-Hetaerina Odonata-Libellulidae-Brechmorhoga Ephemeroptera-Tricorythidae-Tricorythodes Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Farrodes Ephemeroptera-Baetidae-Baetis Hemiptera-Naucoridae-Ambrysus Hemiptera-Naucoridae-Cryphocricos Hemiptera-Veliidae-Rhagovelia Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Philopotamidae-Chimarra Coleoptera-Psephenidae-Psephenus Coleoptera-Elmidae-Macrelmis (A) Coleoptera-Elmidae-Hexacylloepus (A)	N= 5 2 6 1 26 2 6 14 10 2 7 13 4 1 2	P P CG CG/SCR CG/SCR SCR/CG P P FC FC SCR CG/SCR CG/SCR	6 6 6 5 2 2 4 - - 6 3 4 2 2	0.3846154 0.1538462 0.4615385 0.0641026 0.6666667 0.0512821 0.3076923 0.5384615 0.5 0.2051282 0.025641 0.0512821
U.Cibolo Func.Gp P SCR CG FC	9/5/02 N= 37.5 22.1154 19.2308 21.1538 0		Taxa Odonata-Coenagrionidae-Argia Odonata-Calopterygidae-Hetaerina Odonata-Libellulidae-Brechmorhoga Ephemeroptera-Tricorythidae-Tricorythodes Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Farrodes Ephemeroptera-Baetidae-Baetis Hemiptera-Naucoridae-Ambrysus Hemiptera-Naucoridae-Cryphocricos Hemiptera-Veliidae-Rhagovelia Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Philopotamidae-Chimarra Coleoptera-Psephenidae-Psephenus Coleoptera-Elmidae-Macrelmis (A) Coleoptera-Elmidae-Hexacylloepus (A) Diptera-Chironomidae	N= 5 2 6 1 26 2 6 14 10 2 7 13 4 1 2 1	P P CG CG/SCR CG/SCR SCR/CG P P FC FC SCR CG/SCR CG/SCR CG/SCR CG/SCR	6 6 6 5 2 2 4 - - 6 3 4 2 2 4	0.3846154 0.1538462 0.4615385 0.0641026 0.6666667 0.0512821 0.3076923 0.5384615 0.5 0.2051282 0.025641 0.0512821 0.0512821

Stream: U.Cibolo Date: 7/31/03 Location: 12857

		Species	N=	Tolerance	FFG	нві
		Argia	5	6	Р	0.352941176
		Hetaerina	2	6	Р	0.141176471
		Brechmorhoga	3	6	Р	0.211764706
FFG		Tricorythodes	6	5	CG	0.352941176
Р	31.667	Leptohypes	4	2	CG	0.094117647
SCR	9.5455	Camelobaetidius	2	4	SCR/CG	0.094117647
CG	21.667	Isonychia	8	3	FC	0.282352941
FC	37.121	Thraulodes	4	2	CG/SCR	0.094117647
SHR	0	Ambrysus	5	-	Р	-
	100	Cryphocricos	5	-	Р	-
		Rhagovelia	8	-	Р	-
		Corydalus	2	6	Р	0.141176471
		Cheumatopsyche	13	6	FC	0.917647059
		Smicridea	1	4	FC	0.047058824
		Chimarra	9	3	FC	0.317647059
		Helicopsyche	1	2	SCR	0.023529412
		Polycentropus	1	3	FC/P	0.035294118
		Stenelmis (A)	1	7	CG/SCR	0.082352941
		Microcylloepus (A)	4	2	CG/SCR	0.094117647
		Hexacylloepus (A)	1	2	CG/SCR	0.023529412
		Macrelmis (L)	3	2	CG/SCR	0.070588235
		Macrelmis (A)	2	2	CG/SCR	0.047058824
		Celina (L)	1	-	Р	-
		Lutrochus (A)	3	-	CG	-
		Lutrochus (L)	1	-	CG	-
		Chironomidae	4	6	P/CG/FC	0.282352941
		Tabanus	2	7	Р	0.164705882
		Simulium	3	4	FC	0.141176471
		Physella	1	9	SCR	0.105882353
	_	Corbicula	5	6	FC	0.352941176
	_		110	1.28947368		4.470588235

Stream: U.Cibolo Date: 7/31/03 Location: 16702

> P 21.264 SCR 34.052 CG 36.351 FC 8.3333 SHR 0

Species	N=	Tolerance	FFG	нві
Argia	3	6	Р	0.155172414
Hetaerina	1	6	Р	0.051724138
Brechmorhoga	1	6	Р	0.051724138
Erpetogomphus	1	1	Р	0.00862069
Tricorythodes	1	5	CG	0.043103448
Leptohypes	10	2	CG	0.172413793
Camelobaetidius	2	4	SCR/CG	0.068965517
Baetis	12	4	SCR/CG	0.413793103
Baetodes	1	4	SCR	0.034482759
Thraulodes	1	2	CG/SCR	0.017241379
Ambrysus	3	-	Р	-
Cryphocricos	4	-	Р	-
Corydalus	1	6	Р	0.051724138
Cheumatopsyche	2	6	FC	0.103448276
Smicridea	6	4	FC	0.206896552
Stenelmis (A)	1	7	CG/SCR	0.060344828
Stenelmis (L)	1	7	CG/SCR	0.060344828
Microcylloepus (A)	27	2	CG/SCR	0.465517241
Hexacylloepus (A)	5	2	CG/SCR	0.086206897
Macrelmis (L)	2	2	CG/SCR	0.034482759
Macrelmis (A)	7	2	CG/SCR	0.120689655
Neoelmis (A)	2	2	CG/SCR	0.034482759
Dubiraphia (L)	1	5	CG/SCR	0.043103448
Psephenus	8	4	SCR	0.275862069
Chironomidae	2	6	P/CG/FC	0.103448276
Tricladida	10	7.5	Р	0.646551724
Corbicula	1	6	FC	0.051724138
	116	3.73913043		3.362068966

Stream: U.Cibolo Date: 10/8/03 Location: 12857

Argia 9 6 P 0.586956522 Tricorythodes 31 5 CG 1.684782609 Leptohypes 11 2 CG 0.239130435 P 27.102804 Camelobaetidius 2 4 SCR/CG 0.086956522 SCR 7.9439252 Fallceon 1 4 SCR/CG 0.043478261	9 5 2
Leptohypes 11 2 CG 0.239130435 P 27.102804 Camelobaetidius 2 4 SCR/CG 0.086956522 SCR 7.9439252 Fallceon 1 4 SCR/CG 0.043478261	5
P 27.102804 <i>Camelobaetidius</i> 2 4 SCR/CG 0.086956522 SCR 7.9439252 <i>Fallceon</i> 1 4 SCR/CG 0.043478261	2
SCR 7.9439252 Fallceon 1 4 SCR/CG 0.043478261	
	l
CG 47.663551 Isonychia 3 3 FC 0.097826087	7
FC 16.82243 Ambrysus 4 - P -	
SHR 0.4672897 <i>Rhagovelia</i> 11 - P -	
100 <i>Corydalus</i> 2 6 P 0.130434783	}
Cheumatopsyche 7 6 FC 0.456521739)
Chimarra 2 3 FC 0.065217391	
Microcylloepus (A) 4 2 SCR/CG 0.086956522	2
Hexacylloepus (A) 1 2 SCR/CG 0.02173913	
Macrelmis (L) 4 2 SCR/CG 0.086956522	2
Helichus (A) 1 4 SCR/CG 0.043478261	
Chironomidae 6 6 P/FC/CG 0.391304348	}
Tabanus 1 7 P 0.076086957	7
Simulium 4 4 FC 0.173913043	}
Physella 2 9 SCR 0.195652174	ļ
Hyalella 1 8 CG/SHR 0.086956522	2
92 2.28571429 4.554347826	;

Stream: U.Cibolo Date: 10/8/03 Location: 16702

Р	33.928571
SCR	29.910714
CG	27.232143
FC	8.9285714
SHR	0
	100

Species	N=	Tolerance	FFG	НВІ
Argia	4	6	Р	0.244897959
Brechmorhoga	7	6	Р	0.428571429
Erpetogomphus	3	1	Р	0.030612245
Tricorythodes	1	5	CG	0.051020408
Leptohypes	10	2	CG	0.204081633
Fallceon	5	4	SCR/CG	0.204081633
Ambrysus	7	-	Р	-
Cryphocricos	7	-	Р	-
Cheumatopsyche	5	6	FC	0.306122449
Smicridea	1	4	FC	0.040816327
Chimarra	3	3	FC	0.091836735
Microcylloepus	15	2	SCR/CG	0.306122449
Hexacylloepus (A)	4	2	SCR/CG	0.081632653
Macrelmis	10	2	SCR/CG	0.204081633
Neoelmis (A)	1	2	SCR/CG	0.020408163
Psephenus (L)	16	4	SCR	0.653061224
Chironomidae	3	6	P/CG/FC	0.183673469
Tabanus	1	7	Р	0.071428571
Oligochaeta	1	8	CG	0.081632653
Tricladida	8	7.5	Р	0.612244898
	98	2.37931034	·	3.816326531

BIOTIC ASSESSMENT – BENTHIC MACROINVERTEBRATES

Rapid Bioassessment Protocol



Stream: U.Cibolo Date: 9/04/02 Location: 12857	County: Kendall	
Metric	Value	Score
1. Taxa Richness	15	3
2. EPT Taxa Abundance	7	3
3. Biotic Index (HBI)	4.78	2
4. % Chironomidae	0	1
5. % Dominant Taxon	22.7722772	3
6. % Dominant FFG	45.5445545	2
7. % Predators	36.6336634	1
8. Ratio of Intolerant:Tolerant Taxa	0.68	1
9. % of Total Trichoptera as Hydropsychidae	48.9361702	3
10. # of Non-insect Taxa	0	1
11. % Collector-Gatherers	10.3960396	4
12. % of Total Number as Elmidae	2.97029703	4
Aqautic Life Use: INTERMEDIATE	Total Score:	28

Stream: U.Cibolo	Stream: U.Cibolo Date: 9/05/02 Location: 16702 County: Kendall				
	М	etric		Value	Score
1. Taxa Richness				17	3
2. EPT Taxa Abundar		6	2		
3. Biotic Index (HBI)				3.62	4
4. % Chironomidae				0.96153846	4
5. % Dominant Taxon					3
6. % Dominant FFG				37.5	3
7. % Predators					1
8. Ratio of Intolerant:Tolerant Taxa					2
9. % of Total Trichoptera as Hydropsychidae				35	3
10. # of Non-insect Taxa				1	1
11. % Collector-Gathe	19.2307692	4			
12. % of Total Numbe	r as Elmidae			2.88461538	4
Aqautic Life Use: HIC	SH			Total Score:	34

Stream: U.Cibolo	Date: 7/31/03	Location: 12857	County: Ke	ndall
	Metric		Value	Score
1. Taxa Richness			30	4
2. EPT Taxa Abundar	nce		8	3
3. Biotic Index (HBI)			4.47	3
4. % Chironomidae			3.63636364	4
5. % Dominant Taxon			11.8181818	4
6. % Dominant FFG			37.1181818	3
7. % Predators			31.6636364	2
8. Ratio of Intolerant:	Folerant Taxa		1.29	1
9. % of Total Trichopte	era as Hydropsychio	dae	56	2
10. # of Non-insect Ta	axa		2	2
11. % Collector-Gathe	erers		21.6636364	. 3
12. % of Total Numbe	r as Elmidae		10	4
Aqautic Life Use: HIC	SH		Total Score	35

Stream: U.Cibolo Date: 7/31/03 Location: 16702 County: Kendall					
Metric	Value	Score			
1. Taxa Richness	25	4			
2. EPT Taxa Abundance	8	3			
3. Biotic Index (HBI)	3.36	4			
4. % Chironomidae	1.72413793	4			
5. % Dominant Taxon	23.2758621	3			
6. % Dominant FFG	36.3534483	4			
7. % Predators	21.2672414	3			
8. Ratio of Intolerant:Tolerant Taxa	3.74	3			
9. % of Total Trichoptera as Hydropsychidae	100	1			
10. # of Non-insect Taxa	2	2			
11. % Collector-Gatherers	36.3534483	2			
12. % of Total Number as Elmidae	39.6551724	1			
Aqautic Life Use: HIGH	Total Score:	34			

Stream: U.Cibolo	Date: 10/8/03	Location: 12857	County: I	Kendall
	Metric	;	Value	Score
1. Taxa Richness			20	3
2. EPT Taxa Abundar	nce		7	3
3. Biotic Index (HBI)			4.55	2
4. % Chironomidae			5.607476	64 3
5. % Dominant Taxon	1		28.97196	26 3
6. % Dominant FFG			47.66355	14 2
7. % Predators			27.10280	37 2
8. Ratio of Intolerant:	Tolerant Taxa		2.29	2
9. % of Total Trichopt	era as Hydropsychi	idae	77.77777	78 1
10. # of Non-insect Ta	axa		2	2
11. % Collector-Gathe	erers		47.66355	14 1
12. % of Total Number	er as Elmidae		8.411214	95 4
Aqautic Life Use: INT	TERMEDIATE		Total Sco	re: 28

Stream: U.Cibolo Date: 10/8/03 Location: 16702 County: Kendall					
Metric	Value	Score			
1. Taxa Richness	20	3			
2. EPT Taxa Abundance	6	2			
3. Biotic Index (HBI)	3.81	3			
4. % Chironomidae	2.67857143	4			
5. % Dominant Taxon	14.2857143	4			
6. % Dominant FFG	33.9285714	4			
7. % Predators	33.9285714	2			
8. Ratio of Intolerant:Tolerant Taxa	2.38	2			
9. % of Total Trichoptera as Hydropsychidae	66.666667	2			
10. # of Non-insect Taxa	2	2			
11. % Collector-Gatherers	27.2321429	3			
12. % of Total Number as Elmidae	26.7857143	2			
Aqautic Life Use: HIGH	Total Score:	33			

BIOTIC ASSESSMENT – FISH

Species Lists and Preliminary Data Manipulation



Fish Species List

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
U.Cibolo	9/4/02	10007	Blacktail shiner	61		S	-	IF
			Blacktail shiner	19		E	-	IF
			Bluegill	4	SF	E	T	IF
			Bluegill	1	SF	S	Т	IF
			Bullhead Minnow	19		E	-	IF
			Channel Catfish	4		E	Т	0
			Green Sunfish	16	SF	E	Т	Р
			Longear Sunfish	22	SF	E	-	IF
			Longear/Spotted hybrid	1	SF	E	-	IF
			Orangethroat Darter	3	D	E	-	IF
			Red Shiner	9		E	Т	IF
			Red Shiner	24		S	Т	IF
			Redbreast Sunfish	14	SF	E	-	IF
			Spotted Bass	5		E	-	Р
			Spotted Bass	1		S	-	Р
			Stoneroller	24		E	-	Н
			Stoneroller	10		S	-	Н
			Warmouth	1	SF	E	Т	P
			Total	238			•	
							-	

Stream	Date	ID	Species	N=	Туре	Method	Tolerance	Trophic Gp
U.Cibolo	9/5/02	16702	Blacktail shiner	37		S	-	IF
			Bluegill	4	SF	S	-	IF
			Bluegill	15	SF	E	-	IF
			Channel Catfish	4		E	Т	0
			Green Sunfish	5	SF	E	Т	Р
			Green Sunfish	1	SF	S	Т	Р
			Greenthroat darter	4	D	E	1	IF
			Guadalupe Bass	1		E	1	Р
			Guadalupe Bass	4		S	1	Р
			Longear Sunfish	5	SF	E	-	IF
			Longear/Spotted hybrid	1	SF	S	-	IF
			Longear/Spotted hybrid	2	SF	Е	-	IF
			Orangethroat Darter	4	D	E	-	IF
			Pallid shiner	1		S	-	IF
			Redbreast Sunfish	4	SF	E	-	IF
			Redbreast Sunfish	1	SF	S	-	IF
			Redbreast/Spotted Sunfish	1	SF	Е	-	IF
			Redear/Bluegill hybrid	1	SF	S	-	IF
			Rio Grande Cichlid	8		E	-	IF
			Spotted/Orange Spotted Sunfish	4	SF	Е	-	IF
			Spotted/Orange Spotted Sunfish	1	SF	S	-	IF
			Stoneroller	6		Е	-	Н
			Stoneroller	4		S	-	Н
			Warmouth	1	SF	S	Т	Р
			Warmouth	1	SF	Е	Т	Р
		_	Yellow Bullhead	2		E	-	0
		_	Total	122				

KEY:	
SF	Sunfish
)	Darter
SU	Sucker
Ξ	Electroshock
E S	Seine
V	Visually Observed
· Γ	Intolerant
Γ	Tolerant
	Intermediate
)	Omnivore
F	Invertivore
•	Piscivore
H	Herbivore

Stream: U.Cibolo	Species	N=	Type	Method	Tolerance	Trophic Gp.
Date: 7/31/03	Blacktail shiner	2	CY	E	~	IF
Location: 16702	Blacktail shiner	31	CY	S	~	IF
	Bluegill	7	SF	Е	~	IF
	Bluegill	1	SF	S	~	IF
	Central stoneroller	34	CY	Ε	~	Н
	Central stoneroller	5	CY	S	~	Н
1 RGC with growth on body	Gambusia	1		E	Т	IF
	Gambusia	11		S	Т	IF
	Green sunfish	5	SF	Ε	Т	Р
	Green sunfish	2	SF	S	Т	Р
	Greenthroat darter	9	D	Ε	I	IF
	Greenthroat darter	1	D	S	I	IF
	Guadalupe bass	2		Е	1	Р
	Lepomis sp.	2	SF	E	~	IF
	Lepomis sp.	10	SF	S	~	IF
	Longear sunfish	17	SF	Ε	~	IF
	Longear sunfish	6	SF	S	~	IF
	Orangethroated darter	1	D	Ε	~	IF
	Redbreast sunfish	2	SF	Ε	~	IF
	Rio Grande cichlid	4		Ε	~	IF
	Rio Grande cichlid	29		S	~	IF
	Spotted bass	2		Ε	~	Р
	Texas shiner	8	CY	Ε	~	IF
	Texas shiner	28	CY	S	~	IF
	Unknown minnow	29	CY	S	~	IF
	Yellow bullhead	4		Е	~	0

Stream: U. Cibolo Date: 7/31/03 Location: 12857

Species	N=	Type	Method	Toloropoo	Tranhia Cn
Species		Type		Tolerance	
Blacktail shiner	2	CY	E	~	IF
Blacktail shiner	29	CY	S	~	IF
Bluegill	9	SF	E	~	IF
Central stoneroller	44	CY	Е	~	Н
Central stoneroller	150	CY	S	~	Н
Channel catfish	3		E	Т	0
Gambusia	8		S	T	IF
Green sunfish	5	SF	E	Т	Р
Greenthroated darter	4	D	E	I	IF
Guadalupe bass	2		S	1	Р
Lepomis sp.	1	SF	S	~	IF
Longear sunfish	16	SF	E	~	IF
Longear sunfish	2	SF	S	~	IF
Orangethroated darter	11	D	E	~	IF
Orangethroated darter	10	D	S	~	IF
Red shiner	5	CY	E	Т	IF
Red shiner	9	CY	S	Т	IF
Redbreast sunfish	2	SF	E	~	IF
Rio Grande cichlid	1		S	~	IF
Spotted bass	1		E	~	Р
Texas shiner	1	CY	E	~	IF
Texas shiner	3	CY	S	~	IF
Unknown minnow	3	CY	E	~	IF
Unknown minnow	9	CY	S	~	IF
Warmouth	1	SF	E	Т	Р

253

Strean	1: U	.Cibolo
Date:	10/8	3/03
Locati	on:	16702

* 3 greenthroats w/ spots

Species	N=	Type	Method	Tolerance	Trophic Gp.
Blacktail Shiner	1	CY	E		IF
Blacktail Shiner	90	CY	S		IF
Bluegill	2	SF	E	Т	IF
Central Stoneroller	68	CY	E		Н
Central Stoneroller	40	CY	S		Н
Channel Catfish	2		E	Т	0
Green Sunfish	3	SF	E	Т	Р
Greenthroat Darter	7	D	E	I	IF
Greenthroat Darter	2	D	S	I	IF
Guadalupe Bass	3		E	I	Р
Guadalupe Bass	3		S	I	Р
Lepomis sp.	1	SF	E		-
Lepomis sp. Hybrid	4	SF	E		-
Longear Sunfish	10	SF	E		IF
Orangethroat Darter	9	D	E		IF
Red Shiner	1	CY	E	Т	IF
Red Shiner	2	CY	S	Т	IF
Redbreast Sunfish	1	SF	E		IF
Redbreast Sunfish	17	SF	S		IF
Rio Grande Cichlid	6		E		IF
Rio Grande Cichlid	4		S		IF
Roundnose Minnow	80	CY	E	I	0
Roundnose Minnow	51	CY	S	I	0
Texas Shiner	54	CY	S		IF
Warmouth	1	SF	E	Т	Р
Western Mosquitofish	3		E	Т	IF
Western Mosquitofish	34		S	Т	IF
Yellow Bullhead	12		Е		0
	511		297	11	145

Stream: U. Cibolo Date: 10/8/03 Location: 10007

	0		_0.		0
			214		243
					10
Species	N=	Type	Method	Tolerance	Trophic Gp.
Blacktail Shiner	9	CY	E		IF
Blacktail Shiner	146	CY	S		IF
Bluegill	6	SF	E	T	IF
Central Stoneroller	2	CY	E		Н
Central Stoneroller	76	CY	S		Н
Green Sunfish	9	SF	E	Т	Р
Green Sunfish	1	SF	S	T	Р
Longear Sunfish	16	SF	E		IF
Longear Sunfish	1	SF	S		IF
Orangethroat Darter	6	D	E		IF
Orangethroat Darter	1	D	S		IF
Red Shiner	2	CY	E	Т	IF
Red Shiner	10	CY	S	Т	IF
Redbreast Sunfish	21	SF	E		IF
Rio Grande Cichlid	8		E		IF
Rio Grande Cichlid	11		S		IF
Texas Shiner	58	CY	S		IF
Western Mosquitofish	5		E	Т	IF
Western Mosquitofish	25		S	Т	IF
	413		329	28	309

84

^{* 8} blacktails w/ spots

BIOTIC ASSESSMENT – FISH

Indices of Biotic Integrity – Statewide Criteria



Stream: U. Cibolo	Date: 9/4/02 Location: 12857	County: Kend	iali
Category	Metric	Value	Score
Species Richness and Composition	Total number of fish species	13	5
	2. Number of darter species	1	3
	3. Number of sunfish species (exc. bass)	6	5
	4. Number of sucker speices	0	1
	5. Number of intolerant species	0	1
	6. Percentage of individuals as tolerants	24	1
	7. Percentage of individuals as omnivores	2	5
Trophic Composition	8. Percentage of individuals as insectivores	74	3
	9. Percentage of individuals as piscivores	10	5
	10. Number of individuals in sample	238	5
Fish Abundance and Condition	11. Percentage of individuals as hybrids	0.5	3
	12. Percentage of individuals with disease/anomalies	0	5
	Aquatic Life Use: INTERMEDIATE	Total Points:	42

Stream: U. Cibolo	Date: 9/5/02 Location: 16702	County: Kend	iali
Category	Metric	Value	Score
Species Richness and Composition	1. Total number of fish species	17	5
	2. Number of darter species	2	3
	3. Number of sunfish species (exc. bass)	8	5
	4. Number of sucker speices	0	1
	5. Number of intolerant species	2	3
	6. Percentage of individuals as tolerants	10	3
	7. Percentage of individuals as omnivores	5	5
Trophic Composition	8. Percentage of individuals as insectivores	76	3
	9. Percentage of individuals as piscivores	10	5
	10. Number of individuals in sample	122	3
Fish Abundance and Condition	11. Percentage of individuals as hybrids	3	1
	12. Percentage of individuals with disease/anomalies	0	5
	Aquatic Life Use: INTERMEDIATE	Total Points:	42

Stream: U.Cibolo	Date: 7/31/03	Location: 128	57 County: Kend	all
Category	Me	ric	Value	Score
Species Richness and Composition	1. Total # of fish species		18	5
	2. Number of darter species		2	3
	3. Number of sunfish species (exc. bass)	6	5
	4. Number of sucker species		0	1
	5. Number of intolerant specie	3	2	3
	6. Percentage of individuals as	tolerants	9.37	3
	7. Percentage of individuals as	omnivores	0.91	5
Trophic Composition	8. Percentage of individuals as	insectivores	37.8	1
	9. Percentage of individuals as	piscivores	2.11	3
	10. Number of individuals in sa	mple	331	5
Fish Abundance and Condition	11. Percentage of individuals a	s hybrids	0	5
	12. Percentage of individuals v	vith disease/anomolies	0	5
	Aquatic Life Use: INTERMED	ATE	Total Points:	44

Stream: U.Cibolo	Date: 7/31/03 Lo	cation: 16702	County: Kend	lall
Category	Metric		Value	Score
Species Richness and Composition	1. Total # of fish species		16	5
	2. Number of darter species		2	3
	3. Number of sunfish species (exc. bass)	5	5
	4. Number of sucker species		0	1
	5. Number of intolerant species		2	3
	6. Percentage of individuals as tolerants		10.3	3
	7. Percentage of individuals as omnivore	es	1.58	5
Trophic Composition	8. Percentage of individuals as insectivo	res	78.7	3
	9. Percentage of individuals as piscivore	s	4.35	3
	10. Number of individuals in sample		253	5
Fish Abundance and Condition	11. Percentage of individuals as hybrids		0	5
	12. Percentage of individuals with disease	se/anomolies	0.4	5
	Aquatic Life Use: INTERMEDIATE-HIGH		Total Points:	46

Stream: U.Cibolo	Date: 10/8/03 Location: 12857	County: Kend	all
Category	Metric	Value	Score
Species Richness and Composition	1. Total # of fish species	11	5
	2. Number of darter species	1	3
	3. Number of sunfish species (exc. bass)	4	5
	4. Number of sucker species	0	1
	5. Number of intolerant species	0	1
	6. Percentage of individuals as tolerants	14.04358354	3
	7. Percentage of individuals as omnivores	0	5
Trophic Composition	8. Percentage of individuals as insectivores	74.81840194	3
	9. Percentage of individuals as piscivores	2.421307506	3
	10. Number of individuals in sample	413	5
Fish Abundance and Condition	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomolies	0	5
	Aquatic Life Use: INTERMEDIATE	Total Points:	44

Stream: U.Cibolo	Date: 10/8/03 Location:	16702	County: Kend	lall
Category	Metric		Value	Score
Species Richness and Composition	1. Total # of fish species		19	5
	2. Number of darter species		2	3
	3. Number of sunfish species (exc. bass)		7	5
	4. Number of sucker species		0	1
	5. Number of intolerant species		3	5
	6. Percentage of individuals as tolerants		9.486166008	3
	7. Percentage of individuals as omnivores		28.65612648	3
Trophic Composition	8. Percentage of individuals as insectivores		48.02371542	3
	9. Percentage of individuals as piscivores		1.976284585	3
	10. Number of individuals in sample		511	5
Fish Abundance and Condition	11. Percentage of individuals as hybrids		0.782778865	3
	12. Percentage of individuals with disease/and	omolies	0	5
	Aquatic Life Use: INTERMEDIATE	·	Total Points:	44

BIOTIC ASSESSMENT – FISH

Indices of Biotic Integrity – Regional Criteria



Stream:Upper Cibolo	Date: 09/04/02	Location: 12857	County: Kend	dall
	Metric		Value	Score
1. Total number of fish spec	cies		13	5
2. Number of native cyprinic	d species		4	3
3. Number of benthic inverti	vore species		1	3
4. Number of sunfish specie	es		6	5
5. Number of intolerant spe	cies		0	1
6. Percentage of individuals	as tolerants (exc. G. a	iffinis)	24.8	5
7. Percentage of individuals	as omnivores		2	5
8. Percentage of individuals	as insectivores		74	5
9. Percentage of individuals	as piscivores		10	5
10. Number of individuals in	n sample		238	-
a. number of ind/seine h	naul		16	1
b. number of ind/min ele	ectrofishing		9.4	5
11. Percentage of ind. as no	on-native species		5.9	1
12. Percentage of individua	ls with disease/anomal	ies	0	5
Aquatic Life Use: HIGH	_		Total Points:	46

^{*}Average of 10a and 10b

Drainage area upstream of Site 12857 = 72.1 sq. km.

Stream:Upper Cibolo	Date: 09/05/02	Location: 16702	County: Kend	dall
	Metric		Value	Score
1. Total number of fish spec	cies		17	5
2. Number of native cyprinic	d species		3	3
3. Number of benthic invert	ivore species		2	5
4. Number of sunfish specie	es		8	5
5. Number of intolerant spe	cies		2	5
6. Percentage of individuals	s as tolerants (exc. G. a	affinis)	9.8	5
7. Percentage of individuals	as omnivores		5	5
8. Percentage of individuals	as insectivores		76	5
9. Percentage of individuals	as piscivores		10	5
10. Number of individuals in	n sample		122	-
a. number of ind/seine l	naul		9.3	1
b. number of ind/min ele	ectrofishing		4.4	3
11. Percentage of ind. as n	on-native species		4.1	1
12. Percentage of individua	ls with disease/anomal	ies	0	5
Aquatic Life Use: HIGH	-	-	Total Points:	51

2*

Drainage area upstream of Site 16702 = 163.3 sq. km.

^{*}Average of 10a and 10b

Quantitative Biological Scoring for Evaluating Aquatic Life Use Subcategories Based on Fish Regional Criteria (Region 30)

Stream: U.Cibolo (30) Date:7/31/03 Location:12857	County: Kendal	I
Metric	Value	Score
1. Total # of fish species	18	5
2.Total Number of cyprinid species	5	5
3. Number of benthic invertivore species	2	5
4. Number of sunfish species (exc. bass)	6	5
5. Number of intolerant species	2	5
6. Percentage of individuals as tolerants (exc. G.affinis)	6.95	5
7. Percentage of individuals as omnivores	0.91	5
Percentage of individuals as insectivores	37.8	3
9. Percentage of individuals as piscivores	2.7	1
10. Number of individuals in sample	~	~
a. Number of individuals/seine hual	37.3	3
b. Number of individuals/min. electroshocking	7.1	5
11. Percentage of individuals as non-native species	0.6	5
12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: EXCEPTIONAL	Total Points:	53

Drainage area upstream of Site 12857 = 72.1 sq. km.

Stream: U.Cibolo (30) Date: 7/31/03 Location: 16702	County: Kendal	l
Metric	Value	Score
1. Total # of fish species	16	5
2.Total Number of cyprinid species	4	3
3. Number of benthic invertivore species	2	5
4. Number of sunfish species (exc. bass)	5	5
5. Number of intolerant species	2	5
6. Percentage of individuals as tolerants (exc. <i>G.affinis</i>)	2.77	5
7. Percentage of individuals as omnivores	1.58	5
8. Percentage of individuals as insectivores	78.7	5
9. Percentage of individuals as piscivores	4.35	3
10. Number of individuals in sample	~	~
a. Number of individuals/seine hual	25.5	1
b. Number of individuals/min. electroshocking	6.67	5
11. Percentage of individuals as non-native species	0.79	5
12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: EXCEPTIONAL	Total Points:	54
*Average of 10a and 10b		

3*

Drainage area upstream of Site 16702 = 163.3 sq. km.

^{*}Average of 10a and 10b

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

(Region 30)

Stream: U.Cibolo (30) Date: 10/8/03 Location:12857	County: Kendal	l
Metric	Value	Score
1. Total # of fish species	19	5
2.Total Number of cyprinid species	5	5
3. Number of benthic invertivore species	2	5
4. Number of sunfish species (exc. bass)	7	5
5. Number of intolerant species	3	5
6. Percentage of individuals as tolerants (exc. G.affinis)	2.173913043	5
7. Percentage of individuals as omnivores	28.65612648	1
Percentage of individuals as insectivores	48.02371542	3
9. Percentage of individuals as piscivores	1.976284585	1
10. Number of individuals in sample		~
a. Number of individuals/seine hual	49.5	5
b. Number of individuals/min. electroshocking	14.26666667	5
11. Percentage of individuals as non-native species	3.522504892	1
12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: HIGH	Total Points:	46

5*

Drainage area upstream of Site 12857 = 72.1 sq. km.

Stream: U.Cibolo (30) Date: 10/8/03 Location: 16702	County: Kendal	l
Metric	Value	Score
1. Total # of fish species	11	3
2.Total Number of cyprinid species	4	3
3. Number of benthic invertivore species	1	3
4. Number of sunfish species (exc. bass)	4	5
5. Number of intolerant species	0	1
6. Percentage of individuals as tolerants (exc. <i>G.affini</i> s)	6.779661017	5
7. Percentage of individuals as omnivores	0	5
8. Percentage of individuals as insectivores	74.81840194	5
9. Percentage of individuals as piscivores	2.421307506	1
10. Number of individuals in sample		~
a. Number of individuals/seine hual	54.83333333	5
b. Number of individuals/min. electroshocking	5.6	5
11. Percentage of individuals as non-native species	5.084745763	1
12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: HIGH	Total Points:	42
*Average of 10a and 10b		-

5*

Drainage area upstream of site 16702 = 163.3 sq. km.

^{*}Average of 10a and 10b

HABITAT ASSESSMENT

Part I – Stream Physical Characteristics Worksheet



Turk Port II 11/15/02

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

Part I - Stream Physical Characteristics Worksheet Time: Wenther conditions: P. cloudy

Observers: Date: Time: Wenther conditions: P. cloudy
Stream: Apple Cibolo Greek Decation of site: 10007 Length of stream reach:

Stream Type (Circle One): gordunial or intermittent w/ perennial pools Stream Bends: No. Well Defined.; No. Moderately Defined.; No. Poorly Defined. Aesthetics (circle one): (1) wilderness (2) natural (3) common (4) offensive Stream Segment No.: Observed Stream Uses:

No. of Riffles: S Channel Flow Status (circle one); (fig.) moderate low no flow Channel Obstructions/Modifications:

Riparian Vegetation (%): Left Baffk: Trees_Shrubs/O Grasses, Forbs/Cont. Fields/O Other S/Right Bank: Treesro Shrubs/S/Grasses, Forbs/Cult. Fields/O Other 190

Location of	Stream	Left	Left	Salar			6	1	30	Right	Right	Tree	
135611	(m) (A, M	Slope	Potential (%)	of Thalweg	Depth: . 6.1	enm Depms		ounts Across Transect		Slope		Canopy (%)	
	11 hoL	150	ch.	1 1/4	0 1/4	1/4	1 1/4 1	11/2	140	in O	10	0	
Europed wine	Habitat Type (Circle One Kithin Run	(Circle	Dominant Substrate Type	nte Type	ĽŽ	minant Typ ft Bank:	Dominant Types Riparian Vegetation: 40% other 80% F	etation: 40%.	in 30%	77	% Gravel or Larger	Ber	100
	100 1 200		IMESTONE	hodrock	R	ght Bank:	Right Bank: Grasses dolother to%	S 40/014	1,01 m	12	0		200
bridge	Algae or Mnor (Circle One)	ophytes	Width of Natural Buffer Vegetation (m)		Instream Co	ver Types:	Instrum CoverTypes: algae, concrete boulders	CONCINE	te bou	Idens	% Instream Cover	t t	800
	Rare Absent	nomme	LB: K RB: 2								35		000

N

Location of	Stream	Len	1.69	Inches	16.7	H	Total
Transect	Width (m),	Bank Slope (*)	Bank Erosion Potential (%)	A, A, AN, AN,	Stream Depths (m) at Points Across Transect of 9.9 & 9. Sit.	Bank Bank Erosion Slope Potential	Canopy (%)
between north	31911	96	40	61/2 10 9	9 /2 10 11 10/2 11 15 9/2 9 8 90	09) 0	0
and and bridges	Habitat Type One) Riffle R Glide Pool	Clrcle	Dominant Substrate T	Substrate Type	Dominant Types Riparian Vegetation: Left Bank: Survive C. Grac SS CS 6% 7 6% F 80% 0 Right Bank: Syrac SS CS 2% F 45% 0	\$0% 0 % Oravel or Larger F-15% 0 5 0/0	Sec.
	Algae or Mac (Circle One) Abundant C Rare (Absent	rophytes	Width of Natural Buffer	d Buffer Ins	Instream Cover Types: gravel, cut bank	% Instream Cover	15

Location of Transect	Stream Left Wight Bank (m) A Slope	Bank Erosion Potential (%)	40	Thalwag Depth:		(m) at Point , O'è	3 Across Trans	80° 40	66.	Right Stope Stope	Right Bank Erceion Potential (%)	Canopy (%)
between	281" 12	10	_	5 6/2	8 4 3	M	11/2	31/2 3	1/2	94	10	2.0/7
and and 32d bridges	Habitat Type (Circle Oner Kiffe Run Glide Peol	Dominant Substrate Type	nte Type		Dominant Ty Left Bank: Right Bank:	Dominant Types Riparian Vegetation: Left Bank: Sourie C, graces Right Bank: Sumal, Straces	gration: graces	90%0	36	52.5	% Oravel or Larger	b
	Algae or Macrophytes (Circle One) Abundant Common Rare Absents	Width of Natural Buffer Vegetation (m) LB RB: 1	Buffer	Inni	Instrum Cover Types: grove	gravel,	cobble,	, over h	over hanging veg	die	S Instream Cover	
Location of Transect	Sizeana Leff Wideh Bank (m) 1,00 Siope	Bank Eresion Potential (%)	200	.o. 10.	- 2	Streets (m) at Points Across Transect of 18, 18, 18, 18	Acress Trans	61.	33.	Right Stope	Right Bank Erosion Potential (%)	Tree Camopy (%)
between,	435" 16	01	08	1/2 3	0	1/2 0	3 5	0		16	W	0
South bridge	Habitat Type (Clicke One) Riffle Run Glide Beet	Dominant Substrate Type	nte Type		Dominant T. Left Bank: Right Bank:	Dominant Types Riporian Vegention: Left Bank: \$70\SeS Coc. Right Bank: \$00.0	Secution	bermuda) ;	20% 0 3	W 0	% Gravel or Larger	b
	Algae or Macrophyres (Circle One) Algundant Common (Karō Absent	Widtl Vege LB:	Buffer	hal	Insfream Cover Types:		cob	ble, boulder cut bank	Leg.		% Instream Cover	
Location of Transect	Stream Left Width Blank (m) Slope (7)	Left Bank Eresion Potential (%)	07.	1, 19 Thalweg Depth:	1	Stream Depths (m) at Points Across Transect	S Across Trun	nect on on	40	Right Bank Slope	Right Bank Eroston Potential (%)	Canopy (%)
@30m upstream	334" 55		4	4/2 7	9 9	20	36 41/2	316 316	10	53	20	208
of southinest bride	Habitat Type (Circle One) Rith Run Glidy Post	Dominant Substitute Type		John	Dominant T) Left Bank: Right Bank:	Dominant Types Riparian Vegetation: Left Bank: Der et st. A. graz. Right Bank: elen, ch. A. a. be.	Repetation:	7.000	10% 0 40% 8 30% 8 10% 8	25'6 F 10'6 F 18 7/8	% Oravel or Larger	ia .
	Algae or Macrophytes (Circle One) Abundant Common Researchemen	Width of Natural Buffer Vegetation (m)	1 Buffer	less	Instream Cover Types:		evertanging	30	grave		% Instream Cover	ler.

Port Joseph Dollmen

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

Part I - Stream Physical Characteristics Worksheet

Aesthetics (circle one): (1) wilderness (2) natural (3) common (4) offensive Stream; U.C.bols Location of site; 16402 Length of stream reach; 7.7 5m Observers; JW, 57 Date: 419 Pine; Member conditions: 76 Stream Segment No.: _ Observed Stream Uses:

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	Width (m) \$,09	Left Slope Cope	Left Bank Erosion Potential (%)		Thalweg Depth	Septh:	Stream Depths (10), at Points Across Transect 72 1"	at Points As	ross Trans		4.12m	Right Stope (3)	Right Bank Enosion Potential (%)	Canopy (%)
	3.8"	+21	30%	5.0		6,	1,91 "12 "12 "202 "05	" 21"	1.77	35.	15" 1.6"	4.	5%	18.5/12
topts down covered	Habitat Type (Circle Cont. Riffle Run (GEde Pool	(Circle Run	Dominant Substrate Type	Substrate Type	A 14	11:	Si 52 53 53 4" Change Charles Control Control Charles Banks 70% Land Control Control Banks 70% Land Control Co	Sylvarian Veg	The sheet	75/2 (1 5/2)	1 5% of	coth (light	% Oravel or Larger	15 50
down most penic tables	Algae or Macrophytes (Circle One) Abundaut Common Rare & Issen	crophyres ommon	Width of Natural Buffer Vegetation (sn) LB: 12 RB: >20	al Buffer		Instream	Instrant Cover Types: Cobble, Gravel, Boulder, Roots	Bould	0	to		mondy	% Instream Cover	į,

D

Location of Transect	Stream Width (m)	Bank Slope Slope	Left Bank Erosion Potential (%)	~	Thalweg Depth	Depth:	Stream J	Stream Depths (m) nt Points Across Transect) at Points	Across T	masect	5 1187	2	Right Bank Slope	Right Bank Erosion Potential	Canopy (%)
far - dr 459	364"	,91	1/9H	-	.61	62	2 : 47	24" 23" 235" 21" 21" 245" 24" 25	. 7	12 25	50	24.	10	.22	35%	19,4
up han shope	Habitat Type (Circle One) Riffle Run Glide Foot)	(Circle tun	Dominant Substrate Type	rate Type			Domina Left Bar Right B.	Dominant Types Ripardan Vegetation: 367, L.S. 10764 Left Bank: Coffing College Alex 367, L.S. 10764 Right Bank: Cyfreso - 56, L.A. 367, 446, 267, 400	Riparina V	C. C. J.	36 7	L. C. L.	Dominant Types Ripardan Vegetation: 367, L.S. 10% (ruse Left Bank: Contiller 20%, L. J. 30%, alter 20%, dec.	ribre	% Gravel or Larger 70%	Ber.
	Algne or Mac (Circle One) Abundant C Rare Absent	crophytes	Width of Naturn Vegetation (m) LB: 74, RB:	al Buffer		Instream P.	Instream Cover Types:	by, A	Sixu	10	Til	174	Roots, Cobble, Grand, Bulder, Faller Con		% Instream Cover	i.

4 0517

Location of Transect	Stream Width (m) 15	Pank Slope	Left Bank Erosion Potential	- 3	Thalwe	weg Depth:	Stream Depths (III) at Points Across Transect	chs (m) at B	oints Acr	oss Trans		A1 N		Right Bank Slope	Right Bank Erosion Potential (%)	Canopy (%)
	1)26	1	30%	"11"	1 10	1.6°	1.6° 3.5° 1."	1," 56" 5" 4,5" 5" 45" 1	5,	1,8%	5. 4	1 ,5	1		40%	t1/21
65404	Habiter Type (Circle One (Righe Run Glide Pool	Circle Run	Dominant Substrate Type	rate Type	F A		Dominant Types Rivertan Vegetation Shoth Johnson Right Bank: 50 th Johnson Right Bank: 50 th Johnson	So. 2	lan Veget	107.4	62 3	oft.	John		% Gravel or Larger	et.
	Algae or Macrophytes (Circle One) Abundant Common Pore Assents	crophytes common	Width of Natural Buffer Vegetation (m) LB 7.0	nl Buffer		Instrea	Carbolo, Buller, Port , Cost Books	1/1/	2	2	74 Cy	ig.	-		% Instream Cover	b

Daytered - Part I B/26/03

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

Part I - Stream Physical Characteristics Worksheet

12,595/2

Run 1

11000

Charles Je. M.S. Dane (1) Time 5 Weather conditions. Stream work.

Stream Type (Circle One) perennial or intermittent w/ perennial poels Stream Bends: No. Well Defined, ; No. Moderacky Defined, ; No. Poorly Defined. Stream Segment No.: Chterved Stream User. Aesthetics (circle one): (1) wilderness (2) natural (3) common (4) offensive

Channel Obstructions/Modifications: No. of Rifflex: Channel Plow Status (circle ene); high worderable for no flow Riperinn Vegetnton (%): Lett Bruk: Trees_Shrubs_Grasses, Fotbs_Cuit, Fields_Other_ Right Bank: Trees_Shrubs_Grasses, Fotbs_Cuit, Fields_Other_

Lecation of Transact	Strenen Width (mt)	Left Bank Misse	Bank Ercelon Fromfall	The same	weg Depth;	Stream Dapths (ra) at Points Across Thursect Back: Stepe C. O. L.		Right Brack Engloss Potential	Canopy (%)
Annual Control of the	14:1	000	0000	0 40'	000	P 10. 60. 0 0 50. 80. 80. 80.	10	600	0
Bakel and	Habin Type One) Riffle R Olide Fool	in the second	Deminant Substrate Type	atte Type		Dominana Types,Ripatina Vegenniau. Left Bank: SO SOVES SO SOVES SO SOVES	\$	% Gravel or Larget 100%	
3	Algae or Mas (Civile One) Abundank-D Rare Absent	common	Wight of Netural Briff Vegetation (m) LB 5 28:	Buffer	fratter?	States and Cover Types	8	We Instruction Cover	

Location of Transport	Stream Widdh (m)	Left	Left Benk Evalor Forential (%)	Thelverg Dappi	Stream Depths (m) at Polma Acress Transfect 0,45	ilect	Signature	Rank Engles Potential (%)	Tree Canopy (%)
pa	130 100	00	7500	JE : 66. 10,	PR . 15. 06. OF, 18. 0	24 , 35 , 30 , 82	1350	50%	0
between northern t	Habitat Type Oner Hittle B Gibbs Post	Chole	Dominest Sebain	are Type	Dominent Types Ripsrian Vegetaligni Left Bank: 50 0 three 50	"Degrass 96 ofter		% Cravel or Larget	
sna mraga	Alger or Mar (Circle Onch Abundant Rara Abrest	croplaytes	Width of Natural Vegetation (m) LS: 10 RS: O	Beffer	hausem Cover Types Undercent bank also also y	bank tes, onerhans	18	% Instrain Cover	

Legation of Transport	Source Winds (m)	Slepe Slepe	Les Lepton Potreil	Theberg Deeb:	Steman Deptin (no) at Polists Acress Trement Stope Stope	Broth Broslos Potential	Canalys (%)
03	7.2	000	8000	34 34 HB	350 18,34 ,49,51 63 154,49 ,48,31 350	\vdash	0
Service 3rd	Habitet Type (Clinite One) Mills Rem Olife Cost	f (Clivite Rms	Danitsatt Sabatust Type	Substituting	Deniant Types Ripordes Vegenillans Led Bank (3.2 5, 10.55 5 0, 10.47 7 Ripts Bank: (0.0 0, 40.40)	4 Orwel or Largin	10.0
5256110	Alger of Mecrophyces Absorbing Commen Kare Meered	erephyses	With of Nessel Buller Vegrados had UN ₁ O AB: O		benefitzer boulder, undercut		
Lecasion of Trapacca	Sneam Wilds and	Sale Sale Sale Sale Sale Sale Sale Sale	Left Brok Emelon Folgoide 1784	Thebest Day	Steam Depths (std in Polisis Actors Transect Rock Stopes	Blak Bester Peterdisi	Sept.
3	2.9	0	10070	01, 01. 00.	0 10. 50 pg 00. 31. 11. H. JI.	000	٥
Bedween in	Holies Tyre (Cheto Chet Hills) (m. Gilde Paal	genero Jenn	Doubrest Sybrass Type	isomaty.		& Gravel or Larges (DOS)	92.0
Oridges	Algae or Macauphyers Celeia Organica Abresidos Commo Rece Absenti	Seemes .	With al Natural Buffer With an Indian State (1841,0 MB)		comple, boulder, algae, gravel	o hancau Ceres US ² ? _u	
1-position of Transfect	Spream Widels 0m3	Ships	Jeh Bank Breston Peterstol	Theboas Dunhi	Stream Depths (m) at Polluts Across Transect Beyon Steps	Right Potentla	Cataly
050	98	310	75%	PI. CI. 20.	-		(1)
south of	Rashin Trin (Oede Oed Jane Trin Clide Fool	him Shim	Designant Enderson Type Decky Dely	Dedvoole	Demonstrates Marries Masses 25 Corbes Bight Book: 25 Tree. 65 of hear 80 Sorbes	% Owner on Longer 1000%	per .
4th bridge	Algae of Metisphytas (Circle One) Absorbarif, evented Rare Absorb	Kraphytas Catignesi	With af Nexual Buffer Vegetalist (m) LB: (c) (ll: >3.0		hilling Covertypess algae, colobble, macrophytes	& Instream Coros	49
Lecanion of Transact	Will Edit	THE COLUMN	Left Back Shedon Potential (%)	Thelpeg Da	Sterem Depths (mt sc. Pubris Acress Themson) Balook Shope ster	Right Bunk Ereston Perencial (O)	College (September 1987)
	Hebitat Tyne (Circle One) Killsi Ran Gilde Peri	N (Circle Ross	Dendenet Substate Type	ate Type	Daminos Types Riparins Vegetation: Left Buck: Right Rooks	6 Ocerel or Legar	.ni.
	Algore or Mineraphysiss (Chiefe Chief Chief Chief Abundani Chiefe Chiefe Abundani Ante Ababisi	Domental Commental	Walth of Hennel Buffer Vegetation and LB: 755.		Завтана Сечат Тургот:	S frationin Cever	181

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Dydreed Part 11 - Blacks

Send 1 (page) RIGHE III Pool III

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

Part I - Stream Physical Characteristics Worksheet

Stream U.C.b. Location of site; 16-70 L. Length of stream zeachd \$5641 Observers: 4w At? Date: 45 Time: 10 Weather conditions: 5

Adothetics (circle one): (1) wilderness (2) natury) (3) conmon (4) offensive Strenm Segment No.: Observed Strenm Usest

Stream Type (Circle One); persunda) or intermittent or/ persundat pools Stream Bends: No. Well Defined, ; No. Modernely Defined, ; No. Poorly Defined.

Commet Obstructions/Modifications ______ No. of Riffles; __ Channel Flow Sintus (circle one): high-moderate Jow no Slow

Ripatian Vegatation (%): Left Bank: Trees_Shrubs_Grasses, Forbs_Cult, Fields_Other_ Right Bank: Trees_Shrubs_Grasses, Forbs_Cult, Fields_Other_

Stream Depths (ni) At Points Across Tracects Single Single Forestical Canopy Single Forestial (%)	[[] [] [] [] [] [] [] [] [] [Deminant Types Riparian Vegetation. Left Bank. 25 4 4 5 4 4 5 5 6 6 6 5 5 6 6 6 5 6 6 6 6	Institute Over Open 100 to
Left Back Bresion Footnolaid	50% .03	Dominant Substrate Type	With of Natural Buffer Vegstadion (m) LB - FB
Left Bank Slope	130	Rus Rus	erophytes ottomed
Stream Width Imil	5.7	Reheart Calle	Algae or Ma (Circle Ogal) Abundank C Rare Altern
Location of Transact		Tom D. Laws	

Location of Transect	Stream Workh (m)	Leth Brink Sleps	Left Benk Evallen Potental	Steam	Stream Depths (m) at Points Across Transact	Black Brink Slene	Right Bank dresion Potential	Changy (45.)
20	11.9	360	50%	. 35 . 71 . 75 . 83	80. 02. 1C. 21.17. 18. 68.	340	50%	LIAIL
Som	Habitut Type One) Barrie Olide Peel	Run Sun	Donsinent Substrate Type CO10101	Domine Left Bri	ant Types Riparian Vegetation: min GO groups 50 other Bank 10 types 5 Shrub US-const 200	90%	% Oravet or Larget	
رعب ا	Algae or Ma (Circle Oag) Abundant C	crophytes Smenon	Width of Natural Buffer Vegetation (m) LB RB: >20	Instream Cover 7	Month Syrand, colobic months were	. 697	% Introdu Cover	

Lecation of Transect D.S.	Sharm Width (m)	2000 2000 2000 2000 2000 2000 2000 200	Ush Book Enpline Parental (*19	Tietterg Deptic	Streets Depoin first at Policie Agrees Terrinces Street Street Street Street Street Street Street Street	Right Explor		Cheep
50m	5.5		55%0 .01	0,	S. Je. 39. 44. 163. 44. 30. Je. 31		000	2/8/2
upstraum Gram Da	Habitor Typo (Cirels Once Mills Rest Oliffe Peed	(Cleck	Dentitatet Substrate Type		Designant Types Ripscha Vestaulien: School School States Street Sto School School States Sto School School States	4 Chrise	A dinvelor Largor	
	Algae to Massaphyter Kowia Qui Abunfan Camman Abunfan Camman	englyter Jessensa	Wochs of Noseed Bydes Vegetation to the UK, SEC 20		become continued, Stavel, Lobble,	S Jacon	HS.S.	
Location of Transact	Sheens Which ons	Since	Laft Brack Ebelden Procession (2bg	Theberg Digits	Stream Deprits (m) as Polem Across Transcer Steps Steps	M. Might Bank Energy Percential	-	Charge
PA PA	6	Q ²	5000	0.	012 50, 02, 55, 05, 65, 52, 07, 45,	<u> </u>	000	nic
Som	Habita Type (Cleels Oue-Higgs Ren Olde Ped	Keni, Keni,	Dominion Substituting Type To Book clear	2	Designed Dyna Hipatha Vegatigion: Scrass Street Street Street Street Screen Street Screen	& Gine	& Gined or Leges	
Sa week	Algae or Monaghytes IChelle Corty Absociate Consent Rorr Absorb	Sound	Wielt of Nation Buffer Vegetation find 1285,508 ft > 2.0		Cales,	S bear	S Instrum Cover	
Lactition of Transmit	Wide One	THE STATE OF	Left Forestern	Thebeat Death	Stream Depths (m) H Poless Across Transect Holes Single Single Single	-	Rock Resion Potential	Canaly (6)
26	5	00	=	_	33 CO. (1 186 CB. 100) 101 100 CD.	H	26	0
Som	Proton-Bug (Clicks Cont. Amer Non Gilde-Pead	LiClete Sym	Developer Submert Type CO'colol &	2	Let Book Spring Vaporion Colors Colors Colors Right Book Spring 70 cross, Bio Orbital	\$ Out	95010	
from DH	Algue or Meruphysis ICircle Ond Abundani Cerevini Rara Abresi	Ceremon			Sylvately Losophy, Algary, Controson	& Jane	& Battimaters Chooses	
Location of Transect	MAN I	2700	Left Back Stoffen Petendal (%)	Thalwa Dayle	Steams Dayths (m) so Policies Across Thanseett Banker Shapes		Right Back English Potencial (99	all of the
								-
	Hubbat Tyne i Circle Ouch Riffle Ross Gilda Port	E ICInda Ross	Deminant Substitute Type	94	Dunitons Types Riparies Vegetation: Left Bank: Right Back:	& Outs	5 Onerd or Larger	
	Algue or Miscophysts (Cleric One) Abundant Chmenn Have Abenit	Semplotes Commen	Which of Record Buffer Vegetation (m) LR: RB:		Institution Center Types:	S has	S Instrum Cover	

10/00/04

Glide -

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

Part I - Stream Physical Characteristics Worksheet

Observers: JW Mb Date: Time: Weather conditions: Ramy

Stream: Cibalo Location of sire: 1000 Length of stream reach; 200 m

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

Stream Type (Circle One); persunially intermittent w/ persunial 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 Yegeration (%): Left Bank: Trees_ Shrubs_ Grasses, Forbs_ Cult. Fields_ Other_ Right Bank: Trees_ Shrubs_ Grasses, Forbs_ Cult, Fields_ Other_

	DI Sence		Location of Transect
Algae or Macrophytes (Chicke Ope) Abundant Common Rare Absent	Habitat Type (Circle One) Riffie Run Glide Pool	11.14	Stream Width (m)
common	Cun	UT	Left Bank Slope
Width of Natural Buffer Vegetation (in) LB: RB;	Dominant Substrate Type	SL	Left Bank Erosion Potential (%)
l Buffer	beckrack	10,	
		202	(),0% Thalweg Depth:
Instrum		0	Depth:
Instream Cover Types: 04 eV hars NS, alsae, boulder	Dominant Types Riparian Vegetation: Left Bank: 51 Wee 75 SVGSS 20 other Right Bank: 10 3 Y GSS 30 other	0 .03 .00 .00 .00 .00 .00 .00 .00	Stream Depths (m) at Points Across Transect
		38	Right Bank Slope (*)
% Instream Cover	% Gravel or Larger	Ö	Right Bank Brosion Potential (%)
	er er	0	Tree Canopy (%)

Hom svom	northern	D D	Location of Transect
Algae or Macrophytes (Circle Oge) Abundant/Common Rate Abeent	Habitat Type (Circle One) Righe Run Glitte Pool	8,86	Stream Width (m)
rophytes	(Circle	O	Left Bank Slope (*)
Width of Natural Buffer Vegetation (m) LB: SRB:	Dominant Substrate Type	03	Left Bank Erosion Potential (%)
l Buffer	bedrock	118	
		5	6.77 Tiniweg Depth:
Instream		8	
Instream Cover Types:	Dominant Left Bank Right Ban	6,06	Stranın Dej
2.C . D	Types Rip	上京	oths (m) at
alsae, overhans	Dominant Types Riparian Vegeration: Left Bank:	18 .17 .20 .20 ,24 ,27 .25 .39 .	Suvan Depths (m) at Points Across Transect
33	S S	139	s Transect
100	255	(X)	
es, underchi	rass 35 other	80.	
22 X	2	51	Right Bank Slope
% Instream Cover	% Gravel or Larger	0	Right Bank Brosion Potential (%)
er.	ger.	0	Tree Canopy (%)

65/65

P. P. C - 11

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

Part I - Stream Physical Characteristics Worksheet

Observers: My Date: W/6 Time: Wenther conditions:

Stream: U. C.b.lo Location of site: 16757 Length of stream reach: Location Stream Segment No .: Observed Stream Uses: Present Aesthetics (circle one): (1) wilderness (2) matural (3) common (4) offensive

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

Riparian Vegetation (%):
Left Bauk: Trees_ Shrubs_ Grasses, Forbs_ Cult. Fields_ Other_
Right Bank: Trees_ Shrubs_ Grasses, Forbs_ Cult, Fields_ Other_

	0	Zom Love Par		Location of Transect
The same of the sa	Algae or Macrophytes (Circle One) Abundant Common (Rarp)Absent	Habita Type (Circle One) kijfle Run Glide Pool	16.55m	Stream Width (nt)
-	erophytes onnnon	(Circle Run	400	Left Bank Slope
***************************************	Width of Natural Buffer Vegetation (m) LB; RB;	Dominant Substrate Type	20%	Left Bank Erosion Potential (%)
-	al Buffer	unie Type	0.08 0.17 0.04 0.04 0	
			0.12	0.05 Thalweg Depth:
	Instren		0.04	Depth:
	Erawl, Cobble, Leat Rack, Sman	Domir Left B Right	0.04	Stream
	Types:	unt Typ ank: Z Bank: 4	0	Depths
	et 1	Dominant Types Riparian Vej Left Bank: 207, 55, Right Bank: 57, 85 F	0	(m) at Pa
	Pack.	Dominant Types Riparian Vegetation: Left Bank: Zor, 65, 608 Right Bank: 97, 858, 10%	0.00	Stream Depths (m) at Points Across Transect
	× ×	ation:	0.08	oss Tran
	7	15 ashu	009	sect
-	Rest	1	0 100	
	Rest, Algo		0.03	
	Jue		150	Right Bank Slope
	% Instream Cover	% Gravel or Larger	50%	Right Bank Erosion Potential (%)
-		er.	100%	Tree Canopy (%)

Brow DI 30 w 05

Habitat Type (Circle One) Rittle Run Glitle Pool

Dominant Substrate Type

Algae or Macrophytes (Circle One). Abundant Common Rase Absent

Width of Natural Buffer Vegetation (m) LB: RB: -10m

Instream Cover Types: Algae, Grace,

Cottle Overhang Vez, Roots

Right Bank:

104. 70 F

. 20 Other

Z

11.93M

-9

4.017

0.05 0.45 0.63

0.72 0.91 0.80 0.80 0.77 0.74 0.58

0.06

34.

50%

14/17

% Gravel or Larger

% Instream Cover

20%

Right Bank Slope

Right
Bank Erosion
Potential
(%)

Tree Canopy (%)

Dominant Types Riparian Vegetation:

Thalweg Depth:

0.52

Stream Depths (m) at Points Across Transect

Location of Transect

Stream Width (m)

Bank Slope

Left Bank Erosion -Potential (%)

		Legation of Transect	Frank DH	20 mag	20	Location of Transpet	5) men	Som up	Dy	Location of Transect	20 may	Dr. Jon JP		Location of Transoct
Algae or Macrophytes (Chrile One) Abundant Commun Rare Absent	Habitat Type (Circle One) Withe Run Glide Pool	Siction (M)	Algas or Macrophytes (Circle One) Abundant Common Rugi Absent	Habija-Thes (Circle One (Little-Run Glide Pool	4.55m	Siream Width (m)	Algae or Macrophyles (Clicle Coo) Abundant Commun Race Absent	Habitat Type (Circle One) Riffle Run Glide You	9,2m	Cud Whish	Algae or Macrophyres (Circle Onu) Abundant Common Ruce Absent	Habitat Type (Circle One) Riffic Run Glide 260D	8.95m	Stream Width (m)
erophytes	(Circle	Left Rank Slope	nommon	Circle	eg.	Len Dank Slope	antiquing saidilas	(Circle un	36.	Left Bank Stope	minoih	Circle	18.	Len Bank Slope
Width of Natural Buffer Vegetation (m)	Dominant Substrate Type	Left Bank Brosion Potential (%)	Vigith of Natural Buffer Vegetation (m) Lib: RB: 700	Dominant Substrate Type	15010	Left Bank Brosion Perputal (%)	Width of Natural Buffer Vegatation (m) 1.13 RB:	Danifant Substante Type	40%	Bank Erosion Potential	Width of Natural Buffer Vegetation (nn) LB: RB: 720	Dominant Substrate Type.	35%	Loft Bank Exoston Potential (%)
l Buffer	mta Type	Thalwe	Buffer	NIC Type	0.11 0.11	O. W	Buffer	and Type	0.02 0.11	H2'0	Buffer	Type.	0.06 0.08	0.59 Thalweg Depth:
Instrumni Cover Types:	Dominant Types Riparian Vegetation: Left Bunk: Right Bank:	Stream Depths (111) at Points Across Transact	Algan Grand, Cobble, Rost lead Macrophylu	Donithman Types Ripation Vegetation: 52-16-7 Right Bank: 57 807 150+6-7	0.15 0.10 0.10 0.10 0.10 0.10 0.04	Stremn Depths (111) at Points Across Transect Depth:	Algae, Cobbot, Gund, Rod, leaf;	Dondinant Types Ripation Yepetation: Left Dank: 577 807 4 504 6.	0.30 0.29 0.31 6.32 0.38 0.36 0.19 604	אן Stream Depths (נוז) at Points Across Transect Thalweg Depth:	Instrant Cover Types: Algae Le affrace, Root, Grand Over how	Donning Types Riparlan Vegetation: Left Bank: 57 857 15 or her Right Bank: 57 857 10 orly	0.3 0.4 05 0.55 0.61 0.58 0.18 0.07	Stromy Depths (m) at Points Across Transact
		Right Bank Slape (*)			210	Right Bank Slope			110	Right Bank Slope (1)	J. P. Phi		450	Right Hank Slope
% Insucam Cover	% Chavel or Large	Right Bank Erosion Potential (%)	% Insuram Cover	% Gravel or Larger	10%	Right Bank Broston Potential (%)	% Instront Cover	% Gravel or Larger	40%	Right Bank Erosion Potential (%)	% Instream Cover	% Cinvel or Larger	50%	Right Bank Ecosion Potential
Đ.	ž61.	Tree Canopy (%)), 5	11/8:31	Tree Canopy (%)		E.	100%	Tire Canopy (%)		2-7	15.5/17	Tree Curropy (%)

HABITAT ASSESSMENT



Stream name	U.Cibolo 12857
Date of assessment	9/4/2002
Stream bed slope over evaluated reach	0.0076
Approximate drainage area above transect furthest downstream	72km²
Stream order	4
Length of stream evaluated	200m
Number of lateral transects made	5
Average stream width	10.52m
Average stream depth	0.11m
Instantaneous flow	8.61 ft ³ /sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	8m
Maximum pool depth	<0.5m
Total number of stream bends	1
Number of well defined bends Number of moderately defined bends Number of poorly defined bends	0 0 1
Total number of riffles	3
Dominant substrate type	Bedrock
Average percent of substrate gravel sized or larger	31%
Average percent instream cover	34%
Number of stream cover types	7
Average percent stream bank erosion potential	28%
Average stream bank slope	40°
Average width of vegetative buffer	1m
Average riparian vegetation percent composition by: Trees Shrubs Grasses/Forbes Cultivated Fields Other	2% 2.30% 25.40%
Average percent tree canopy coverage	13%
Overall aesthetic appraisal of stream	Common

Stream name	U.Cibolo 16702
Date of assessment	9/5/2002
Stream bed slope over evaluated reach	0.0013
Approximate drainage area above transect furthest downstream	163km²
Stream order	4
Length of stream evaluated	225m
Number of lateral transects made	5
Average stream width	8.16m
Average stream depth	0.36m
Instantaneous flow	1.91 ft ³ /sec
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	6m
Maximum pool depth	>1m
Total number of stream bends	1
Number of well defined bends	0
Number of moderately defined bends Number of poorly defined bends	0 1
Total number of riffles	3
Dominant substrate type	Cobble
Average percent of substrate gravel sized or larger	78%
Average percent instream cover	51%
Number of stream cover types	7
Average percent stream bank erosion potential	40%
Average stream bank slope	17°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	170/
Trees Shrubs	17% 2%
Grasses/Forbes Cultivated Fields	62.50%
Other	18.50%
Average percent tree canopy coverage	87%
Overall aesthetic appraisal of stream	Natural

Stream name	U.Cibolo 12857
Date of assessment	7/31/2003
Stream bed slope over evaluated reach	0.0076
Approximate drainage area above transect furthest downstream	72km²
Stream order	4
Length of stream evaluated	200m
Number of lateral transects made	5
Average stream width	9.16m
Average stream depth	0.18m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	9m
Maximum pool depth	<0.5m
Total number of stream bends	1
Number of well defined bends Number of moderately defined bends Number of poorly defined bends	0 0 1
Total number of riffles	2
Dominant substrate type	Bedrock
Average percent of substrate gravel sized or larger	96%
Average percent instream cover	19%
Number of stream cover types	5
Average percent stream bank erosion potential	49%
Average stream bank slope	36°
Average width of vegetative buffer	10m
Average riparian vegetation percent composition by: Trees Shrubs Grasses/Forbes Cultivated Fields Other	2% 0.00% 33.00% 65.00%
Average percent tree canopy coverage	4%
Overall aesthetic appraisal of stream	Common

Stream name	U.Cibolo 16702
Date of assessment	7/31/2003
Stream bed slope over evaluated reach	0.0013
Approximate drainage area above transect furthest downstream	163km²
Stream order	4
Length of stream evaluated	225m
Number of lateral transects made	5
Average stream width	7.92m
Average stream depth	0.32m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	12m
Maximum pool depth	>1m
Total number of stream bends	1
Number of well defined bends Number of moderately defined bends Number of poorly defined bends	0 0 1
Total number of riffles	3
Dominant substrate type	Cobble
Average percent of substrate gravel sized or larger	93%
Average percent instream cover	35%
Number of stream cover types	7
Average percent stream bank erosion potential	46%
Average stream bank slope	16°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by: Trees Shrubs Grasses/Forbes Cultivated Fields Other	8% 2% 72.00%
Average percent tree canopy coverage	92%
Overall aesthetic appraisal of stream	Natural
the state of the s	

Stream name	U.Cibolo 12857
Date of assessment	10/8/2003
Stream bed slope over evaluated reach	0.0076
Approximate drainage area above transect furthest downstream	72km²
Stream order	4
Length of stream evaluated	200m
Number of lateral transects made	5
Average stream width	8.1m
Average stream depth	0.14
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	11m
Maximum pool depth	0.4m
Total number of stream bends	1
Number of well defined bends	0
Number of moderately defined bends Number of poorly defined bends	<u>0</u> 1
Total number of riffles	1
Dominant substrate type	Bedrock
Average percent of substrate gravel sized or larger	94%
Average percent instream cover	33%
Number of stream cover types	10
Average percent stream bank erosion potential	46%
Average stream bank slope	28
Average width of vegetative buffer	10m
Average riparian vegetation percent composition by:	
Trees Shrubs	<u>1%</u> 2%
Grasses/Forbes	30%
Cultivated Fields	
Other	67%
Average percent tree canopy coverage	8%
Overall aesthetic appraisal of stream	Common

Stream name	U.Cibolo 16702
Date of assessment	10/8/2003
Stream bed slope over evaluated reach	0.0013
Approximate drainage area above transect furthest downstream	163km²
Stream order	4
Length of stream evaluated	225m
Number of lateral transects made	5
Average stream width	9.0m
Average stream depth	0.25m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	12m
Maximum pool depth	0.82m
Total number of stream bends	1
Number of well defined bends Number of moderately defined bends Number of poorly defined bends	0 0 1
Total number of riffles	2
Dominant substrate type	Gravel
Average percent of substrate gravel sized or larger	86%
Average percent instream cover	33%
Number of stream cover types	8
Average percent stream bank erosion potential	36%
Average stream bank slope	28
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by: Trees Shrubs Grasses/Forbes Cultivated Fields Other	7% 1% 80.00%
Average percent tree canopy coverage	94%
Overall aesthetic appraisal of stream	Natural
The second secon	

HABITAT ASSESSMENT



				D / 0///00
Habitat Parameter	Scoring Category		Location: 12857	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	a stable habitat; adequate habitat for maintenance of	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: 3	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 auxillary pockets
Score: 1	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°	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	
Score: 1	3	2	1	0
Riparian Buffer Vegetation	Extensive Width of natural buffer is >20 meters	20 meters	Moderate Width of natural buffer is 5-10 meters	meters
Score: 0	3	2	1	0
Aesthetics of Reach	Wilderness Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	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: 16	INTERMEDIATE			

Habitat Parameter	Scoring Category		Location: 16702	Date: 9/5/02
Available Instream Cover	Scoring Category Abundant	Common	Rare	Absent
Available ilisticatii Cover	>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	30-50% of substrate supports a stable habitat; adequate habitat for maintenance of	10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently	<10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable
	banks, macrophytes			
Score: 4	4	3	2	1
Bottom Substrate Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
	>50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	<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	Moderate	Small	Absent
	Pool covers more than 50% of the channel width; maximum depth is > 1m	Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	No existing pools; only shallow auxillary 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: 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 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: 23	HIGH			

Habitat Baramatar	Sporing Cotogony		Location: 12057	Data: 7/21/02
Habitat Parameter	Scoring Category	0	Location: 12857	Date: 7/31/03
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	a stable habitat; adequate habitat for maintenance of	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	Abundant	Common	Rare	Absent
To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	≥5 riffles	2-4 riffles	1 riffle	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 auxillary pockets
Score: 1	3	2	1	0
Channel Flow Status Score: 2	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 0
Bank Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
Balik Stability	Little evidence (<10%) of erosion bank failure; bank angles average <30°	_	Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	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	
Score: 1	3	2	1	0
Riparian Buffer Vegetation Score: 1	Extensive Width of natural buffer is >20 meters 3	Wide Width of natural buffer is 10.1- 20 meters 2	Moderate Width of natural buffer is 5-10 meters	Narrow Width of natural buffer is <5 meters 0
Aesthetics of Reach	Wilderness	Natural Area	Common Setting	Offensive
Score: 1	Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	Tree and/or native vegetation common; some development	Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
			'	· · · · · · · · · · · · · · · · · · ·
Total Score: 16	INTERMEDIATE			

stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes Score: 3 Solitor Substrate Stability Score: 4 Ausumber of filmes Nouther of signer with substrate substrate in the substrate is uniform type is mine than grave. Distrate, c.e., grevel, cobble, bouters, command substrate is uniform type is gravel or larger substrate, c.e., grevel, cobble, bouters, command substrate is uniform type is gravel or larger substrate; dominant substrate is uniform type is mine than grave. During strate is uniform type is mine than grave. During strate is uniform type is gravel or larger substrate; dominant substrate is uniform type is gravel or larger. Score: 4 A Number of filmes A Abundant Scriffies 4 Abundant Cammon Score: 3 Dimensions of Largeel Pool Channel and be at least as longs as the channel width. depth is > 1m depth is > 1m Abendin Score: 3 Channel Flow Status Water reaches the base or both the lower banks; rs% of channel substrate is exposed or stager. Score: 3 Score: 3 Score: 3 Ghannel Flow Status Score: 3 Score: 3 Score: 3 Score: 3 Channel Flow Status Score: 3 Stable Little evidence (<10%) of erosion bank failure; saller scores bank failure; saller scores on bank failure; saller scores of the same substrate is substrated as removing with the substrated as					
Available Instream Cover Solve is abbartate flavorable for colonization and fision cover; good mix of several stable to cover; good mix of several stable (not new fail or transient); cover types such as mags, cobbis, undercut banks, macrophyses auch as mags, cobbis, undercut banks, macrophyse such as mags, cobbis, undercut banks, macrophyse in the number of different habital disturbed or removed bytes in the composition of disturbed bytes in the composition of the composition of the composition of the composition of th	Hahitat Parameter	Scoring Category		Location: 16702	Date: 7/31/03
2-50% of substrate supports 10-29 9% of substrate supports 10-29 9% of substrate 10-29 9% of s			Common		
Score: 3 Channel Flow Status Score: 3 Channel Flow Status Score: 2 Bank Stability Score: 3 Channel Flow Status Score: 2 Bank Stability Score: 3 Channel Flow Status Score: 2 Bank Stability Score: 3 Channel Flow Status Score: 2 Bank Stability Score: 3 Channel Flow Status Score: 2 Bank Stability Score: 2 Bank Stability Score: 3 Channel Stability Score: 3 Channel Stability Score: 3 Channel Stability Score: 2 Bank Stability Score: 2 Bank Stability Score: 3 Channel Stability Score: 3 Channel Stability Score: 3 Score: 2 Bank Stability Stable Score: 2 Bank Stability Stable Score: 2 Bank Stability Score: 3 Score: 2 Bank Stability Stable Stable Score: 2 Bank Stability Stable Stable Score: 3 Score: 2 Bank Stability Stable Score: 3 Score: 2 Bank Stability Stable Score: 2 Bank Stability Stable Score: 3 Score: 2 Bank Stability Score: 3 Score: 2 Bank Stability Score: 3 Score: 1 Riparian Buffer Vegetation Wilderness Score: 3 Score: 4 Score: 4 Score: 4 Score: 5 S	Available ilisticalii Cover	>50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or	30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in	10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently	<10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable
Stable		snags, cobble, undercut		disturbed or removed	
Score: 4 Score: 5 Score: 6 Score: 7			_	_	-
Number of Rifffles 2-4 riffles 2-4 rif	Bottom Substrate Stability	>50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate	30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	<10% gravel or larger substrate; substrate is uniform
To be counted, riffles must extend x-50% the width of the channel width be at least as long as the channel width Score: 3 Channel Flow Status High Water reaches the base of both the lower banks; c5% of the channel substrate is exposed Score: 2 Bank Stability Score: 2 Score: 3 Channel Stability Score: 3 Channel Stability Score: 3 Channel Flow Status High Water reaches the base of both the lower banks; c5% of the channel; or c25% of channel and/or riffle substrate is exposed Score: 2 Score: 3 Score: 2 Score: 3 Channel Flow Status High Water reaches the base of both the lower banks; c5% of the channel; or c25% of c45%		•			•
Dimensions of Largest Pool Pool covers more than 50% of Pool covers approximately the channel width; maximum depth is > 1m Pool covers approximately 50% or slightly less than the channel width; maximum depth is <0.5 meter depth is <0.5 met	To be counted, riffles must extend >50% the width of the channel and be at least as long				
Pool covers more than 50% of plool covers approximately 55% or slightly less than the depth is > 1m Pool covers approximately 55% or slightly less than the depth is > 1m Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter depth is > 1m Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter depth is <0.5			-		•
Score: 3 Channel Flow Status High Water reaches the base of both the lower banks; <5% of both the lower banks; <5% of channel substrate is exposed substrate is exposed substrate is exposed substrate is exposed	Dimensions of Largest Pool	Pool covers more than 50% of the channel width; maximum	Pool covers approximately 50% or slightly less than the channel width; maximum	Pool covers approximately 25% of the channel width;	No existing pools; only
Water reaches the base of both the lower banks; <5% of channel; or <25% of channel; or <25% of channel available channel and/or riffle available channel and/or stream of the valuable available channel and/or riffle available chash and sallow in the channel and/or riffle available chash and the valuable channel and/or riffle devidence (10-29.9%) of evolution fedos on the natur	Score: 3	3		1	0
Score: 2 Bank Stability Stable Little evidence (<10%) of erosion bank failure; bank angles average <30° Score: 2 Channel Sinuosity Score: 2 Acesthetics of Reach Wilderness Outstanding natural beauty; usually exceptional Score: 2 3 2 1 0 Unstable Large and frequent evidence (<50%) of erosion bank failure; small failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60° None Score: 2 3 2 1 0 Whoderate Score: 1 Riparian Buffer Vegetation Score: 3 Aesthetics of Reach Wilderness Outstanding natural beauty; usually exceptional Score: 2 3 2 1 0 None Straight channel; may be obtained bends present Width of natural buffer is >20 meters Moderate Score: 3 Aesthetics of Reach Score: 3 Aesthetics of Reach Score: 2 3 2 1 0 None Straight channel; may be obtained bends present Width of natural buffer is 10.1- 20 meters Natural Area Tree and/or native vegetation common; some development evidence (10-29.9%) of erosion bank failure; raw areas frequent evidence (>50%) of erosion or bank failure; sommon (30-50%); high potential of erosion during flooding; bank angles average 40-60° None Score: 1 Score: 1 Score: 1 Score: 1 Score: 1 Score: 1 Score: 2 Score: 3 Aesthetics of Reach Wilderness Outstanding natural beauty; usually exceptional Score: 2 Score: 2 Score: 2 Score: 2 Score: 2 Score: 3 Score: 3 Score: 3 Score: 3 Score: 4 Score: 4 Score: 5 Score: 5 Score: 7 Score: 9 Score: 9 Score: 9 Score: 9 Score: 9 Score: 9 Score: 1 Score: 9 Score: 1 Score: 9 Score: 9 Score: 9 Score: 1 Score: 9 Score: 9 Score: 1 Score: 9 Score	Channel Flow Status	Water reaches the base of both the lower banks; <5% of	Water fills <75% of the channel; or <25% of channel	Water fills 25-75% of the available channel and/or riffle substrates are mostly	Very little water in the channel and mostly present in standing pools; or stream is
Little evidence (<10%) of erosion bank failure; bank angles average <30° bank failure; bank angles average <30° bank failure; bank angles average <30° bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9° bank angles average 30-39.9° bank angles average 40-60° bank angles average 40-60° bank angles average 40-60° bank angles average >60° bank; bank angles average 40-60° bank angles average >60° bank; bank angles average >60° bank angles a	Score: 2	3	2		
High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present Score: 1 Riparian Buffer Vegetation Score: 3 Aesthetics of Reach Wilderness Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional Score: 2 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present Wide None Straight channel; may be channelized Narrow Width of natural buffer is 10.1- weters Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional Score: 2 Natural Area Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid Score: 2 None Straight channel; may be Straight channel; may be devhance in the straight channel; may be straight channel; may be straight channel; may be straight channel; may be dephance in the present Narrow Width of natural buffer is 5-10 Width of natural buffer is 5-10 Moderate Narrow Width of natural buffer is 5-10 Width of natural buffer is 5-10 Motorfensive; area is developed, but uncluttered such as in an urban park; water clarity may be slightly turbid or discolored Score: 2 3 2 1 Common Setting Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored water clarity is usually turbid or discolored water clarity is usually turbid or discolored	Bank Stability	Little evidence (<10%) of erosion bank failure; bank	Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles	Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles	Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank
≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present Score: 1					
Riparian Buffer Vegetation Extensive Width of natural buffer is >20 meters Score: 3 Aesthetics of Reach Wilderness Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional Score: 2 Wide Width of natural buffer is 10.1- Width of natural buffer is 5-10 meters 1 Common Setting Not offensive; area is developed, but uncluttered such as in an urban park; water clarity is usually turbid Width of natural buffer is 5-10 meters Offensive Stream does not enhance the avelepoped, but uncluttered such as in an urban park; water clarity may be turbid or discolored Score: 2 3 2 1 Common Setting Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored Score: 2 1 Oometers 1 Oometers Oimeters Oimeter	Channel Sinuosity	≥2 well-defined bends with deep outside areas (cut banks) and shallow inside	1 well-defined bend OR ≥3 moderately-defined bends	<3 moderately-defined bends OR only poorly-defined bends	Straight channel; may be
Width of natural buffer is >20 meters Score: 3 Aesthetics of Reach Wilderness Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional Score: 2 Width of natural buffer is 10.1- Width of natural buffer is 5-10 meters To meters Others Common Setting Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be slightly turbid Score: 2 Width of natural buffer is 5-10 meters Midth of natural buffer is 5-10 meters Midth of natural buffer is 5-10 meters Offensive Stream does not enhance the acethetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored Score: 2 1 Offensive Stream does not enhance the acethetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored					
Aesthetics of Reach Wilderness Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional Score: 2 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 turbid or discolored Common Setting Not offensive Stream does not enhance the aesthetics of the area; cluttered; highly developed; water clarity may be turbid or discolored Score: 2 1 Offensive Stream does not enhance the developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored water clarity may be turbid or discolored or discolored Offensive Stream does not enhance the developed, but uncluttered such as in an urban park; water clarity may be a dumping area; water clarity is usually turbid or discolored	Riparian Buffer Vegetation	Width of natural buffer is >20 meters	Width of natural buffer is 10.1- 20 meters	Width of natural buffer is 5-10	Width of natural buffer is <5 meters
Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional Score: 2 Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be turbid or discolored Score: 2 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 1 Outstanding natural beauty; usually developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored				-	
		Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Total Score: 23 HIGH			2	1	0

Habitat Parameter	Scoring Category		Location: 12857	Date: 10/08/03
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	a stable habitat; adequate habitat for maintenance of	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: 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 auxillary pockets
Score: 1	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°	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	
Score: 1	3	2	1	0
Riparian Buffer Vegetation	Extensive Width of natural buffer is >20 meters	20 meters	Moderate Width of natural buffer is 5-10 meters	meters
Score: 2	3	2	1	0
Aesthetics of Reach	Wilderness Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	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: 17	INTERMEDIATE			

Habitat Parameter	Scoring Category		Location: 16702	Date: 10/8/03
	Scoring Category	C		
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	supports stable habitat; habitat availability less than desirable; substrate frequently	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	Moderately Stable	Moderately Unstable	Unstable .
,	>50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	<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	Moderate	Small	Absent
	Pool covers more than 50% of the channel width; maximum depth is > 1m	Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	No existing pools; only shallow auxillary 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: 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: 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 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: 21	HIGH			